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October---December, 1889.

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The TRANSACTIONS Of the Ottawa Field-Naturalists' Club

(Organized March, 1879. Incorporated March, 1884.)

CONTENTS.

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Monthly parts, 10 cents each; to members, 4 cents.

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NOTICE.—The Treasurer begs to call the attention of members to the advertisements.

EDITORIAL.

Collecting in most of the branches of Natural History has now come to an end for the season. The naturalist, however, must never rest on his oars. There is much to do even now. The collections of the past season have to be sorted out and arranged, new discoveries or rare species must be put aside for description or for exhibition at the winter soirees. This, too, is a branch of our work which is much neglected by members. There is always time at the evening meetings for a short chat before or after the lectures, and if workers in different branches of natural history would each time bring a few of their remarkable captures for exhibition and discussisn at the soirees it would add largely to the interest and would certainly cause these agreeable reunions to be better attended.

There are very few cities which equal Ottawa in the advantages which it offers for scientific study and relaxation. The Geological and Natural History Survey, with its grand museum and large staff of active naturalists, of course first demands mention. The museums of the Department of Fisheries, the Ottawa Literary and Scientific Society and the Normal School, as well as the various private collections of our own members, render it uunecessary, in most lines of study, for the beginner to be hampered by the great trouble and expense of sending his material away for identification. Besides the above advantages, there are opportunities right through the winter, at least once a week, of hearing lectures upon scientific subjects. The programme of the Club Lectures is presented herewith, and I think most will agree that it is one of the best programmes we have ever had offered to us. In addition to our own lectures, which will of course be published in the NATURALIST, I purpose recording during the present winter the proceedings of the Ottawa Literary and Scientific Society. In the present number will be found Mr. H. B. Small's excellent address as President for the current year, which I feel sure will be read with pleasure by all of our subscribers.

The Treasurer begs to request those members who have not already paid their subscriptions to do so as soon as conveniently possible. The subscription is necessarily payable in advance so as to meet the ex-

penses of publication and postage, which have to be paid promptly at the time of issue of each number of the OTTAWA NATURALIST. The annual subscription of $1 is fixed at that low figure on the estimate that all will pay up before the end of the year. There is no wish on the part of the Council to have a balance in hand, and if by obtaining a larger number of members more money comes into the treasury, the policy of the past will be followed of enlarging the magazine and lowering the price of the excursion tickets, so as to give the members as much as possible for their money. If members will be good enough to send their subscriptions to the treasurer, instead of waiting until an application is made, they will save that officer much trouble and the club the expense of postage. JAMES FLETCHER, *Editor.*

———:o:———

AMERICAN ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE.

The thirty-eighth annual meeting of this flourishing association was held in Toronto, beginning on 27th August and lasting for a week. The meeting was an unqualified success. The Toronto people outdid themselves in hospitality to their visitors, who went home enthusiastic in their praises of the courtesies extended to them. Many valuable papers were read in the various sections and clubs. It is pleasing to notice that Canadians did their share to make the meetings interesting. The Botanical and Entomological Clubs held regular meetings in the new biological laboratory of Toronto University. Perhaps one of the most interesting lectures was a demonstration by Prof. Ramsay Wright of his method of teaching natural science.

As an outcome of the meetings and discussions of the Entomological Club, a permanent association or union was formed for the special consideration of economic and agricultural entomology. This organization, which will be known as the Association of Official Economic Entomologists, will meet annually, and the discussions will be confined entirely to the operations of injurious and beneficial insects. The officers for the year are as follows: President, Prof. C. V. Riley, United States Entomologist; Vice President, Prof. S. A. Forbes, State Entomologist of Illinois; Secretary, Prof. J. B. Smith, Entomologist of the New Jersey Agricultural Experiment Station. The first meeting of this association was held at Washington, on 12th Nov., and the proceedings are to be published in the next number of *Insect Life.*

Ottawa Field Naturalists' Club

PROGRAMME

For the Winter of 1889-1890.

SOIREES:

1889.

Dec. 13.—Inaugural Address, (Geological Progress in Canada.) Dr. Ells.

1890.

Jan. 10.—The Mistassini Region.....Mr. A. P. Low.
The Serpentines of Canada.....Mr. N. J. Giroux.

Jan. 24.—The Yukon Country .....Mr. McConnell.
Glaciation in America..... Dr. A. C. Lawson.

Feb. 7.—Some Geological facts observed on a trip to the Straits of Belleisle.....Dr. Selwyn.
A Bird in the Bush ..... Mr. W. A. D. Lees.

21.—Some notes on the English Sparrow.....Mr. J. Ballantyne.
The Wolf.....Mr. Lett.

Mar. 7.—On some of the larger unexplored portions of Canada.....Dr. G. M. Dawson.
A Naturalist in the Gold Range, B.C...Mr. J. M. Macoun.

13.—Reports of the Leaders of Branches.

MONDAY AFTERNOON POPULAR LECTURES.

Jan. 13.—Geology (Volcanoes and their associated phenomena).....Dr. Ells.

20.—Palæontology.....Mr. W. R. Billings.

27.—Botany.....Mr. W. Scott.

Feby. 3.—Botany.....Mr. J. M. Macoun.

10.—Zoology.....Mr. J Ballantyne.

17.—Ornithology:.....
24.—Ornithology..... } Mr. W. A. D. Lees.

Mar. 3.—Entomology.....Mr. T. J. McLaughlin.

10.—Conchology.....Rev. G. W. Taylor.

THE LAND SHELLS OF VANCOUVER ISLAND.

By Rev. Geo. W. Taylor.

Very little attention seems to have been given by conchologists to the land and fresh water shells of the extreme western portion of the Dominion. Many very full lists of eastern Canadian shells, and others more or less complete, of the mollusca of the prairie provinces, have been published; but, so far as I know, only one person (Mr. J. K. Lord) has attempted to enumerate the land shells of our Pacific coast, and his list, published in "The Naturalist in Vancouver Island," 1866, is very incomplete, containing the names of seven species only.

My own collecting in Vancouver Island, although it has extended over a period of seven years, has not been by any means exhaustive. In fact I have only examined four localities, and these comparatively near together, and all on the east coast of the island:—

1. Victoria, at the south-eastern extremity of the island;

2. Saanich, twenty miles north of Victoria;

3. Salt Spring Island, a small island about a mile from the coast of Vancouver Island and a little to the north of Saanich;

4. Comox, a settlement about 140 miles north of Victoria, but also on the east coast of Vancouver Island.

In these four localities, however, I have succeeded in finding thirty species of terrestrial mollusca, which form the subject of the present paper, and twenty-six species of fresh water shells, which I propose to enumerate in a subsequent contribution to this journal.

The list of Vancouver Island land shells that here follows contains the names of thirty-two species; thirty of these, as above stated, have been taken by myself. Of the other two, one, *Onchidella Carpenteri*, W.G.B., is added on the authority of Dr. W. G. Binney, and might probably have been found by me had my search been more thorough. The other, *Arionta Dupetithouarsi*, is recorded from Vancouver Island by J. K. Lord, but my own impression is that the shell was collected in California and accidentally mixed with the Vancouver collection, as no trace of this species has been discovered on the island by anyone

else. Mr. Lord also took home to England a specimen of *Orthalicus zebra*, a Central American shell which he said he had taken alive on Vancouver Island. I have seen the specimen itself in the British Museum, but I cannot think that the species is indigenous on Vancouver Island.

LAND SHELLS OF VANCOUVER ISLAND.

1. *Selenites Vancouverensis*, Lea. sp.
2. " *sportella*, Gould, sp.
3. *Limax agrestis*, Linn.
4. " *hyperboreus*, Westerlund.
5. *Hyalina arborea*, Say, sp.
6. " *milium*, Morse, sp.
7. " *Binneyana*, Morse.
8. " *conspecta*, Bland, sp.
9. *Conulus fulvus*, Müller, sp.
10. *Vitrina Pfeifferi*, Newcomb.
11. *Patula striatella*. Anthony, sp.
12. " *asteriscus*, Morse, sp.
13. *Microphysa Lansingi*, Bland, sp.
14. " *Stearnsii*, Bland, sp.
15. " *minutissima*, Lea, sp.
16. *Ariolimax Columbianus*, Gould, sp.
17. *Prophysaon Hemphilli*, Bland and Binney.
18. *Stenotrema germanum*. Gould, sp.
19. *Mesodon Columbianus*, Lea, sp.
20. " *devius*, Gould, sp.
21. *Aglaja fidelis*, Gray, sp.
22. *Arionta Dupetithouarsi*, Deshayes, sp.
23. *Pupilla corpulenta*, Morse, sp.

24. *Vertigo ovata*, Say.
25. " *simplex*, Gould, sp.
26. *Ferussacia subcylindrica*, Linn. sp.
27. *Succinea rusticana*, Gould.
28. " *Nuttalliana*, Lea.
29. " *Oregonensis*, Lea.
30. *Onchidella Carpenteri*, W. G. Binney.
31. " *borealis*, Dall.
32. *Carychium exiguum*, Say, sp.

In the foregoing list several species will be recognized as common European forms, namely, *Limax agrestis*, *Conulus fulvus*, *Ferussacia subcylindrica*, and in the opinion of some conchologists the following American and European species are also identical :—

AMERICAN.		EUROPEAN.
Macrophysa minutissima, Lea,	=	*pygmæa*, Drap.
Vertigo ovata, Say,	=	*antivertigo*, Drap.
" *simplex*, Say,	=	*edentula*, Drap.
Carychium exiguum, Say,	=	*minimum*, Müll.

As, however, there is a little uncertainty on these points, I prefer for the present to use the earliest American names.

