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THE DEVELOPMENT OF THE MINES OF THE OTTAWA REGION.

MR. JOHN STEWART.

(Read 10th February, 1887.)

The mineral district of which Ottawa is the centre is a large one; including the western part of Quebec Province and the eastern part of the Province of Ontario. It is to this section especially that reference is made, although the following remarks apply to the whole of the provinces mentioned, and as regards the best interests of the miner, prospector or explorer, the saying "good and bad everywhere," may be put "bad and worse," and applied equally to them both.

The development of the mines has an important connection with the most complete knowledge of the minerals of only scientific interest; and this reason, and that of the injustice done to one section of the population, by those in power, are the apology offered for those remarks, which may appear to some to have too much of a technical bearing.

About two years ago, when some of these notes were made, there appeared in the newspapers of almost all parts of Canada, articles and correspondence under sundry headings, showing clearly that there is something materially wrong with the mining interest of these provinces as at present situated, that is, an individual ownership instead of Government holding the minerals for rental, or on lease.

Some writers attribute the lack of mineral development, and the stagnation of the whole industry (coal mining excepted) to the absence of a Bureau of Mining Statistics, or to a neglect on the part of the Geological Survey of Canada in not publishing reports of the extent of mining done each year. They saddle the Geological Survey with the total neglect of the mining interests, and find relief in considering it the "Scape Goat" in this case, and none try to arrive at a clear understanding of the position in which the mining interests of the provinces stand at the present time. Were statistics collected by the Survey they would tend to make more glaring the error in our laws as regards mining lands, give the number and acreage of our mining land monopolies, and show more clearly the error our Provincial Legislators have fallen into in selling the minerals with the surface soil to the

farmers. It is desired to point these out as the true causes of the lack of mineral development in this district and to suggest a remedy.

Others give as the causes the depending on a foreign market for our ores, extravagance and bad management, with an ill advised expenditure of too much money on the surface, before the mine is developed in depth, or to untrue and glowing promises, of "millions of tons of ore in sight" on the part of promoters of a new enterprise. There is no doubt that in some cases, these causes have helped to close the enterprise and deter others from embarking in a similar mine or property.

In Nova Scotia, Newfoundland and British Columbia, the Crown, or Provincial Government, owns the minerals, and issues licences to parties desiring to open and work mines, and in these Provinces the business of mining is largely and most successfully carried on. In Quebec and Ontario the minerals are at present sold along with the soil, and the birth right and portion of the explorer, prospector or miner, is thus given to the farmer, or, still worse, to the speculator in mining lands, and these sons of toil have to beg for terms from the miserly farmer, or independent and extortionate land owner or speculator. Mining lands have been sold in this way during the last forty or fifty years in Quebec and Ontario; some few, it is true, are being worked, but the great majority of the most valuable mining lands and mines are in the hands of speculators, or of parties who will not work them, and who ask for the mines and properties an exorbitant price should an intending purchaser approach them.

This state of affairs, or the act of the Local Legislators selling the minerals, instead of giving a lease or license, and compelling the owner to work the mine or quarry, or have it revert to the Government, or exacting a low rent or royalty, under such *lease or license*, from the profits derived from working the mine, is the cause of so many valuable properties being locked up, as it were, and development retarded, and the mining industry does not receive the attention it would, if these mining lands remained in the hands of the Government. In proof of this may be mentioned the vast amount of mineral land held by companies and speculators; in the Lake district and in eastern Ontario alone the area thus held amounts to many millions of acres of the best mineral

lands. The same is true as regards the phosphate region in Quebec. It is this system of unconditional sale of mining lands for speculation, without regard to yearly working, that has ruined the mining interests of this district. The error of any one party owning a large extent of mining land in a block, arises from the fact, which is well known to experienced miners and explorers, that by selling, say to an Iron Mining Company, a few thousand acres in a block, it gets other minerals, which it cannot treat, or the use of which it may not know, and the ores other than iron remain unworked.

