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October 1891.

THE OTTAWA NATURALIST

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The Transactions Of the Ottawa Field-Naturalists' Club

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EXTRAS — BILLINGS, W. R. Palæontology. An elementary lecture. pp. 11, 5c.

ELLS, R. W. Asbestus; its history, mode of occurrence and uses. pp. 24, 10c.

MONDAY AFTERNOON POPULAR LECTURES—BOTANY.

THE EDUCATIONAL VALUE OF BOTANIC GARDENS.

By James Fletcher.

Read January 26th, 1891.

One of the influences which has affected materially the progress of the science of Botany, has been the instution in various parts of the world of Botanic Gardens. The importance of public Botanic Gardens has for centuries been recognized by the governments of civilized states. In an article on this subject in the Encyclopædia Britannica, we find as follows: "The foundation of Botanic Gardens during the XVI and XVII centuries did much in the way of advancing Botany. They were at first appropriated chiefly to the cultivation of medicinal plants. This was especially the case at universities, where medical schools existed. The first Botanic Garden was established at Padua in 1545. The Jardin des Plantes at Paris, was established in 1626. The Botanic Garden at Oxford was founded in 1632. The garden at Edinburgh was founded by Sir Andrew Balfour and Sir Robert Sibbald in 1670, and, under the name of the Physic Garden, was placed under the superintendence of James Sutherland, afterwards professor of Botany in the university. The park and garden at Kew date from about 1730. The garden of the Royal Dublin Society at Glasnevin, was opened about 1796. Gesner states that at the end of the 18th century, there were 1600 Botanic Gardens in Europe." (Ency. Brit. IV, 80.)

"The Royal Botanic Gardens of Kew originated in the exotic garden, formed by Lord Capel and greatly extended by the Princess Dowager, widow of Frederick, Prince of Wales, and by George III., aided by the skill of the Aitons, and of Sir Joseph Banks. In 1840 the gardens were adopted as a national establishment, and transferred to the department of woods and forests. The gardens proper, which originally contained only about 11 acres, have been increased to 75 acres and the pleasure grounds and arboretum adjoining extend to 270 acres." (Ency. Brit. XIV. p. 55.)

It may be well now to consider what a Botanic Garden is. In a report of a committee appointed by the British Parliament, in 1838, to enquire into the management, etc. of the Royal Gardens at Kew

previous to their being taken over by the Government as the National Public Botanic Gardens, we find that Dr. Lindley, who signed the report, defines a Botanic Garden as "A Garden of Science and Instruction," which means, I take it, a garden where science, that is knowledge, concerning plants may be accumulated and there applied for educational purposes. In order that these objects may be attained in the most satisfactory manner, there are certain features of the work which must always be borne in mind. The means of gathering together the material to be grown in the garden, by purchase, by exchange, by communication with correspondents at other gardens or who live in different parts of the world, although of great importance in the management of a botanical garden, do not come within the scope of my subject to-day. One of the chief sources of supply however is, of course, by exchange with other Botanical Gardens, of which there are many, both public and private, in all parts of the world where education and culture are cherished. In the first instance Botanic Gardens were merely collections of plants which were deemed useful for their medicinal qualities, later general utility, beauty, variety, or even curiosity were considered, and it is only comparatively lately that the most important development of all, the educational value of these institutions, has been recognized. One thing which should be conspicuously apparent on entering a Botanic Garden is systematic arrangement, *not necessarily any particular arrangement, but an arrangement* by which something is illustrated. A feature of the utmost importance also, is that every plant should be labelled plainly, both with its scientific and vernacular names. In addition to this any further information should be given which can be put on the label without confusion, such as its native country and date of introduction, for foreign plants, and more definite localities in the case of indigenous species. When a plant is the source of some useful product, and this is not shown by the name, it should be indicated on the label. In short the label should give as much information to a visitor as is possible without loss of clearness. In a scientific garden record books, giving full particulars, must of course, be kept, as to the source, age and condition of every individual plant grown. This is of great value and may be the means of saving much loss by preventing the