The seven species just mentioned occur also in the eastern parts of Canada, and with the five following find a place in the Ottawa lists : *Hyalina arborea*, *Hyalina milium*, *Hyalina Binneyana*, *Patula striatella*, *Patula asteriscus*. There are thus twelve species out of thirty-two common to Ottawa and Vancouver Island. The remaining twenty species are all purely western forms, with the single exception of *Pupilla corpulenta*, which is recorded from Nevada and Colorado.

NOTES.

1. SELENITES VANCOUVERENSIS, Lea, sp.

Helix Vancouverensis, Lea. Am. Phil. Trans., VI, 87, pl. xxiii, f. 72 (1839) = *H. vellicata*, Forbes.

Common and distributed over the whole island. When fully adult the peristome is sometimes almost as much depressed above as in *sportella*.

2. SELENITES SPORTELLA, Gould, sp.

Helix sportella, Gould, Proc. Bost. Soc. Nat. Hist., ii, 167. (1846)

Occurring with the last species at Saanich, Comox and Salt Spring Island, but absent from the district round Victoria. As regards its shell it seems abundantly distinct from *Vancouverensis;* at any rate it is a well marked form, and as such deserves a name. It differs from the last species in being constantly smaller and more strongly striated, and in having a much more open umbilicus. The dimensions of this species and of *S. Voyana*, as given in Binney's Manual, seem to be incorrectly printed.

3. LIMAX AGRESTIS, Linné, Syst. Nat. ed. x, I, 652 (1758).

Introduced, I suppose from Europe, a few years ago, and now a great pest in the Victorian gardens. It has not yet spread far into the country districts, but no doubt such extension is only a matter of time.

4. LIMAX HYPERBOREUS, Westerlund.

I collected some small blackish slugs at Comox in May, 1887, of which I sent some specimens to Dr. W. G. Binney. He referred them doubtfully to this species. In his "Second Supplement to the 5th volume of the Air-breathing Mollusks of the United States," p. 42, Dr. Binney mentions the receipt of a Limax from Seattle, Washington Territory, similar to *hyperboreus* in outward appearance and in the dentition.

5. HYALINA ARBOREA, Say, sp.

Helix arborea, Say, Mich. Encyc., pl. iv, fig. 4. (1816).

Very common everywhere. Cannot be distinguished from eastern specimens.

6. HYALINA MILIUM, Morse, sp.

Helix milium, Morse, Proc. Bost. Soc. VII, 28, (1859).

Not rare among fallen leaves and moss.

7. HYALINA BINNEYANA, Morse, Journ. Portl. N. H. Soc., I, 13, fig. 25, 26; and pl. ii, fig. 9; pl. vi, fig. 27. (1864).

Not common. I am not very confident that this is the true *Binneyana*. Specimens collected by me have been seen by Dr. Binney, who considered them to be *H. viridula*, and has so recorded them in Bull. Mus. Comp. Zool. Cambridge, vol. XIII, p. 42. Dr. Dall, however, named other specimens from the same lot *Binneyana* after comparison with typical specimens in the Smithsonian collection. My shells are very different in colour to those I have always received as *viridula*, and neither do they agree exactly with Binney's figure of *Binneyana*, though they are more like the shells that receive the latter name in Ottawa collections. It is just possible that the Vancouver shells may belong to a distinct species.

8. HYALINA CONSPECTA, Bland, sp.

Helix conspecta, Bland, Ann. N. Y. Lyc, VII, 163, fig. 7. (Nov. 1865).

Alaska to California. Next to *striatella* and *arborea* this is the commonest of the smaller land shells in Vancouver Island. It occurs everywhere under logs and stones and among decaying leaves.

9. CONULUS FULVUS, Müller, sp.

Helix fulva, Müll. Verm. Hist., pt. II, p. 56. (1774) = *H. chersina*, Say, + *H. egena*, Say.

Circumpolar. Common. The specimens I have collected in Vancouver Island are the finest I have seen; larger than any I have taken in England or in Eastern Canada.

10. VITRINA PFEIFFERI, Newcomb, Proc. Cal Acad. Nat. Sci., II, 92. (1861)

Not common, but widely distributed. Occurs usually under stones. I have never found it in colonies like *limpida*.

11. PATULA STRIATELLA, Anthony, sp.

Helix striatella, Anth. Bost. Jour. Nat. Hist., III, 278, pl. iii, f. 2. (1840)

Very common.

12. PATULA ASTERISCUS, Morse, sp.

Helix asteriscus, Morse Proc. Bost. Soc. Nat. Hist., VI, 128. (1857).

Not rare at Comox, May 1887, among fallen and decaying leaves. I have not found it elsewhere on Vancouver Island. Occurs also in eastern parts of America.

13. MICROPHYSA LANSINGI, Bl nd, sp.

Zonites Lansingi, Bland, Ann. Lyc. N. H. of N. Y., XI, 74, fig. 1, 2. (1875).

Described from Astoria in Oregon. It is not uncommon in Vancouver Island, and I have found it in all the localities I have examined. At Comox and Salt Spring Island, however, the next species is the more plentiful.

14. MICROPHYSA STEARNSI, Bland, sp.

Zonites Stearnsi, Bland, Ann. Lyc. N. H. of N. Y., XI, 76, fig. 3. (1875)

This rare shell can easily be distinguished from *Lansingi* by its larger size, darker color, and the absence of the lamella on the peristome. I have only found it at Comox and

Salt Spring Island, where it occurs not uncommonly with *Lansingi* under leaves and under pieces of maple bark in the woods. This species was first found in Oregon and Washington Territory.

15. MICROPHYSA MINUTISSIMA, Lea, sp.

Helix Minutissima, Lea, Trans. Am. Phil. Soc. IX, 17. (1841)

? = Helix pygmæa, Drap. Tab. Moll. p. 93. (1801)

Common under dead leaves in woods. There seems still to be a doubt as to the identity of this species with the European *H. pygmæa*, Drap. My Vancouver Island specimens do not appear to me to agree well with those I have collected in England.

16. ARIOLIMAX COLUMBIANUS, Gould, sp.

Limax Columbianus, Gould, in Terr. Moll., II, 43, pl. lxvi, fig. 1. (1851).

Pacific Coast, British Columbia, to California. Common, growing to a very large size. Around Victoria the specimens are generally spotted and blotched with black, but at Comox the unicolorous variety is more common. The eggs of this species, which are as large as good sized peas, are often found under logs or bark during the winter.

17. PROPHYSAON HEMPHILLI, Bland and Binney, Ann. Lyc. N. H. of N. Y., X, 293, pl. xiii, fig. 8. (1873)

The commonest slug in Vancouver Island and recognized at once by the two blackish lines that border the mantle. It may be found under logs and stones and among leaves all over the island. It also occurs in Oregon and California.

18. STENOTREMA GERMANUM, Gould, sp.

Helix germana, Gould, U. S. Expl. Expd. Moll., (1852), p. 70, fig. 40, *a*, *b*, *c*.

Not common, but occurring in all the localities I have searched. It is a much smaller shell than the next species, and is of a richer chestnut color. Specimens usually occur singly, and I have never found more than two under the same log. *Columbianus*, on the contrary, is generally in colonies. *Germanum* seems to be a species of limited range, the only locality named in "Binney's Manual" being Astoria, in Oregon.

19. MESODON COLUMBIANUS, Lea, Sp.

Helix Columbiana, Lea, Am. Phil. Soc. Trans., VI, 89, pl. xxxiii. fig. 75.

= *H. labiosa*, Gould.

Abundant among leaves and under logs. Occasionally specimens occur with an indication of a parietal tooth. I have twice taken specimens with the shell of a grayish white colour. Occurs from Sitka to California.

20. MESODON DEVIUS, Gould, sp.

Helix devia, Gould, Proc. Bost. Soc. N. H., II, 165. (1846)

I have only seen one specimen of this species from Vancouver Island, and that was taken at Esquimalt, near Victoria. The specimen was sent to Dr. W. G. Binney, who agreed in the identification. *Devius* is not uncommon in Oregon, and was therefore to be expected in Vancouver Island.

21. AGLAJA FIDELIS, Gray, sp.

Helix fidelis, Gray, Proc. Zool. Soc., July, 1834, 67.

= *H. Nuttalliana*, Lea.

Common in woods. The shell sometimes nearly black, occasionally very pale greenish white and almost transparent. This species roams abroad in wet weather in the spring and autumn after the manner of the European *Helices*.

22. ARIONTA DUPETITHOUARSI, Deshayes, sp.

Helix Dupetithouarsi, Desh. Rev. Zool., 1839, 360.

= *H. Oregonensis*, Lea.

This species is entered here simply on the strength of the record by Lord mentioned above. I have not myself seen in Vancouver Island any trace of this shell, or indeed of any other *Arionta*. *Arionto Townsendiana*, Lea, sp., is, however, common on the mainland of British Columbia, but has not as yet turned up on the island. *Dupetithouarsi* is a native of Monterey, California, and a few other places in the same region.

23. PUPILLA CORPULENTA, Morse, sp.

Isthmia corpulenta, Morse, Ann. N. Y. Lyc., VIII, 210, fig. 7 (Nov. 1865).

Not rare in moss and among leaves. Also found in company with *Vertigo simplex*, as described below. This is a species that was hardly to be expected in Vancouver Island, its headquarters being in Nevada and Colorado, but I believe my specimens are correctly determined.

24. VERTIGO OVATA, Say, Journ. Acad. Nat. Sci. Phil., II, 375. (1822).

+ *Pupa modesta*, Say.

= *V. tridentata*, Wolf.

Only taken in one locality near Victoria. This was on the margin of a swamp (since drained) about four miles from the city. The specimens were under leaves close to the water's edge. It is an eastern species not before quoted from the Pacific province. Dr. Gwyn Jeffreys considered this species identical with the British *Vertigo antivertigo*, Drap.

25. VERTIGO SIMPLEX, Gould, sp.

Pupa simplex, Gould, Bost. Journ. Nat. Hist., III, 403, pl. iii, fig. 21 (1840).