Compare the system adopted in the Western United States, where a mining claim is given to the discoverer on condition that it is worked, or has labor spent on it to the extent of \$100 each year; failing which it reverts to the Government. Under that system the right of discovery of the explorer, prospector, or miner, is respected, and a reward granted him (he can locate two claims), but in Ontario and Quebec, he has no rights, and he is, therefore, drawn to the more inviting fields of the United States. The location of the claim in the States is made by the discoverer on the ground, and is placed on record in the Land Office; but in this district it is made by a clerk in the Land Office, and not by the discoverer; a practice which has proved fruitful of the worst abuses and frauds on Canadian discovery. In the United States, by granting mining claims in that way, ore accumulated under the clause compelling at least so much work each and every year, and from its accumulation arose the necessity for milling or smelting works to work it up, and had the same inducements and compulsion been in force in Canada, our mines would have been counted by the thousand, instead of the few now in operation.

The chief ores of this region are: iron, (hematites and magnetic), phosphate, or apatite, and a large variety of pyrites, or sulphuret ores of the miners, holding in places copper, gold and silver in workable quantities, lead or galena, plumbago (black-lead), mica, and others of less importance.

The ores of iron are found in such variety and abundance that the only reason they are not now worked is the question of cheap fuel for reduction. Next spring certain tests of machinery are to be made, and should they prove as successful as former trials, this question will be

settled on a commercial scale, and the smelting of iron established in the district.

The apatite in the raw state is largely shipped to Europe, but the home demand for the superphosphate of lime for fertilizing purposes can be supplied from the works of the Brockville Chemical and Superphosphate Co. The pyrites used by this company for the last few years, for the manufacture of sulphuric acid, have been imported from New York State, but ores from the County of Hastings have been introduced to them, and the supply in future will be procured from local ores. The extended mining of the pyrites ore of the district is a question of much importance to the City of Ottawa, with its cheap water-power for dressing ores, and grinding apatite. The sulphur is used for treating the apatite in the form of sulphuric acid, and it would, if all we exported was shipped as superphosphate of lime, form an important industry. The residue of the pyrites ore can be most successfully treated after roasting, along with the lead ores, which we also have, and the copper, gold and silver extracted. Our lead ores are too poor in silver (about 5oz. or \$5 per ton silver) to pay to work for silver and lead alone, but when smelted along with the residue of the sulphur ores, holding copper, gold and silver, the question of working both is settled.

The more extended production of gold also requires attention. No man has ever possessed too much of it, and no country has produced too much. Its value increases with the cost of getting it, and the want of it. It is our highest standard of money and exchange, and is therefore, when found in workable quantities, the best investment for *surplus* labor and capital. The discovery of gold in California and Australia produced periods of great world-wide prosperity. All classes and conditions of men were drawn to a new occupation and country by the high wages earned in the mines. A laborer who had been working for a farmer or a tradesman, for \$1.00 or \$1.50 a day, could wash out gold to the value of \$10 or \$20 a day. Can a wise adjustment of our mining laws be made to have this effect, if only on a much smaller scale, by granting free-grant mining claims in districts where gold is known to exist?

In iron alone, had such measures been adopted, there would to-day

have been enough mined and worked to supply our own wants and for exportation, as is done in Sweden and Norway with similar ores, climate and fuel (wood charcoal), as the laws of that country are such that no mining property can remain idle so long as any one desires to work it. In Sweden and Norway if a party owns a mine and is not working it, another party can do so by paying the owner half the profit of the working of the mine, and if he gives it up the owner or any other person can undertake to work it on the same conditions, hence no mining properties remain unworked.

In some European countries, and in some parts of the British Islands, the minerals are owned by the Crown, and at one time, even in Ontario, certain reserves of minerals were made in old deeds, but of recent years this is not the case.

Some may say, that in advocating the State owning the land, you are advocating communistic doctrines, but that is another question altogether; what is desired is for the State to own the minerals, which is British law and custom.

There are at the present time thousands of British and Canadian subjects in the United States mining regions who would take up claims in Canada were the laws such as would induce them to do so, but at the present time there are no free-grant mining claims given and no inducements offered to explorers, prospectors or miners, to locate and develop a claim.