introduction of trees or other plants into districts unsuitable for their proper development. Many plants are peculiarly affected by climate, the fact that such will grow even luxuriantly in a certain locality makes it by no means sure that they will produce in paying quantities any useful products derived from them in their natural habitat. Most plants show impatience of being grown in unsuitable soil or climate by their behaviour as to flowering or fruiting. Many of our wild plants when grown in England, flower very seldom or not at all, as the Virginian Creeper and Wax Works Vine (*Celastrus scandens*). The charming British Columbian shrub *Nuttallia cerasiformis* although it flowers frequently and profusely in England, will not produce the exquisitely beautiful waxy berries, with their shades of pure white, yellow, pink and black, all growing on the same bush and at the same time, which make it such an attractive object in the Vancouver Island hedgerows and woods. Similarly the production by plants of alkaloids, aromatic oils, and other products, which may be utilized in the various arts and sciences, is much affected by change of climate. But, on the other hand, many most useful members of the vegetable kingdom can, and have been introduced from one part of the world to others where they were not found naturally. Tea from China, and coffee from Arabia, the banana from Africa, the peach from Persia, and many other luscious fruits; our own indian corn, the sugar cane and numerous grasses are now grown over far wider areas on the globe's surface, than were originally adorned with them by nature. Forest trees and trees and shrubs for hedges and ornament, are frequently being imported from one country into another or from other parts of the same country. But all plants, even from the same locality, do not thrive similarly when placed under the changed conditions of soil and climate consequent upon their introduction into another country or locality. In this way thousands of plants have been destroyed and much capital squandered, which might have been obviated had there been a botanic garden, where careful experiment could have been made beforehand with all the particulars recorded for reference when required. Certain trees will thrive well in some localities for a few years and then suddenly their development wil cease--instances of this are found in the attempted cultivation of certain

kinds of apple and pear trees in some parts of Canada, where they seldom attain to any great age or size. The black walnut again is a tree which has disappointed some of its admirers. For a few years after germination, being a vigorous grower, the rapid production of wood gave so much promise that experimenters were induced to devote considerable areas to its cultivation, only to find after 10 or 15 years that the trees rapidly decreased in vigour and retrograded. This may be due to their having penetrated through the upper layer of suitable soil and reached a colder or less congenial stratum; but, I do not wish to discuss that point now; the unnecessary outlay would not have been made, had it been possible to examine trees of a known age, grown under similar circumstances in a botanic garden. Again on the other hand, a botanic garden would be the means of introducing and distributing through the country new and valuable plants, with the great advantage that those who acquired them would know beforehand whether they were likely to succeed. Botanic Gardens to be of the greatest educational utility should be, of course, thrown open to the public as much as possible, and for that reason should be laid out in an ornamental manner, so that not only botanists, gardeners and specialists may be satisfied when they visit them to study and examine new or rare plants, but, also that they may form attractive places of recreation for the large and important class of mechanics and other labouring classes and their families, consisting in this country of people possessed of considerable education, and, who, when once attracted to one of these gardens, could not but find in it an efficient instrument for refining the taste, increasing their knowledge and augmenting in a very high degree the amount of rational and elevating pleasure available to them. A fertile source of interest in Botanic Gardens is the cultivation and exhibition of the various plants from which foods and other economic products are derived. Interest in these will soon extend to other plants. In the same line of thought is the fostering of a love for flowers in children, and I believe that every child should be taught to wish for a garden of its own. I know of nothing at all which will give such continued and wholesome pleasure to a child as a small plot of garden of which it considers it has the sole proprietorship. If any one wishes to see true pleasure, let them take a seedsman's catalogue, about the

month of May and give it, together with a small amount of money to spend on seeds, to a child who has had a garden of its own and learnt to love flowers. Do not give any help in the choosing unless especially asked to do so, and limit the choice to about three or four packets. For a child to get the most pleasure out of a garden it should not have too much assistance, either in plants or work. The soil should be well dug up to begin with, all else should be done by the juvenile proprietor, and for the garden to be of the most use, it should not be made too easy to get plants, so that each one may be cherished and new ones grown from seeds or cuttings. I know from my own experience when a child, what a source of delight my garden was. On coming home from boarding-school to spend the holidays, the first thing to be looked at was my garden. The associations with flowers are all good and enlightening, and a love for them should be most carefully engendered and cherished in those unhappy children where it does not exist naturally. Such however, are exceedingly rare. The greatest encouragement to a child who has a garden of its own, is for the elders to take an interest in it, never decline to go and look at it whenever asked to do so, and above all things do not interfere in the arrangement and management except to prevent disastrous mistakes; small mistakes will do good, by teaching their own lessons. Now, what these gardens are to children, public gardens are to the masses, furnishing them with, at the same time, innocent and beneficial and also engrossing and satisfying occupation.

All public gardens should be scientific to the extent of having everything properly named and plainly labelled. The first demand when anything creates interest is to know its name, and it is a great dis appointment when this cannot be obtained. As a matter of history it is interesting to learn that the Royal Botanic Garden at Kew, now the most extensive scientific garden in the world, was far from being scientific at the time it was taken over, and the committee appointed to investigate the matter, when referring to the fact that few plants were properly labelled, expressed the following opinion of a garden in that state: "It is not easy to discover what advantage except that of a pleasant walk has been derived, by the public, from the privilege of visiting the garden."