I have found this species in moss in many localities, but not plentifully. In May, 1887, however, I found it, together with *Papa corpulenta*, in great abundance on the fronds of a fern, *Aspidium munitum*. This was at Comox, but I afterwards found it in the same situation in other localities. The *Aspidium*

grows most luxuriantly in damp places all over the island, and few plants that I have examined at the right season of the year have been without one or more of the Vertigos. This species is referred by Jeffreys to *Vertigo edentula*, Drap., of Europe.

26. FERUSSACIA SUBCYLINDRICA, Linn., sp.

Helix subcylindrica, Linn. Syst. Nat. ed. 12, II, 1248. (1766)

= *lubrica*, Müller.

= *lubricoides*, Stimpson.

= *Morseana*, Doherty.

This widely distributed species occurs, but not very abundantly, in all the localities I have examined, generally under stones or logs, often in very exposed situations.

27. SUCCINEA RUSTICANA, Gould, Proc. Bost. Soc. N. H., II, 187. (Dec. 1846).

The three species of *Succinea* here recorded seem to be distinct, although it is not easy, to my mind, to distinguish between the young specimens. *Rusticana* has only occurred to me at Comox.

28. SUCCINEA NUTTALLIANA, Lea, Proc. Am. Phil. Soc., II, 32. (1841).

Common at Victoria.

29. SUCCINEA OREGONENSIS, Lea, Proc. Am. Phil. Soc., II, 32. (1841).

Common at Victoria. These three Succineas occur throughout the "Pacific province."

30. ONCHIDELLA BOREALIS, Dall, Am. Journ. Conch., VII, 135. (August, 1866).

This species is common near Victoria on rocks close to high water mark, but is very likely to escape notice unless specially sought for. It was found by Dall from Alaska to Vancouver Island.

31. Onchidella Carpenteri, W. G. Binney, Proc. Ac. Nat. Sci., Phil., 1860, 154.

Not taken by myself, but said by Binney to occur from Straits of Fuca to Gulf of California. As nearly all the mollusca recorded from the Straits of Fuca have also been found on the Vancouver coasts, it is most probable that this also occurs there. It is much smaller than *O. borealis*, and hence may have escaped my notice.

32. Carychium exiguum, Say, sp.

Pupa exiqua, Say, Journ. Acad. Nat. Sci., II, 375. (1822).

? = *C. minimum*, Müll. Verm. Hist. pt. II, p. 125. (1774).

Common at Comox and Salt Spring Island, but not observed near Victoria.

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DEVELOPMENT AND PROGRESS.

(An Inaugural Address delivered by Mr. H. B. Small, President of the Ottawa Scientific and Literary Society, 14th November, 1889.)

The above was the subject of a comprehensive paper showing the rapid strides development and progress have made in science and literature during the latter part of the nineteenth century.

After reviewing various matters in connection therewith, the lecturer based the existence of everything that caused development on the use of the solar power either directly or indirectly, and the existence of this he traced through the various channels conveying it.

The following extracts afford to our readers the main portions of the lecture :

Applied science is built upon the long and unrequited labor of students. The steamship, the railway, the telegraph, the telephone and nearly every invention of the age, are due to the patient observation and collection of facts which at one time appeared to have no practical bearing. It is perhaps difficult to get even a misty glimpse of the practical utility of some investigations, such as those in archœology and philology, but the fascinating interest of some of the conclusions arrived at, or to be reached, have at least a value in developing the human mind which money cannot measure. We are apparently on the eve of startling discoveries in astronomy which it is easily conceivable may have a bearing on material affairs, This is true in a far greater measure of meteorology, geology and chemistry, in all of which the data accumulated are great, and the problems awaiting solution are of an intensely practical nature. Physiology and its kindred sciences have not only in recent years added to the fairy tales of science, but have opened new fields of great promise and consequence. Intensely interesting, and suggestive of great results to the human race, are the recent discoveries in regard to cell-life. The anatomy and physiology of these cells, spores and bacilli have already received sufficient attention to warrant the hope that improved methods of prolonging life and warding off disease may yet be discovered. Great as have been the advances of late years, we are apparently waiting for discoveries and inventions quite as great,

and we have to look for them very largely as the result of investigation and patient collection of dry data which do not appeal to popular fancy. There is, therefore, good reason why the increasing number of people among the general public who appreciate the results of pure science should give what encouragement they can to scientific institutions and societies.

Facts need to be ascertained. We are too apt to confine ourselves to matters of importance of to-day, without regard to their bearing on the future, when their commercial bearing may be most marked. The scientific results of specialists should be discussed by men of general knowledge or science, before they can become available to all. One of the most remarkable signs of progress and development during the last half century is to be found in the growth of the colonies and dependencies of the Crown. The opening era of the Australian continent, and of the foundation of our own Dominion, now spanning this continent, are two of the brightest spots in this career of progress. These developments of her resources have not cost England battles by land or by sea, nor have they added millions to her national debt. What we trace is a period of sunshine, prosperity and progress. New communities devising for themselves institutions, now sub-dividing for convenience, now confederating for mutual help, and all under one benignant sceptre. The state of things is not yet definite, but time is granted to devise even a firmer system, a federation of the whole. Could we lift the curtain that covers the destiny of the next century, who could foretell the aspect? The word "Excelsior" would stand out prominent, blazoned in letters of gold.

Man's circumstances under the influence of man's mind tend to progress. By the extension of railways, industrial conditions everywhere are undergoing changes; manufacturing towns need no longer be located on rivers or by the sea, but may be established near the sources where the raw materials for manufacture are obtained. The development of the world's resources is facilitated by the application of various departments of science, such as mining, farming, fishing, engineering, and navigation; and supply and demand, and the changes which are always in progress can be anticipated by such commercial men as undertake to acquaint themselves with the leading principles of physical geography.

In point of utility, and as a vast reservoir of power, coal takes the lead amongst minerals which aid development. Its energy is a fraction of the solar heat and light diffused on the tree ferns and giant tropical growth of the carboniferous era, ages before man, which is again partly restored in combustion. Wherever coal exists, there is, or will be, development, and to its presence is due the existnce of many a great industrial town. Take the Lowlands of Scotland and the manufacturing districts of England for an example. France, Belgium and part of Germany are hives of industry overlying coal fields, and a network of railways binding them together, aids in developing manufactures of all kinds, with ever increasing success.

The coal deposits of America, and their associated iron, have covered the Eastern States with factories and railways, and yet the story is told, that scarce one hundred years have elapsed since a wandering hunter in Pennsylvania built a fireplace of stones in a lonely valley, and was astonished to see his hearth taking fire from the burning brushwood. That was the first discovery of the great Appalachian coal field, and, if I mistake not, our own fellow-townsman, Professor Macoun, in his wandering over the prairies in search of his favorite plants, near Crowfoot, accidentally found, much in the same way, what are now the coal mines of the Saskatchewan district in our Northwest. As long as coal maintains the preëminence as the source of power, the nations owning coal regions must maintain a supremacy. As in the course of centuries the supply fails in the countries now producing it, so the seat of commerce will change to where coal has yet been undeveloped, and the land of the Celestials (China), whose coal deposits are said even to cast America into the shade, will and must become the centre of commerce. Then civilization will have traversed the globe to recommence in the East.

Petroleum, accidentally discovered whilst boring for brine, to the intense disgust of the borer, has to a wonderful degree developed many large and important towns; but a rival treads hard on its heels, and before liquid fuel has displaced the solid it is itself threatened by gas. Pennsylvania, Ohio and Indiana are using gas where petroleum and coal formerly maintained the sway. Iron is melted, glass manufactured, and steam raised for factories, towns lighted, and houses heated by

the vast supply of natural gas, which has drawn together a rush of population, and factory towns have sprung up at its bidding.

The precious metals and stones are doing their part in developing new countries. California, Australia, British Columbia and the South African republic have in turn been peopled by miners. Towns sprang up, first in canvas, then in wood, till by the exhaustion of surface and unskilled diggings, technical skill and division of labour became necessary; capital became more powerful than labour, companies controlled the mining by machiney, and the town founded in haste either dwindles away, as may be seen at Silver City and at Golden, in our own Rocky Mountains, or else developes the agricultural resources of the region, so that its next generation is transformed into a prosperous farming community. When the first discovery of diamonds was made at Kimberly, South Africa, a few miners' huts sprang up in a desert region; now Kimberly is a town of over 20,000 inhabitants, with a railway from the coast, and with the most approved system of water-works and electric lights. When the diamond supply fails, as eventually it must, the frontier trade will suffice to support there a prosperous town, but no such site would ever have come into existence in so desert a land without being developed by the valuable products of its mines. The country dependent on minerals alone has been likened to a man depending on a liberal expenditure of his capital for prosperity—the more lavishly he spends it the wealthier he seems, but in reality the poorer he becomes.

With plants and animals this is different, and the wealth of a people in live produce corresponds to the interest of a large capital. They have no fixed natural distribution, but can be carried to new regions; by cultivation and breeding, their value and number can be increased.

Timber may be regarded as a typical natural vegetable product, but large supplies of it do not concentrate population except under certain conditions of water-power, etc., and even then, when the supply is exhausted, unless something else takes its place, the town rapidly declines. Even here in our own city, where the business of rafting used to be largely carried on, the development of the forests by railways piercing their midst has diverted or destroyed this business, and the square timber that for years afforded work to hundreds in the rafting

line, is now loaded upon trucks specially prepared to receive it, right in the forest itself, and run down direct to Quebec in three days time, as against three weeks formerly required to float it down in rafts. British Honduras exists as a colony only for its woods; Burmah was annexed to the British rule for its valuable forests of teak; and sandal-wood has been the means of opening up many of the islands of the south seas. Cotton, the importance of which can never be overestimated, has had much to do with the social condition of this continent. Its growth developed the southern States, whose climate suited it well; but requiring harder labour than the planters cared to give, African labour was imported, and the climate suited that race.