Under the present system 100 acres realizes to the government, say at \$1.00 per acre, \$100; and in ten years the country gets the benefit of the amount expended on that mine in labor, &c., if it is developed and worked, but if not, nothing. Under the system where the government holds the minerals, and gives grants free to miners, or on lease or royalty, the country receives at least \$100 per year for ten years, say \$1,000 less the value of the 100 acres—\$100, leaving a balance of \$900 in favor of the free-grant or lease systems.

Under the lease or royalty system, in ten years the country receives the same as under the free-grant, together with the additional royalty received when the mine is paying, which may be several thousand dollars yearly, and the increased value of public lands.

But it may be asked, from what source will the government

receive revenue for inspection and office expenses if they do not sell the lands as at present? The free-grants which proved paying mines, on arriving at that stage if charged a low royalty on profit, after working expenses are paid, would yield annually a larger revenue to the government than the present system of selling lots. In proof of this, the British Crown paid the Earl of Derby £50,000 stg. for the Isle of Man, and has been refunded from royalty on mines and quarries more than the sum paid for the island.

Compulsory working to hold a claim may be considered a small thing in an individual case, as regards the amount of labor employed, but take the returns for a province, or the whole Dominion, and it would amount to a large sum, on all the now known valuable minerals lots throughout Canada. In yearly doing a little on a mining property to hold it, new discoveries would be made, and new life given to what was possibly considered a doubtful prospect. It was in this manner that John W. McKay and other United States millionaires gained their first start. Through being compelled to work their claims they made a discovery which enabled them to sell or work it with profit. The mining interests in Canada will never prosper till similar measures are adopted. The custom of granting land to farmers under the free-grant system, and not giving an explorer, prospector or miner a free-grant, under conditions similar to that of the farmer, or of compulsory development of the minerals contained in the property is an injustice to the mining section of the population, and for that reason settlement has made progress and mining has not.

Some parties ask "but why give away a valuable mine as a free-grant?" A mining property in this section has no more value than the same amount of land, say \$1.00 an acre, which you now give to the farmer. The miner would return \$100 in labor each year, and develop the mine and prove its value, and if it proved valuable the Government would receive a revenue from royalty as long as it paid expenses. And some say: "What use would a free-grant be to a miner who had not money enough to purchase it at \$1.00 per acre?" Under the free-grant plan both the farmer and the miner have energy and skill to develop the value of their claims, with proper provisions imposing on them a certain amount of work yearly, and that is worth

more to the country than to have so many dollars paid into the land office, and have the property lie in a state of nature and undeveloped.

There is a wrong system practised in Ontario and Québec, the selling of mining lands by auction. When a valuable ore has been discovered in a section of country the excitement gets strong, and the land office is flooded with applications for lots, and to satisfy, not the discoverer, but contending parties, the properties are advertised and sold by auction, and the competition raises the price beyond that which a miner can afford to pay. The discoverer is not rewarded, and the property falls into the hands of a more wealthy man, a speculator, who will not work it himself, but purchases it on the chance of a rise in value, which fails to come, and the properties so sold remain undeveloped. The district ought to be opened as a free-grant mining camp, and the properties would be developed under proper mining laws and inspection, and the country receive many times more benefit than by selling it unconditionally.

The vast importance to a country of the proper development of its mineral wealth renders this subject one requiring the attention and careful consideration of our legislators and citizens.

IS *MONOTROPA UNIFLORA* A PARASITE?

 GEORGE BAPTIE, M.A., M.B.

(Read, 3rd March, 1887.)

This note had its origin in a chance question put at one of Mr. R. B. Whyte's admirable afternoon lectures on botany. The discussion which followed showed that members of the Ottawa Field-Naturalists' Club were divided in opinion in regard to the parasitism of *Monotropa uniflora*, or Indian pipe, some holding the plant to be a parasite, others disposed to believe that it was not. Now, what is a parasite? It is desirable to know precisely what is meant by this term, because one person may mean one thing by it, another person may understand a different thing. To settle the usage a number of authors were examined. They mean by a *parasite* a plant which has an organic connection with another living plant, and thus derives nourishment from the latter. Parasites differ in the extent to which they draw sustenance from the plant to which they are attached. The relation may be illustrated by what is commonly known to be the relation between animals and their animal parasites. The parasitic plant bears the same relation to another plant that a louse or a tapeworm bears to the animal which supports it. A plant parasitic on another may be said to steal a part or the whole of its living, its food, from the plant to which it is attached.