Wheat, however, is the great factor of the vegetable world in developing civilization. Climate has much to do with the well-being of this cereal. A hot, dry summer gives it perfection, a changeable and damp summer is detrimental to it. Confined formerly to only certain districts, it is now by adaptation of circumstances grown where a few years ago its cultivation would have been laughed at, and the great wheat fields of India now furnish large supplies, through the extension of railways and by means of irrigation, combined with very low wages. In Australia, the Argentine Republic, Chili and California, wheat is now grown to an enormous extent by means of improved systems of agriculture, and the development of these countries is remarkably increasing.

Look at our great Northwest and the rapid strides of its development. The Canadian Pacific Railway depends largely on wheat as an article of freight traffic, and the lines to the southern frontier from Winnipeg were mainly built for wheat, and as new branches are extended over the prairie, pioneer settlers break up the matted sod that has for centuries turned the rain aside from the soil below, which, soaking into the newly exposed surface, calls forth at once its power of raising grain. What the future of this granary of the world, now throbbing with the strongest and newest life of the west will be, none dare predict. From the height of land south-west of Lake Superior, the whole valley of the Red River northwards to Lake Winnipeg, the undulating prairies rolling westward to the Rocky Mountains, and the Upper Mississippi valley, constitute this granary, and this centre of production is the centre of the river systems of North America. The old

style mill that turned out the flour used by our ancestors is a thing of the past, and the skill and science displayed in the manufacture of that commodity now, has developed the growth of cities like St. Paul and Minneapolis; and Rat Portage bids fair, with its water power to rise to similar eminence.

But continuous cultivation rapidly exhausts the soil, of which Eastern Canada and the Eastern States are a living example, and the materials yearly extracted therefrom, must be returned by fertilizers, or the production fails.

In 1889 Mr. Gordon Brown calculated the amount of phosphorous actually contained in the grain annually shipped from the port of Montreal, estimating it for this purpose in the form of phosphoric acid. The shipment of that year amounted to 292,534 tons, and the quantity of phosphoric acid sent away in it equalled 2,340 tons. Taking the average quantity of this substance contained in good soils, he found this meant an exhaustion to a depth of one foot of 70,320 acres, in so far as phosphates are concerned, and that to restore this 5,850 tons of artificial manure would be required. The total loss of phosphoric acid in the year to Canada, he estimated, represented $500,000.

This again leads to development. Our new phosphate industry, the product of which is not yet used at home, is in constantly increasing demand abroad, and when its necessity becomes apparent here, such development will take place around the scene of its production that will wake the echoes of the old Laurentian hills, and imagination would not be far astray in picturing at our Chaudiere water-power huge manufacturing establishments for grinding, treating and manipulating this necessary adjunct to wheat growth, long after the present lumber business has removed to points still further away.

Another valuable point about plant life is, that where one species fails, another may succeed. Tea cultivation succeeded the old coffee plantations of Ceylon when they gave out, and the same may be said of fruit culture. Dye plants are now scarcely cultivated, a chemical treatment of coal tar producing to-day most of the dyes of commerce, and the land that yielded these plants is turned to other uses.

As regards animal life, that has had much to do with the civilization of the world. From the days when the patriarchs of old moved

about with their flocks and herds in search of pasture, down; to the ranche life of the west to-day, the owners of these cattle were, and are, the pioneers of civilization. The vast pastures of Australia were nibbled by only a few kangaroos, till men saw their suitability for sheep. Australian wool is now the finest produced in the world, and the unusual fecundity of the sheep in that country was most marked. Analogy in this respect to other animals was not thought of, and the rabbit, introduced for sport, has now become such a pest as to threaten the very destruction of the sheep pastures. The above examples fully serve to show how natural commodities exert the chief influence in the growth or origin of centres of population and trade, whilst hundreds of other facts could be cited if needed.

In the development of man, the general aspects of nature and climate exert an appreciable influence. A hot climate and bounteous soil tend to enervate the body and mind, but a temperate clime, where the hand and the head must be constantly at work, is favorable to physical and intellectual development or brain power. The latter is that activity of the mind which shows itself in the great productions—literature, art, architecture, conquest and civilization—and it is interesting to trace the gradual changes from ancient times down, and see that it has been from the gross to the finer idea, and from warmer to colder climates. Egypt, with its civilization running beyond the records of history, gave expression to its brain power in gigantic pyramids, huge sculptures, and the elements only of the arts and sciences. Although the climate was too warm for great mental activity, the extremely dry atmosphere gave the Egyptians of old advantages superior to many of the neighbouring nations. When they ceased to possess princes able to lead them to conquest, or to continue gigantic buildings, the ease with which they could procure a living from their valley soil caused them to fall into habits of indolence, and their enervation was their downfall.

India, with a similar temperature but moister air, produced later on the fantastic civilization, and light, airy and imaginative architecture peculiar to the Hindoo race, its impossible systems of cosmogeny, deities and worship, lived its life of sensual intellectuality and then passed away. Greece, with its more moderate climate, its narrow valleys, rapid streams and snow-capped mountains, with its clear sky, and

soil not so rich as to breed habits of indolence, placed its people where they could achieve prodigies; and its advanced civilization, arts, laws, architecture, statuary and literature, both poetic, historical and philosophical, were the outcome of these favorable conditions. In Italy, with a climate still nearer perfection, the results were on a vaster scale than in Greece, and culture was broader, especially in law and general knowledge. But when in the Roman Senate there was no longer the cry that "Carthage must be destroyed," when accumulated wealth and luxury had done their deadly work, as they did in Greece, the climate, too warm and humid to invite the Roman character to hard mental labour, allowed the sceptre to depart from Italy, and to be upheld by a sturdier race in a colder clime. In France, where the climate is somewhat colder than Italy, and from its various genial and sunny climatic influences sprung a sparkling and vivacious literature peculiar to its race. But luxury has done its work there, and it is the colder and more northern climate where no extremes occur, and where food is raised eminently fitted to produce a robust physique, and not to pamper the appetite, where intellectual grandeur culminates. England, Ireland and Scotland are proofs of this, and Germany goes hand in hand. The productions of these countries are not so spontaneous as to beget indolence, and reaction of the system against the cold sets the powers of the mind into vigorous action. These northern nations present mental results that live; facts are reached by induction, imagination is rich and varied, but not wild and sensual, and patient research marks all their literature. On this continent the influences of climate are plain to all. The greyer skies and severer climate of the North control man's character and activities, whilst the Southerner gives himself up more to the indolence engendered by the influences of a hotter atmosphere.

American literature lies in the north, and Canada and the Northern States have produced and are producing the literature and mental energy of the continent. When men are settling a country there is but little chance for mental products. Their minds are absorbed in organizing, building, shaping. Thought is like carbon; to crystallize into the diamond needs time, and the most favourable of surrounding influences. Yet the very fusion of so many diverse characteristics of blood, locality

and nationality, is an element of future greatness, and time only can develop the latent qualities of the whole when merged into one. History has always shown that when a people can *easily* get a competency or wallow in riches, degeneracy of mind follows. Note Egypt, Persia, Rome.

To the student who has thought out the gradual development of literature, its changes are as full of wonder as are the formation of rocks to the geologist. Early man tried like the child of to-day to draw, and in the rude endeavour scratched with a flint tool on bones found in the caves of Southern France, we may see the beginnings of an art which culminated in the creation of writing. Dr. Isaac Taylor says that "the history of writing forms no exception to that law of developement which modern research has found to preside over the destinies of the universe." Printing has been the great medium of development of literature in modern days. The germ of its discovery was innate; but it took centuries to evolve it, and to attain to the degree of excellence it now possesses. Signet rings and seals and the scarabœi found in Egyptian tombs bore elaborate inscriptions evidently intended to be transferred to the surface of substances fitted to receive them. The dies of coin in all countries involve the same idea. What the intellectual exigencies of future generations may be who can tell? Education is spreading every day, and in every country. A love of knowledge, of science, of literature is penetrating all communities deeper and deeper, and will, in the onward march of civilization, be universal. Doubtless men in the future as in the past will continue to develope contrivances answerable to all needs. Photography and electricity may be enlisted yet further than they have already been in the service of letters, and appliances for satisfying the mental hunger of the human race, having photography and electricity as co-efficients, may possibly be thought of which to us now would seem to involve the incredible, but which to our descendants will be things of course, and classed by them among the ordinary conveniences of every day life. Nothing is now impossible.

Lord Justice Fry not long ago wrote an article in the *Contemporary Review* on the subject of imitation as a factor in human progress. He says "how far the manual and techical arts of human life owe their

suggestion and origin to imitation is a point which has never been fully considered." The first canoe was made in imitation of a rotten log which had served as a ferry boat. The first pillar was constructed in the likeness of an erect tree, and the gothic arch was made to represent the overarching boughs in a forest glade, suggestive of how the imitation of the objects in nature underlies all the various arts and products of human labor. Now the absence of this faculty of imitation would produce a stagnation in human society, because each man and each generation of men would derive no benefit from what their forefathers had learned. The presence of no other principle of life must and does equally produce stagnation. A really healthy and progressive state of society is only consistent with free thought and effort. It is difficult in this nineteenth century to realize a society which is really stationary, with our greedy appetite for new ideas, new things, reforms and improvements. We can scarcely credit that a great part of the human race knows none of these, and feels no such appetite, that it has gone on for centuries in the same way as it goes on to-day, and that it regards any attempt to introduce new thought or new modes of life, not merely as an impertinence but an impiety.

But with all our development and progress, we must be warned by the fate of Egypt, Greece, Rome and all other great nations of the past, lest on reaching the zenith of our fame and prosperity, we relapse into a state of apathy, indifference and luxury, and commit that most fatal error of living on the reputation we have gained and the successes we have achieved. When most obstacles have been overcome, and when the struggle for existence and greatness has been triumphantly concluded, nations are apt to give way to a longing for rest, the accumulation of wealth, and the enjoyment of luxury. Politics and commerce doubtless rule, to a great extent, the destiny of nations, but there are other influences as well, and chief among these are the social conditions of the people. The two great examples of the Roman empire and the French monarchy stand out in history as a warning, the social conditions of the people in both cases being the downfall of each. What facts attest, the people cannot afford to despise, and a timely warning may avert many a danger threatening the public welfare.

The developement of man's immortal condition is not in the province of a secular theme like the present; that is left for the pulpit and the preacher. It is a branch of this subject that might fill a volume and send joy into minds that are darkened with doubt, but it is too sacred to be lightly dealt with, or simply passed over, as the limits of an occasion like this would permit.

The permanent edifice of the world's education seems to patiently await the time when men shall tire of fashioning useless building stuff from their crumbling theories, and revert to the basal granite of which the everlasting foundations are laid, caring only to shape the superstructure by the Master Architect's plan. The movement of vital energy is man-ward, and the cry of mankind is God-ward. *Excelsior!*

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OXYGEN—ITS ROLE IN NATURE.

The above is the title of a lecture delivered before the Ottawa Literary and Scientific Society upon Thursday evening, 21st November, by Mr. F. T. Shutt, the chemist of the Dominion Experimental Farms. This lecture, which was upon Oxygen, as the most important constituent of Atmospheric air, formed a fitting sequel to Mr. Shutt's lecture of last year, the subject of which was water, including the chemistry of Hydrogen.

Having given a concise statement of the ground he was about to cover, the lecturer began by giving a short resumé of his last year's lecture before the society, in order to show the connection between the two subjects. Previous to 1774, when Oxygen was discovered by Priestly, it was supposed that the air we breathe was one single gas—an element. The same experiment by which Priestly made this important discovery, namely, heating red oxide of Mercury, was performed before the audience. The Oxygen was given off as gas, which kindled to a flame a glowing ember placed in the mouth of the test-tube, while the mercury was deposited in a film on the sides of the glass. The lecture was earnestly listened to throughout, and there were frequent

bursts of applause as the following experiments were performed to illustrate the fact that Oxygen is the universal supporter of combustion in nature: Burning phosphorus, sulphur, charcoal, zinc, and iron, in glass globes filled with Oxygen.

It is worthy of remark that the whole of the above experiments "went off" the first time they were tried, so that the the tedious delays which sometimes characterise chemical lectures illustrated by experiments were in this instance entirely wanting.

A hearty vote of thanks was tendered to Mr. Shutt at the close of his lecture.

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AMERICAN INSTITUTE OF MINING ENGINEERS.

That Canada is beginning to be better known by our neighbours across the line is evidenced by the increasing frequency of visits from scientific and other learned bodies from that quarter, and their intercommunication with this country is not only pleasant, but beneficial in its results. The recent visit, during October last, of the American Institute of Mining Engineers proved satisfactory in the highest degree to both visitors and those visited, and although the former were not counted by hundreds, yet those who came comprised some of the most prominent members of the profession, besides representatives of the technical institutions. In addition to the points of interest presented by the capital, to which the visitors were conducted, various excursions to points of the leading mining industries took place, that to the phosphate deposits of the Lievre being the largest of all.

The copper mines of Sudbury, the asbestos district in the Eastern Townships, together with the copper and other mining industries of Quebec, were respectively made points of inspection, and the greatest delight was expressed by our guests. At the opening session, held in a committee room of the House of Commons, a number of most interesting speeches were made, among which that by Dr. Raymond, the secretary of the Institute, was a veritable piece of word painting. He alluded to the beauties of our natural scenery, to our waterfalls, rivers,

and the great lakes which he styled as "yours and ours." They appeared to his view the more beautiful in contrast with a lake visited by the Institute last year which he considered "the incarnation of selfishness," receiving everything and giving nothing, not even fruitful enough for the support of fish or to feed the gulls hovering over it—Great Salt Lake.

The opinion of Canada carried away by the members of the Institute is, judging from letters written by several of them since their departure, most appreciative, and it is in the range of probability that in 1891 they will again visit Canada to hold their annual meeting, probably on the shores of Lake Superior.

The readers of the OTTAWA NATURALIST will be pleased to hear that, since the meeting, Mr. H. Beaumont Small, one of our members and the President of the Ottawa Scientific and Literary Society, has been elected a member of the Association in recognition of his writing upon mineralogical subjects. J. F.

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BOOK NOTICES.

THE ENGLISH SPARROW (*Passer domesticus*) IN NORTH AMERICA, ESPECIALLY IN ITS RELATIONS TO AGRICULTURE. BY WALTER B. BARROWS, ASSISTANT ORNITHOLOGIST, U. S. DEPARTMENT OF AGRICULTURE. WASHINGTON, 1889.

This is Bulletin No. 1 of the Division of Economic Ornithology and Mammalogy, of the United States Department of Agriculture, prepared under the direction of Dr. C. Hart Merriam, the Ornithologist of the Department. It embodies the results of investigations of the much discussed English Sparrow question in North America, carried on principally in the year 1886, for the purpose of determining whether the relations of this bird to agriculture were beneficial or otherwise.

Part I contains summaries of the evidence which has been collected by the Department, and which is printed at length in Part II. This is considered and carefully weighed in all its bearings, and the conclusions arrived at are systematically and conveniently arranged. A short history is first given of the introduction of *Passer domesticus*, into

North America, and of its spread and increase. This is followed by a consideration of the evidence, *pro* and *con*, first as to direct injury to field crops, gardens, &c, then as to the relations of this sparrow to other birds beneficial to agriculture, and finally with regard to its insectivorous habits. A careful and impartial survey of the evidence on both sides can hardly fail to convince any fair-minded person, as it has the writer of the bulletin, that "The English Sparrow is a curse of such virulence that it ought to be systematically attacked and destroyed before it becomes necessary to deplete the public treasury for the purpose, as has been done in other countries." Recommendations for legislation and of various methods of exterminating the pest are then given, followed by an interesting paper on trapping sparrows for sporting purposes by Mr. W. T. Hill, of Indianapolis, Ind., and by a short history of the House Sparrow and of the European Tree Sparrow, (*Passer montanus*) at St. Louis, Mo., by Mr. Otto Widmann. The report on the insectivorous habits of the English Sparrow is contributed by Prof. C. V. Riley, Entomologist of the Department, while the paper on the destruction of sparrows by poisons was prepared by Dr. A. K. Fisher, Assistant Ornithologist. A carefully prepared map shows the enormous amount of territory over which the sparrow has spread in the thirty-seven years since its introduction.

Dr. Merriam, who personally wrote but a small portion of the book, is to be congratulated on having such a painstaking and competent assistant as Mr. Barrows has shown himself to be in the authorship and compilation of this bulletin. W. A. D. L.

GEOLOGICAL AND NATURAL HISTORY SURVEY OF CANADA. Alfred R. C. Selwyn, C.M.G., LL.D., F.R.S., F.G.S., &c., Director, Report for 1887. Several parts of Vol. III of the new series are out.

(A) SELWYN—Summary Report of the Director for the years 1887 and 1888; (B) DAWSON—Report on an Exploration in the Yukon District, N.W.T., and adjacent portions of British Columbia; (C) BOWMAN—Report on the Geology of the Mining District of Cariboo, British Columbia; (E) TYRRELL—Notes to accompany a preliminary map of the Duck and Riding Mountains in Northwestern Manitoba; (F) LAWSON—Report on the Geology of the Rainy Lake Region; (H) INGALL—Report on Mines and Mining on Lake Superior; Pt. A: His-

tory and general conditions of the region; Pt. B: Silver Mining; (J) Low—Report of Explorations in James' Bay; (K) Ells—Second Report on the Geology of a portion of the Province of Quebec; (M) Bailey and McInnes—Geology of portions of New Brunswick, Quebec and Maine; (R) Dawson—The Mineral Wealth of British Columbia, with annotated list of localities of minerals of economic value; (T) Hoffmann—Chemical Contributions to the Geology of Canada.

Besides the above Reports there have also appeared (*a*) Mr. Brumell's Report of the Mineral Statistics for 1888, and (*b*) Supplementary Note on Silver Mining in the Lake Superior district by Mr. Ingall.

H. M. A.

"On the Cambrian Organisms in Acadia." By G. F. Matthew, M.A., F.R.S.C. Can. Rec. Sc., Vol. III, No. VII, 383-387, Montreal, July, 1889.

This number of the "Canadian Record of Science," which contains no less than six palæontological contributions, opens with Mr. Matthew's paper above cited. It forms an abstract of a paper read before the Royal Society of Canada in May, 1879. The author enumerates the recent discoveries made in the fauna of the St. John (Acadian) group, and points out their significance in the light of what is at present known of the Cambrian system in Russia, Sweden, &c., and elsewhere in America. From the lower part of the Basal or Georgian series, Mr. Matthew has obtained representatives of no less than three families of sponges, besides "Radiolarians" or allied organisms. The flora of that early period is marked by the presence of a Palæochorda and a Fucoides, *F. circinatus*, Bgt., whilst brachiopoda are represented by what appears to be the *Mickwitzia monilifera* of Schmidt; Crinoidea, by "undoubted examples of *Platysolenites* (Pander)" besides "*Volborthella tenuis*, a minute cephalopod." The St. John or Acadian group is then divided into four general stages or divisions, the uppermost of which belongs to the Ordovician system; these divisions are as follows:—

Fauna and Flora of Division (stage) 1.—(Paradoxides Beds).