To answer the question at the head of this note, the following plan can be adopted:—

We can consult standard books. This has been done. The authors do not agree. Macoun, Spotton, Wood, Gray, Goodale, and Balfour either positively assert that *Monotropa uniflora* is a parasite, or their language would lead a reader to believe it to be parasitic. Gray is self contradictory. Sachs speaks of *monotropa* as a saprophyte, and therefore not parasitic. By saprophytes he means plants which make use in their growth and development of the materials of other plants, dead ones, which are already in a state of decomposition. The position of Murray is this: "No case has yet been satisfactorily made out for the parasitism of this group (*monotropa*)."

Macoun and Spotton, 1879, page 6. "There are others whose roots penetrate the stems and roots of other plants and thus receive their nourishment, as it were, at second-hand. These are parasitic plants. The Dodder, Indian Pipe and Beech-drops of Canadian woods are well known examples." There is no doubt as to the meaning of these statements.

I now turn to Wood's Class Book, p. 30, and I find that he classes parasites under three heads, (1) parasites which appropriate stolen juices to their own growth, as the dodder and mistletoe; (2) parasites which, although standing in the soil, are fixed upon foreign roots and thence derive their entire sustenance, "as the beech-drops and other leafless, colorless plants;" (3) those fixed in the soil, like the last, but which derive from foreign roots a part of their sustenance, as the *Gerardia*. Wood's parasite is then essentially the parasite of Spotton. Let us now turn to our own particular plant. Of the sub-order *Monotropa* he uses these words: "Low, parasitic herbs;" of *M. uniflora* he says: "common in woods, near the base of trees, on whose roots it is doubtless parasitic." There is no mistaking what Wood says.

I now turn to Gray. Lessons 1877, p. 304. Of the sub-order *Monotropa* he says this:—"Parasitic on roots, or growing on decomposing vegetable matter like a fungus." Turn now to his *Structural and Systematic Botany*, 1877, p. 440, sub-order *Monotropæ*: "*Parasitic* herbs, destitute of green color and with scales instead of leaves." This can give one idea and one only—but at page 91 of the same work occur these words: "It is probable that our *Monotropa*, or Indian Pipe, a pallid phænogamous plant, looking like a fungus, actually lives like one, and draws its nourishment, at least in great part, from the decaying leaves among which it grows." In his *Botanical Text Book*, 6th Ed. 1879, p. 38, he states the case as follows: "Pale or coloured parasites, such as Beech-drops, Pine-sap, etc., are those which are destitute of green herbage, and are usually of a white, tawny, or reddish hue, in fact of any colour except green. They strike their roots or sucker-shaped discs into the bark, mostly that of the root, of other plants, and thence draw their food from the sap already elaborated." In the *Botanical Text Book*, 1885, p. 338, we find that, "among the higher plants there are some . . . which derive all their nourishment from decaying

or decayed remains of other plants; while others like *Monotropa uniflora* . . . obtain part of their food from living plants."

In Ealfour's Class Book of Botany, 3rd Ed., p. 848, the only statement I find is "Monotropaceæ; parasitic plants . . . chiefly found parasitic on firs in Europe, Asia and North America."

Sachs, translated by Bennett and Dyer, 1875, p. 620: "Parasites draw the products of assimilation directly from their hosts, while saprophytes (as . . . *Monotropa*, many fungi, &c.) make use for the same purpose of the materials of other plants which are already in a state of decomposition."

To add to the uncertainty it has been asserted that a connection has been observed between the *monotropa* and its supposed host. If so, that settles the matter. But as I am aware of only two cases in which this is alleged, may we not withhold our assent until more observation have been made. It is possible the observers may have been mistaken, and any one who examines the root of *Monotropa uniflora* will find it is not at all like a parasitic root. This is only presumptive evidence; apart from this I have carefully looked for the connection between the *monotropa* and the root of some other plant upon which it might be fastened, but I have been unable to trace the connection. Perhaps the appearance of the plant has misled some observers, a colorless plant being commonly regarded as a parasite. This is an assumption. *Monotropa* is apparently without a particle of chlorophyll in its composition, and therefore has been assumed to be incapable of living and growing by making use of any food that has not been elaborated and prepared by a means of chlorophyll.