Fauna of Division (stage) 2.—(Olenus Beds).

Fauna of Division (stage) 3.—(Peltura Beds).

Fauna of Arenig group (Ordivician).

Palæontological notes are given under each of these divisions showing the organisms which characterize them, and reference made to the new species described for the first time, all of which will appear in the next Trans. Roy. Soc. Can. The paper closes with a brief and clear exposition of the physical history of Southern New Brunswick in Cambrian times as shown by the Cambrian formations themselves.

H. M. A.

"On Fossil Sponges from Beds of the Quebec Group of Sir William Logan at Little Metis." By Sir J. W. Dawson, LL.D., F.R.S. Can. Rec. Sc., Vol. III, No. VII, p. 429. Montreal, July, 1889.

This is an abstract of a lengthy paper read before the Royal Society of Canada at the May meeting, 1889, in which the additional material obtained by Dr. Harrington and the author at Little Metis is given. That paper gave "a detailed account of the containing beds, with a map and sections, and describes the species found, which are about eleven in number, all siliceous sponges, and most of them hexactionellid. There are six *Protospongiæ*, one *Cyathospongia*, and five other sponges belonging to new genera described in the paper. Other species found in the same beds indicate the presence of the genus *Linnarssonia*, also of a new fucoid, *Buthotrephis pergracilis*, whilst the sandstones hold "*Retiolites*, probably *R. ensiformis* of Hall," the *Trigonograptus ensiformis* of more recent classifications. H. M. A.

"New Fossil Plants from the North-West." By Sir J. W. Dawson. Can. Rec. Sc., Vol. III, No. VII, p. 430. Montreal, July, 1889.

This is a note which calls attention to the Upper Laramie plants recently studied by Sir William, from Mr. McConnell's collection in the Mackenzie River basin, and from Mr. Weston's in the Bow River valley. Striking resemblances are noticed between the flora from these two localities and the flora of other parts of the North-West, of Alaska, the Hebrides, Spitzbergen, the United States and Greenland, and the whole will form a very interesting contribution to be given in the forthcoming Volume of Transactions. H. M. A.

"On some Ostracoda from the Mabou Coal Field, Inverness Co., Cape Breton (Nova Scotia). By Prof. T. Rupert Jones, F.R.S., and J. W. Kirby. Geol. Mag. No. 300, Dec. III, Vol. VI, No. VI, p. 269. London, June, 1889.

This paper is the result of a critical examination of species of carboniferous ostracoda which were collected by Mr. A. H. Foord, late of the Geological Survey, Canada, in 1884, at the Mabou coal field, and which were sent to Prof. Jones in 1886. The following forms have been recognized or described, the new one, *Carbonia fabulina*, var. *altilis*, being well illustrated by four wood-cuts:—

1. *Carbonia fabulina*, J. and K.
2. " " var. *altilis*. N. var.
3. " (?) *bairdioides*, J. and K.

The precise statigraphical position of these ostracoda is given from Mr. H. Fletcher's Report, addressed to the Director of the Geological Survey of Canada, in which a list of the associated species and other fossils described by Mr. Whiteaves is also given. H. M. A.

"GLACIATION OF EASTERN CANADA." By Robert Chalmers, of the Canadian Geological Survey. Geological Magazine, Dec. III, Vol. VI, No. 299, p. 211. London, May, 1889.

This contribution by Mr. Chalmers, a member of our Club, is a preliminary note in advance, of an exhaustive paper on the "Glaciation of Eastern Canada," which "will shortly appear in the Canadian Record of Science, Montreal." It presents the subject in a clear and succinct form, pointing out the conclusions which are at variance with those held by extreme glacialists, and shows how "the theory of local glaciers upon the more elevated portions of the country and icebergs or floating ice striating the lower coastal areas during the post-Tertiary submergence of these, as maintained by Sir William Dawson, will serve to explain all the observed phenomena." Mr. Chalmers's conclusions are based on data collected by himself for many years in connection with his geological studies on that "battle ground, so to speak, of the advocates of the two rival theories of continental glaciation and floating ice," together with the vast amount of notes obtained by Sir William Logan, Sir William Dawson, Dr. G. M. Dawson, Dr. Bell. Dr. Ells, Dr. Lawson, Messrs. Alexander Murray, H. Fletcher, A. P. Low, and others of the Geological Survey staff, and the other in Nova Scotia, New Brunswick, Quebec and the Archæan areas as far north as Hudson Bay. Mr. Chalmers has found that the evidences point naturally and clearly to the action of local glaciers and floating ice as the agencies which

have striated and polished rock surfaces during the glacial epoch and the subsequent period of submergence. The term "local glacier" Mr. Chalmers defines as "an ice-sheet limited in extent, that is, confined to one valley or hydrographic basin, whether large or small, and influenced in its movements by local topographic features, such as mountains, watersheds, hills, or the valleys of large rivers." We look forward with much interest to Mr. Chalmers's forthcoming paper in the Canadian Record of Science. H. M. A.

"GLACIATION OF HIGH POINTS IN THE SOUTHERN INTERIOR OF BRITISH COLUMBIA." By Dr. G. M. Dawson, Asst. Dir., Geol. Surv. Can. Geol. Mag. No. 302, Dec. III, Vol. VI, No. 8, p. 350. London, August, 1889.

This very timely contribution to the history of the "Great Ice Age" problem in geology, throws additional light upon the glacial phenomena of Southern British Columbia, where Dr. Dawson has been carrying on his explorations in connection with the Geological Survey of Canada. Whilst Mr. Chalmers's paper deals particularly with the eastern portion of Canada, Dr. Dawson calls attention almost at the same time to the Pacific border of Canada—both papers being of great interest and import, as bearing on the same question from two widely separated standpoints. In the August number of the Geological Magazine for 1888, Dr. Dawson presented the results of his investigations in northern British Columbia, and specially in the Yukon country, where it was shown that the ice mass flowed in a northerly direction, whilst in the southwesterly portion of the same province the ice mass moved in a westerly course. This latter ice mass Dr. Dawson styled the "Cordilleran Glacier." The purport of the paper is to call attention to the noteworthy heights at which glaciation has now been found to occur on some of the higher parts of the interior plateau and its mountains and to the great mass thereby indicated for the southern part of the "Cordilleran Glacier." Whilst 5,280 feet (one mile) above the sea level had been previously noted as the highest point for glacier ice markings, at Iron Mountain, it has been since ascertained that Tod Mountain, 25 miles north-east of Kamloops, rising 7,200 feet above the sea, shows indubitable evidence of the movement of a great glacier ice-mass entirely independent of the local features of the country. A table

giving the height above the sea at which evidence of glacial action occurs accompanies the paper. In one locality the highest point of glaciation is over four thousand feet, in four other places it is over five thousand feet, and in two more over six thousand feet above the sea, whilst Tod Mt., the culminating point, shows evidence of glacier ice or nivie-ice action at the extreme height of 7,200 feet. H. M. A.

"On a New Genus of Siliceous Sponges from the Trenton Formation at Ottawa." By George Jennings Hinde, Ph.D. Can. Rec. Science, Vol. III, No. VII, p. 395. Montreal, July, 1889.

From specimens of sponges discovered by Mr. Walter R. Billings, of our Club, and presented to the national collection at Ottawa, Dr. G. J. Hinde, well known for his researches in fossil sponges—to whom the material was transmitted by Mr. Whiteaves—has recognized and described a new and interesting genus of Lithistid sponges. The generic designation Steliella is that proposed and described, and indicates two species, both from the Trenton formation of this city, viz: *S. Billingsi* and *S. crassa*. The genus *Steliella* finds its nearest ally in the genus *Astylospongia*, Rœmer, "but the nodes are less developed and the network is much less regular." The canal apertures of the surface, and the shape of the sponge as well, resemble some forms of *Calathium*, Bill., such as *C. Anstedi* and *C. Fittoni*, but the spicular structure in these latter is as yet unknown." A plate of six figures, drawn by Mr. L. M. Lambe, accompanies the paper, four of which illustrate *S. Billingsi*, named after our member, Mr. W. R. Billings, so well known as an indefatigable worker in the Trenton of Ottawa, and the two others illustrate *S. crassa* both in its external and internal or microscopic characters.

H. M. A.

"Notes on the Lake St. John Country." By E. T. Chambers. Can. Rec. Sc., Vol. III, No. VII, p. 388. Montreal, July, 1889.

This contribution to the geography and geology of the district in question contains some interesting notes obtained since the Lake St. John Railway opened. Outcrops of "Silurian," more properly Cambro-Silurian or Ordivician, limestones are noted, also peculiarities in the Laurentian area along the route travelled. Amongst the fossil remains noted, one, a *Cryptozoon*: *C. boreale*, has been so named by Sir William

Dawson, a description of which will be given in a future number of the Record. The statement that *Halysites* occurs in the Trenton formation of Roberval and is a characteristic species of that formation, the present writer is inclined to doubt the accuracy of. H. M. A.

"CONTRIBUTIONS TO THE MICRO-PALÆONTOLOGY OF THE CAMBRO-SILURIAN ROCKS OF CANADA." By E. O. Ulrich, of the Geological Survey of Illinois, U.S.A. Published by the Geological and Natural History Survey of Canada. Montreal, 1889.