The analogy of the action of the germ in seeds, utilizing starch, oil, &c., contained in the seed for the growth and development of the very young plant, would give some encouragement to the contention that our *monotropa* may be able to use the organic matter of decaying leaves, &c., in its growth and development. The analogy may be set over against the assumption; but if it can be shown that our plant can grow and develop when only such material is supplied, the assumption should be abandoned as untenable. The following happened with me: A mass of soil and *monotropa* was put in a glass vessel, watered and set aside to await a convenient time for the examination of the roots,

to find, if possible, any connection with roots of other plants. While awaiting the examination new stems grew up and *developed*. This points to the view that the plant can do what it is frequently assumed a plant without chlorophyll cannot do.

Here is an opportunity for our club. During the coming summer all our members should keep a sharp watch on *Monotropa uniflora*, and by careful removal from the soil endeavour to trace any connection between it and its host, if it has any. Attempts should also be made to grow the plant from the seed and then try to make out its history; and by transplanting specimens and growing them in pots show whether they can live and grow independent of any connection with another living plant.

In the discussion which followed the reading of Dr. Baptie's paper, Mr. Fletcher said that he thought the subject a very useful one, because it gave the members an opportunity for investigation during the coming season. Conspicuous objects in the woods in spring were the beautiful seedlings of the beech, the plant upon which *M. uniflora* was alleged to be parasitic. These could be easily transplanted and grown in pots until the seeds of *monotropa* were mature, which might then be planted in the pot, some on the roots and some sprinkled on the soil. Careful attention would then surely reveal something of its nature. It was possible, he thought, that seeds might be found in the old pods of last year, if so the experiment might begin much earlier in the year. He suggested that parasites such as *M. uniflora*, where no connection could be detected between the mass of roots and any living plant, might be biennials, parasitic in the true sense for the first year, when all the energy of the plant was devoted to storing up a supply of nourishment underground, as do carrots, parsnips and other tuberous-rooted biennials. Subsequently the connection with the host-plant might decay leaving merely a mass of roots, at some little distance therefrom, stored with stolen nourishment, from which in the second year would be thrown up the flower-stems. Such a mode of growth would account for Dr. Baptie's plant continuing to develop after removal from its natural habitat.

EXCURSION TO KING'S MERE.

On Saturday, the 21st of May, the first excursion for 1887 was held. The day dawned bright and warm, and at the appointed hour of 9 a.m. a large gathering of members and their friends assembled at the corner of Bank and Sparks streets, where the Club vans were to start from. A few minutes later six large covered vans were closely filled and took their departure for King's Mere. Across the Suspension Bridge they rolled, and their occupants had a good opportunity of seeing the Chaudiere Falls at the period of "high water" in the Ottawa. At Hull the main street was found to be impeded for its entire length with a trench blasted in the solid rock, for the laying of water pipes, and by the resulting mounds of stone, as well as some ridges of ice which had been protected by debris; a detour was thus necessitated and the party emerged through the C. P. R. station-yard on to the Chelsea Road. After the payment of somewhat exorbitant tolls, there was a stretch of several miles of macadamized road and then turning down through Old Chelsea the road ran through a pretty piece of woodland, containing some splendid butternut and other hardwood trees. Pleasant as was the drive, everybody was delighted when the pretty little lake known as King's Mere was reached and the vans halted at its upper end. Several persons who had been unable to go in the vans arrived soon afterwards, and the total number of those present was found to reach 119, making the excursion the largest ever held by the club. As soon as the numerous baskets, collecting boxes, &c., had been removed from the vans, the President, Mr. R. B. Whyte, announced that at two o'clock those wishing to ascend the mountain were to gather, and that at 4.15 the entire party would re-assemble for the purpose of hearing the usual addresses, from the leaders of the several branches, on the collections and observations of the day. The party then broke up into numerous groups, which sought out shady places under the clumps of trees upon the mountain foot-slope, and proceeded to discuss with sharpened appetites the contents of numerous baskets, obtaining clear, cool and sparkling water from a spring near by. At the appointed hour the President headed the company, which desired to ascend the mountain, and the advance was made along an

easily ascending foot-path, through a pleasant little valley, across a small brooklet, and up the wooded, flower studded hillside, until the bare, massive, rocky summit was safely won. The view, though extensive, was greatly limited by the hazy, smoky atmosphere, due to bush-fires resulting from the prolonged drought, and while the Ottawa River could be seen the city was obscured, and many points of interest hidden. Mr. H. M. Ami, with a fine aneroid barometer, kindly loaned by the Geological Survey, found the elevation to be 910 feet above the Hull Station, or 1,125 feet above sea level. No less than seventy-five persons ascended the mountain, perhaps the largest gathering ever upon its summit. The descent was easily made, and collecting renewed along the way, the botanists returning with well filled vasculums and baskets. After a brief rest Mr. Ami gave a short instructive address upon the various geological formations occurring between the city and the mountain, and mentioned that the latter was composed of rocks particularly interesting; from the fact that they belonged to the oldest formation in the world, that known as the Laurentian. Mr. Fletcher, the senior botanical leader, then spoke in an interesting manner of a few of the principal plants observed, and the lessons that might be derived from a study of them. The first one mentioned was the beautiful *Clematis verticillaris*, a climbing plant with large showy blossoms, worthy of a place in our gardens with many others of our handsome native species. *Aquilegia canadensis*, or the Canadian columbine, is also a fine plant, with its bright flowers showing frequently against the stones and shadows of the roadway. The habits of *Comandra umbellata*, a parasitic plant, were explained, and specimens were shown which had been found attached to the roots of wild cherry, *Prunus virginiana*. Attention was called to the flowers of *Acer pennsylvanicum*, or striped maple, and to the often-overlooked fact that the flowers of other maples and various forest trees are very beautiful. Mr. Harrington made a few remarks on insects, calling attention first to the great abundance of the very injurious forest-tent caterpillar, as evidenced by the webs seen so frequently on the apple and other trees along the road. By destroying these webs early in the season while they are small the increase of this noxious insect would be much checked. Some information was given as to the habits of our native bees, which are mostly solitary

in their habits, which were seen in great abundance around the trees in blossom, such as apple, cherry, hawthorn, &c. The President then made a short address, urging the claims of the Club to support from the members, and from all those who take an interest in science and education. The Club had endeavoured by the publishing monthly of the *Ottawa Naturalist*, and by excursions, classes, &c., to foster a love of nature and arouse and strengthen the faculties of observation in those it could reach, and, therefore, deserved encouragement. At 5.30 a start was made and the homeward trip was pleasantly made, conversation, instructive and interesting, with intervals of song enlivening the way, until the city was reached about 8 p.m. This, as already stated, was the most successful excursion of the Club, and all present were well satisfied and pleased with their holiday.

SUB-EXCURSIONS.

FIRST.—The Saturday afternoon "outings" commenced on the 7th May, when the attendance reached the very encouraging number of thirty-three, including a majority of the Council and many active workers, among whom were several ladies. Starting from the Post-Office at two o'clock the party proceeded to New Edinburgh by the street car. Here the Geological section separated temporarily from the Botanists and Entomologists, who proceeded to the woods beyond Rideau Hall, popularly known as McKay's Bush or Beechwood. Along the shaded road and under the cedars there were still heavy banks of snow, but in the open spaces and hardwood groves the ground was quite dry, and such flowers as *Claytonia* abundant. The list of plants collected in flower was, however, small, while insects were very scarce, only the species usually found about fungus, sappy stumps, &c., being taken. About 4.30 the party re-assembled near Rideau Hall, to listen to the "talks" upon the collections in the various branches. The President, Mr. R. B. Whyte, took up the plants and in an interesting manner explained the leading peculiarities and relations of the principal species. Of these the rarest were *Daphne mezereum* and *Viola Selkirkii*, for which the only locality recorded was that just visited. Mr. Whyte's remarks were listened to with much pleasure, especially by a number