This Report contains fifty-six pages of letter press and two lithographic plates, giving descriptions and notes of two new genera and twenty-six species and varieties of *Bryozoa* and ten species of *Ostracoda* collected by officers of the Geological Survey of Canada in the Province of Manitoba. Among these there are ten new species of *Bryozoa*, one new variety, along with five new species of *Ostracoda*. They are as follows:—BRYOZOA. *Monticulipora parasitica*, var. *plana* (n. var.); *Diplotrypa Westoni* (n. sp.); *Batostoma Manitobense* (n. sp.); *Petigopora scabiosa* (n. sp.); *Bythopora striata* (n. sp.); *Fistulipora laxata* (n. sp.); *Goniotrypa bilateralis* (n. sp.); *Pachydictya hexagonalis* (n. sp.); *P. magnipora* (n. sp.); *Ptilodictya Whiteavesi* (n. sp.); *Nematopora* (?) (n. sp.) OSTRACODA: *Leperditia subcylindrica* (n. sp.); *Primitia lativia* (n sp.); *Primitia* (? *Beyrichia*) *parallela* (n. sp.); *Eurychilina reticulata* (n. gen. et n. sp.); *E. Manitobensis* (n. sp.); *Strepula lunatifera* (n. sp.) H. M. A.

"ON THE DISCOVERY OF TURRILEPAS IN THE UTICA FORMATION (ORDIVICIAN) OF OTTAWA, CANADA." By Henry Woodward, LL.D., F.R.S., F.G.S. Geol. Mag. No. 300, Dec. III, Vol. VI, p. 271.

In this contribution to the palæontology of the rocks about Ottawa, Dr. Woodward, Keeper of the British Museum, &c., &c., has described a very interesting and beautiful little species of cirripede found by Mr. Ami, of the Geological Survey, in the "Siphonotreta band" or zone along the right bank of the Rideau river at the head of the Rifle Range Rapids. This species is described by Dr. Woodward as *Turrilepas Canadensis*, and the description is accompanied by an enlarged figure of the same. A note by Mr. Ami on the exact geological position of this cirripede is included in Dr. Woodward's paper, and the species referred to the Lower Utica formation. J. F.

"On a Species of Goniograptus from the Levis formation, Levis, Quebec." By Henry M. Ami, F.G.S. Can. Rec. Sc. Vol. III, No. VII, p. 222.

In this paper the writer records the discovery in America of a genus of graptolites which was hitherto known only from "the Llandeilo flags of the Bendigo goldfield, Sandhurst, Victoria, Australia." Prof. McCoy had described the Victorian species as *Graptolithus (Didymograptus) Thureaui*, and suggested the generic term *Goniograptus* for its reception at some future date. Prof. Lapworth soon recognized the validity of this genus. No specimens or other species of this genus were found until 1866, when Mr. T. C. Weston obtained the first American examples from the black graptolitic and linguliferous beds in the cutting on the I. C. R. 1560 paces below the Lower Levis and Quebec ferry. The Canadian examples of the Goniograptus cannot be specifically separated from the Australian species, *G. Thureaui*, McCoy, although they show a new generic feature in the presence of a disc or membranaceous wing-like expansion clasping the stolons. The varietal designation *Goniograptus Thureaui*, var. *Selwyni*, has been suggested for the Canadian representative of the species, inasmuch as Dr. Selwyn was the first to discover graptolites in Australia (1856), which determined the age of the gold reef bearing slates of Victoria.

J. F.

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EXCURSION TO CASSELMAN.

Upwards of thirty availed themselves of Mr. Craig's kind invitation to visit his farm on the Nation River, at the Ox-bow near Casselman, on August 8th. Arrangements were made with the Canada Atlantic Railway to let the party off at this point, and take them up again there in the evening, a great convenience to those who wished to spend the day in the immediate vicinity of the farm. The majority did so, and found it a most delightful spot, full of cool retreats from the fierce noonday sun, and teeming with animal and vegetable life in its most interesting forms. Many rare specimens in the various branches of natural history were collected or observed during the day. Some

half-dozen members braved the heat and discomfort of a three-mile tramp to Casselman on the railway ties, and were rewarded by finding some interesting relics of a by-gone age in the shape of broken Indian pottery, and by the somewhat novel sensation of a bath in the rapids below the Village, where the water runs at immense speed over large tables of flat rock. Addresses were, as usual, given before leaving, on the collections and observations of the day, by the leaders of the different branches, and were listened to with great interest. The unanimous verdict of the members when they gathered for the return journey was that our excursion to the Ox-bow had been one of the most pleasant and profitable ever held by the Club. The hearty thanks of the Club are due to Mr. Craig and his family, as well as to Mr. Summerby, for the kindness shown the members and their friends. Mr. Craig's hospitality will always be remembered with feelings of gratitude by those who had the good fortune to partake of it at the Ox-bow farm.

W. A. D. L.

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BACK NUMBERS.

Attention is called to the changes in the list of prices of back numbers of the Club publications, on the second page of the cover. To members only, the back numbers are now furnished at cost price, thus enabling them to procure or fill up sets at comparatively small expense.

W. A. D. Lees,
Librarian.

New Members :—Miss I. M. Ballantyne, Messrs. Jeffrey H. Burland, B. App. Sc., F. C. S.; J. B. Dowling, B. App. Sc.; J. Rainson Wills (Buckingham), Capt. Edgar A. Mearns, U.S.A., Fort Snelling, Minn.

OROBANCHACEÆ.—Broom-rape Family.

EPIPHEGUS, Nutt. Beech-drops.

1728. E. VIRGINIANA, Bart. (Cancer-root.)

Under beech trees and parasitic upon their roots. Woods near St. Louis Dam. Beechwood. Chelsea. Oct.—2. (B) A curious branched, leafless, purplish herb about nine inches in height. Flowers many, of two kinds, the upper conspicuous, with a long tubular striped corolla, but sterile; the lower fertile, with a very short corolla.

LENTIBULARIACEÆ.—Bladder-wort Family.

UTRICULARIA, L. Bladder-wort.

1731. U. VULGARIS, L. var. AMERICANA, Gray.

Floating in ditches and slow streams. Common. July—2. (B) Perennial. In autumn round, solid, winter-buds about half an inch in diameter form at the tips of the branchlets. These sink to the bottom of the water and the rest of the plant dies.

1734. U. INTERMEDIA, Hague.

Floating in shallow water and creeping over soft mud, beneath carices and other marsh vegetation. Rideau canal. Billings Bridge. Gatineau Point. Hull. July—2. A much slenderer plant than 1731, with all the bladders on separate leafless branches. Flowers large and few, very rarely produced.

1736. U. CORNUTA, Mx.

Sphagnous swamps. At the gas-spring in the Mer Bleue, Eastman's Springs. In a small swamp at Black Lake, Kingsmere. July—2. A remarkable plant, consisting of a slender stem with a few large yellow flowers at the summit, no leaves, and very few rootlets.

VERBENACEÆ.—Verbena Family.

PHRYMA, L. Lop-seed.

1744. P. LEPTOSTACHYA, L.

Low open woods. Not uncommon. July—1. (B).

VERBENA, L. Verbena.

1745. V. URTICÆFOLIA, L. (White-flowered Vervain).
Roadsides and rocky pastures. Rare in this locality. Hintonburgh. Beechwood. July—1.

1746. V. HASTATA, L. (Purple Vervain).
Roadsides and meadows. July—2. (B).

LABIATÆ.—Mint Family.

TEUCRIUM, L. Germander.

1750. T. CANADENSE, L.
Sandy river banks. Along the Ottawa and Rideau Rivers. July—2.

MENTHA, L. Mint.

1753. M. *viridis*, L. (Spear-mint).
A garden escape. Flowers in a slender terminal spike. Aug.—1.

1754. M. *piperita*, L. (Peppermint).
Introduced, but very common in low ground and along streams. Flowers in an interrupted terminal spike. Aug.—1.

1758. M. CANADENSIS, L. (False Pennyroyal.)
In low ground. The whole plant canescently hairy with a strong odour of Pennyroyal. July—2. (B.)

————————var. GLABRATA, Benth.
With the last; but stouter and much smoother with dark coloured foliage and a different scent. July—1.

LYCOPUS, L. Water Horehound.

1759, L. VIRGINICUS, L. (Bugle weed).
Low wet woods. July—2 (B) Calyx-teeth 4, ovate. Leaves almost sessile, toothed, entire towards the base. Angles of the stem rounded.

1761. L. SINUATUS, Ell.
L. Europæus, L. var. *sinuatus*, Gray.
Low woods, July—2. Calyx-teeth 5, tapering to a very sharp point. Angles of the stem acute. Leaves very variable, sinuate-toothed to pinnatifid.

HYSSOPUS, L. Hyssop.

1762. *H. officinalis*, L. (Garden Hyssop.)

Introduced—Richmond Road. Dalhousie Square. The white-flowered form abundant. The purple-flowered scarce. A perennial herb with simple branches, linear, entire leaves, and the flowers which are in clusters forming crowded spikes. July—1.

SATUREIA, L. Savory.

1767. *S. hortensis*, L. (Summer Savory.)

Introduced. Frequently found on waste heaps and road sides.

CALAMINTHA, Mœnch. Calamint.

1770. C. CLINOPODIUM, Benth. (Basil.)

Rocky woods and fields. Common. June. (B)

HEDEOMA, Pers. (Pennyroyal.)

1772. H. PULEGIOIDES.

Rich wood Billings Bridge. Very rare. A slender erect herb, strongly scented. July—1.

LOPHANTHUS, Benth. Giant Hyssop.

1779 L. NEPETOIDES, Benth.

River bank at Casselman. Aug.—2. A tall, smooth perennial, with a sharply 4-angled stem bearing petioled coarsely crenate-toothed leaves and long terminal spikes of greenish yellow flowers.

NEPETA, L. Cat-mint.

1782. *N. Cataria*, L. (Catnip.)

Introduced, but common everywhere. July—2. (B)

1783. *N. Glechoma*, Benth. (Ground Ivy.)

A garden escape. Occasionally found by waysides. Stewarton. Hintonburgh. Aylmer. Aug.—1.

DRACOCEPHALUM, L. Dragon-head.

1784. D. PARVIFLORUM, Nutt.

Rocky woods; particularly after fires have run through them. June—1.

SCUTELLARIA, L. Skull-cap.