of new members who have evidenced an active interest in botany. Mr. Harrington made a few remarks on the habits of the humble-bees, several of which—chiefly *Bombus ternarius*—had been observed. These were all females which had survived the winter and were now searching for suitable spots for the foundation of colonies. Some nests of leaf-cutting bees (*Megachile*) were exhibited, and the method of their construction explained. Mr. H. M. Ami reported the proceedings of the Geological section. Along McKay Street, near the south-east corner of the Rideau Hall grounds, an outcrop had been examined of a band of impure limestone, ten to twelve inches thick, which was highly bituminous, and fossiliferous, both overlaid, and underlaid by soft, friable shales, all of Utica age. It contained the following species: *Leptaena sericea*, *Orthis emacerata*, *O. testudinaria*, *Zygospira modesta*, *Metoptoma* sp., *Calymene senaria*, and *Asaphus Canadensis*, of which the *Metoptoma* is new, not only to this formation but perhaps to science, the genus not having been recorded from this formation either in the United States or Canada. At excavations on Creighton Street strata were examined which also belonged to the Utica, and which consisted of five bands of impure bituminous limestone, alternating with five bands of shales, the whole aggregating over six feet in thickness. The following were among the most interesting fossils: *Leptograptus flaccidus*, *Leptobolus insignis*, *Schizocrania filosa*, *Conularia Trentonensis*, and *Leperditia* sp. (perhaps new). An outcrop of Trenton limestone yielded *Streptelasma corniculum*, *Murchisonia gracilis*, *Strophomena alternata*, &c. An interesting fault occurs near this outcrop, which brings the Trenton and Chazy formations into contact. Some crinoidal limestones near the tobogan slide were also examined but yielded no specimens. The party then returned to the city, having derived much pleasure and instruction from their outing.

SECOND.—On the 14th May Billings' Bridge was visited. A party of forty-seven was conveyed from and to the city by two large vans, while a group of eight geologists proceeded by boats to Hog's Back, thus making in all fifty-five; the largest sub-excursion yet held by the club. The Botanical section was, as usual, very strongly represented, and the collections were much larger than those of the previous outing, although vegetation was found to be still very backward. After exploring the

vicinity of the river the party re-assembled near the Episcopal Church and was addressed by Mr. Fletcher, as the Leader in the Botanical section. He expressed himself as much pleased at seeing the sub-excursion so well attended, and so much interest shown in the specimens collected. He said that the unusually late spring had rendered the quantity of specimens small; but as is always the case for those who will use their eyes, there was far more to be found than could be studied. He spoke enthusiastically of the pleasures to be derived from a study of the floral gems of the woods, the most insignificant of which would form an ample theme for a whole lecture. The most interesting plants collected during the afternoon were then referred to. The history and uses of some were related, and the structure of others was explained. Instructions for collecting and preserving certain plants, such as the willows, claytonias, orchids and other succulent plants were given. It was announced that the Botanical section would hold sub-excursions throughout the season, and that at each a short lecture would be given by one of the leaders. Mr. Ami then explained the formations observed by the geologists at Hog's Back, and the fossils by which they were characterized, after which the party returned to the city.

ANNOUNCEMENTS.

EXCURSION.—The second excursion will be held on Saturday, the 25th June, when a visit will be paid to Aylmer. There are in the neighbourhood of this place very suitable collecting grounds for Botanists, Entomologists, &c., while interesting formations are exposed for the Géologists. The train by which the party will go leaves the station at 1.15 p.m., and the train leaves Aylmer at 8 p.m. Tickets will be 25 cents each.

SUB-EXCURSIONS.—The Botanical and Entomological Leaders have arranged for the following Saturday Sub-excursions in June: 4th, to Beaver Meadow, Hull; 11th, to Hemlock Lake, Beechwood; 18th, to Dow's Swamp; starting on each occasion from the Post Office at 2 p.m.

NEW MEMBERS.—15, Charles H. Beddoe; 16, C. Henry Grist; 18, Miss Eliza Bolton; 19, George Ha Wilson (Buckingham); 21, Miss Katherine Lee Patterson (New Glasgow, N.S.); 23, Miss L. Roth.

The Montreal Natural History Society holds its at St. Jerome on Saturday, 4th June, and has sent a to be present to any of our members who may be there, or at Ste. Therese *en route*.

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