1785. S. LATERIFLORA, L. (Mad-dog Skull-cap.)
Low ground. July—1. (B.) Flowers small in axillary and terminal one-sided racemes.

1787. S. PARVULA, Mx.
Dry banks and in sand. June—2. Not so common as our other two species. A low, branching, pubescent plant, spreading by means of stolons which bear several elongated and connected tuber-like swellings.

1789. S. GALERICULATA, L. (COMMON SKULL-CAP.)
On floating logs and banks of streams. July—1. (B.) A tall, graceful plant with showy flowers.

BRUNELLA, Touru. Self-heal.

1790. B. VULGARIS, L. (Common Heal-all.)
Prunella vulgaris, L.
Introduced (?) Damp woods and fields. June—2. (B)

LEONURUS, L.

1794. L. *Cardiaca*, L. (Common Motherwort.)
Pastures and clearings. July—1. (B)

LAMIUM.

1795. *L. amplexicaule*, L. (Hen-bit Dead-nettle.)
Introduced. Rare and not persistent. Billings Bridge. Stewarton. Bell's Corners. July—3.

GALEOPSIS, L. Hemp-nettle.

1798. G. *Tetrahit*, L. (Common Hemp-nettle.)
Introduced. Common in waste places and cultivated fields. July—3. (B) Easily known by the bristly stems which are swollen beneath the joints. Flowers often yellowish or white.

STACHYS, L. Woundwort.

1800. S. PALUSTRIS, L.

Wet ground along streams. July—1. (B.) A variable plant in which 1801 should probably be included as a variety. Plants which answer to var. *cordata*, Gray, and var. *glabrata*, Gray, are found both at Billings Bridge and Kettle Island.

1801. S. ASPERA, Mx.

S. palustris, L., var. aspera, Gray.

With the last. A slenderer plant with narrower leaves, the angles of the stem beset with stiff reflexed bristles.

PLANTAGINACEÆ.—Plantain Family.

PLANTAGO, L. Plantain.

1804. *P. major*, L. (Common Plantain.)

Introduced. July—1. (B.) The var. *bracteata*, Macoun, is an accidental form which is sometimes found in low ground, but which is not permanent under cultivation.

1805. P. RUGELII, Decaisne. (Pale Plantain.)

Low ground. Common. June—4. Easily distinguishable from *P. major* by its slenderer spikes, and much more erect pale yellowish-green leaves. Petioles purplish at the base.

1810. *P. lanceolata*, L. (Rib-wort Plantain.)

Introduced with seed of lawn grasses. Not very persistent. August—2.

1814. *P. media*, L. (Scented Plantain.)

Sparingly introduced; but thoroughly naturalised and very persistent on Parliament Hill and Major's Hill. Leaves ovate, canescently downy, flat on the ground, petioles very short. Flowers silvery and showy with pale purple filaments. Sweetly scented.

APETALOUS EXOGENS.

AMARANTACEÆ.—Amaranth Family.

AMARANTUS, L. Amaranth.

1825. *A. retroflexus*, L. (Pig weed. Red root.)
Introduced but thoroughly naturalised in all well-manured soils throughout Ontario. July—2. (B)

1826. *A. albus*, L.
Naturalised. July—2. A low spreading plant with whitish stems and the greenish flowers crowded in the axils of the long-petioled obovate leaves.

ACNIDA, L. Water-hemp.

1828. A. RUSCOCARPA, Gray.
Montelia tamariscina, Gray.
In low marshy ground along rivers. Brigham's Creek, Hull. Casselman. Aug.—1. A diœcious annual plant with much the appearance of an *Amarantus*.

1829. A. TUBERCULATA, Moq.
M. tamariscina, var. *concatenata*, Gray.
A. cannabina, L.
Sandy river banks and flooded fields. Britannia. Hull. Gatineau Point. Aug.—2. Flowers of the lower clusters, in the fertile plant, forming thick distant heads in the axils of the leaves.

CHENOPODIACEÆ.—Goosefoot Family.

CHENOPODIUM. Goosefoot.

1831. *C. album*, L. (Lamb's quarters. Pig weed.)
Introduced. Abundant everywhere. June—2. (B.) A most variable plant in all its stages. In early spring the young leaves of some plants, particularly beneath, are a rich pinkish purple. When growing in poor sandy soil, the whole plant is silvery

white. Late in the season, most of the plants are greener with very little mealiness and fewer flowers. The leaves are no less variable in shape than they are in colour. Until all these forms have been grown separately throughout the season, they must all be classed under the type *C. album*, L.

1833. C. *hybridum*, L. (Maple-leaved Goosefoot.)
Introduced. Cultivated ground. July—2. (B.) Plants tall and widely branching. Leaves thin and glabrous.

1834. *C. urbicum*, L. (Upright Goosefoot.)
Waste places in the city. Not common. Aug.—2. An erect, fleshy-leaved plant, generally tinged with red. Flowers chiefly in erect axillary clusters or in a short terminal leafy panicle. Seeds large and horizontally placed.

1835. *C. botrys*, L. (Jerusalem Oak. Feather Geranium.)
Introduced. Scarce; most abundant along the Rideau below Cummings Bridge. July—2. An erect, ornamental, bright-green, glandular-pubescent, branching plant. Flowers in feathery terminal cymose racemes. Whole plant pleasantly aromatic.

1836. *C. ambrosioides*, L. (Mexican Tea.)
Sparingly introduced. Stewarton. July—2. A tall, coarse, branching herb with tapering repand-toothed leaves and the flowers in dense leafy spikes. Strongly and unpleasantly scented.

1837. *C. glaucum*, L. (Oak-leaved Goosefoot.)
Introduced. Low ground. Not common. Aug.—2. A low spreading or erect plant with glaucous-mealy, pinnatifid-toothed leaves. Stems pinkish.

1838. *C. Bonus-Henricus*, L. (Good King-Henry. Perennial Goosefoot.)
Introduced. Rare. Aylmer, Mer Bleue. July—1.

1839. C. CAPITATUM, Benth & Hook. (Strawberry Blite.)
Blitum capitatum, L.
Damp woods and clearings, particularly after fires. June—2. (B.)

ATRIPLEX, L. Orache.

1841. *A. patula*, L.

"Specimens which we take for this species, are almost smooth and bright-green, with the cusps of the leaves erect. In every case introduced. This form is found around all towns and villages in Ontario." (Macoun's Cat., Pt. III, p. 401.)

——————— var. HASTATA, Gray.

Low ground. Uncommon. River side below Parliament Hill. Gatineau Point. New Edinburgh. Aug.—2. Leaves thick, the lower ones triangular-halberd-shaped.

KOCHIA.

K. scoparia, L.

Introduced. Two patches of this annual plant have been noticed for some years; one by the roadside near the old Crown Timber Office, the other by the roadside at Billings Bridge. It is a curious, erect, branching plant with somewhat the appearance of a *Suæda*. Leaves lanceolate, thin and pubescent. Flowers bearing a tuft of white down at the base.

PHYTOLACCACEÆ.—Poke-weed Family.

PHYTOLACCA, L. Poke-weed.

1860. *P. decandra*, L. ("Pigeon Berry." Garget.)

Introduced, here. Waste places, Stewarton. Aug.- 2. A tall, handsome perennial with deep green foliage and purplish red stems. The flowers small and white, in slender racemes, followed by dark purple, depressed, 5—12-celled berries.

POLYGONACEÆ.—Buckwheat Family.

POLYGONUM, L. Knot-weed.

1869. P. AVICULARE, L. (Knot-grass Door-weed.)

Sandy soil and waste places. June—4. (B.) A very variable plant. We doubtless have both native and introduced forms of this plant. Dr. Gray notices in his Manual that the American form has "stamens, chiefly 5 in the American, 8 in the European plant."

SUMMARY

— OF —

Canadian Mining Regulations.

NOTICE.

THE following is a summary of the Regulations with respect to the manner of recording claims for *Mineral Lands*, other than Coal Lands, and the conditions governing the purchase of the same.

Any person may explore vacant Dominion Lands not appropriated or reserved by Government for other purposes, and may search therein, either by surface or subterranean prospecting, for mineral deposits, with a view to obtaining a mining location for the same, but no mining location shall be granted until actual discovery has been made of the vein, lode or deposit of mineral or metal within the limits of the location of claim.

A location for mining, except for *Iron* or *Petroleum*, shall not be more than 1500 feet in length, nor more than 600 feet in breadth. A location for mining *Iron* or *Petroleum* shall not exceed 160 acres in area.

On discovering a mineral deposit any person may obtain a mining location, upon marking out his location on the ground in accordance with the regulations in that behalf, and filing with the Agent of Dominion Lands for the district, within sixty days from discovery, an affidavit in form prescribed by Mining Regulations, and paying at the same time an office fee of five Dollars, which will entitle the person so recording his claim to enter into possession of the location applied for.

At any time before the expiration of five years from the date of recording his claim, the claimant may, upon filing proof with the Local Agent that he has expended $500.00 in actual mining operations on the claim, by paying to the Local Agent therefor $5 per acre cash and a further sum of $50 to cover the cost of survey, obtain a patent for said claim as provided in the said Mining Regulations.

Copies of the Regulations may be obtained upon application to the Department of the Interior.

A. M. BURGESS,
Deputy of the Minister of the Interior.

DEPARTMENT OF THE INTERIOR,
Ottawa, Canada, December 19th, 1887.

Statutes of Canada

—AND—

OFFICIAL PUBLICATIONS.

The Statutes and some of the Publications of the Government of Canada, are for sale at this office. Also separate Acts. Revised Statutes: price for 2 Vols. $5.00, and for supplementary volume $2.50. Price List sent on application.

B. CHAMBERLIN,
Queen's Printer and
Controller of Stationery.

Department of Public Printing and Stationery.
Ottawa, February, 1889.