The value of plants as food and medicine is a legitimate field of

enquiry for the botanist and the one by means of which he comes most frequently in contact with the unscientific public. Now, there is no place where such investigations can be carried on so conveniently as at a properly equipped Botanic Garden, where plants can be grown under observation and examined, at all stages of development, by investigators specially trained to understand and make the most of what they see, and also fully equipped with the necessary apparatus and literature. Such knowledge as we have, as to the value for food of most of the more important products of the vegetable kingdom, has been derived from the aboriginal inhabitants of the countries where the plants producing them occur in a state of nature; but the scientific botanist has added very much indeed to this list of useful plants from his knowledge of other species in the same or closely allied families. On the other hand in medical botany the useful knowledge derived from aboriginal sources is comparatively small, by far the larger proportion of the valuable vegetable remedies having been discovered by the scientific chemist as a result of direct chemical analysis of plants, aided by experiment or actual knowledge of the effects produced upon the human frame by the various products obtained.

A subject of great interest to everybody and one which is frequently made an excuse by ill-informed people for not studying wild plants, is the fear of being poisoned. Strangely enough this fear never troubles them with regard to cultivated and greenhouse plants where a much larger proportion of poisonous species is to be found than is the case in the woods around us. As a matter of fact poisonous plants in Canada are exceedingly rare. The Poison Ivy *(Rhus Toxicodendron)* is the only plant in this part of Canada, which is poisonous to the touch, and even with regard to this, although it is so virulent in the southern states it is, as you all know, an extremely rare thing to find anyone affected by it here. There are, also, far fewer plants than most people think which are actually poisonous, even when taken internally; and anyone with a very small amount of knowledge and common sense is warned against these by their acrid taste or nauseous odour. This, I have no doubt, is the reason why cattle and wild animals which feed on vegetation are so seldom poisoned. The poisonous plants are distasteful to them and are not eaten in any quantity when their dangerous

nature has been detected by the keen senses of taste or smell. For this reason I can make no excuse for people, who are old enough to think, who allow themselves to be poisoned, and I do not believe any sensible person ever will.

I quite agree with my friend Professor Macoun who a few years ago, in speaking of the vast supplies of good wholesome food going to waste all round us every year in the shape of various fungi, touched on this subject and speaking of the small number of poisonous plants in any locality said: "I have no patience with the stupid people who allow themselves to starve to death in a country clothed with grass, plants, and trees, nearly all of which are capable of sustaining life." With regard to such plants as contain noxious principles there are a few general rules, which may be borne in mind by those who travel in the wilds and are liable to require such knowledge, and to which, without going into undue detail, it may not be amiss to refer here. Plants belonging to the same natural order, as a rule, contain similar constituents. There are large orders of plants every member of which makes wholesome food, notwithstanding the occasional presence of acrid principles; such we find in the cress family which may always be recognized by their cruciform flowers, made up of four separate petals The same may be said of all the rose family which have the stamens standing on the calyx as we find in the rose and apple. All grasses as wheat and corn, and all plants bearing papilionaceous flowers as the bean, the pea, and clover, produce wholesome food for man and beast.

Mrs. Lincoln in her "Familiar Lectures on Botany" says "Such plants as have five stamens and *one pistil*, with a corolla of a dull livid colour, and a disagreeable smell, are usually poisonous; the thorn apple *(Stramonium)* and tobacco are examples. The umbelliferous plants, which grow in *wet* places, have usually a nauseous smell: such plants *are poisonous*, as the water hemlock. Umbelliferous plants which grow in dry places, usually have an aromatic smell and are not poisonous, as caraway and fennel. Plants with labiate corollas, and containing their seeds in capsules, are often poisonous, as the foxglove (*Digitalis*); also such as contain a *milky juice*, unless they are compound flowers. Such plants as have horned or hooded nectaries, as the columbine and monk's hood are mostly poisonous. Amongst plants which are seldom

poisonous are the compound flowers as the Dandelion and Boneset (*Eupatorium*); such as have labiate corollas, with seeds lying naked in the calyx, are seldom or never poisonous, the mint and thyme are examples of such plants."

Plants containing mucilaginous matter are, as a rule wholesome, and in British Columbia the Indians eat almost any bulbous root, making regular annual trips to districts where certain liliaceous plants abound Amongst those roots which they collect in this way are the camass (*Camassia esculenta*) *Lilium Columbianum*, *Fritillaria*, the small bulbs of *Calypso borealis* and, as Professor Macoun tells me, the bulbs of nearly all bulbous-rooted plants, which they designate by the genera name of *muck-a-muck*. Another article of food to which they are very partial is the inner bark of young trees of *Pinus Murrayana*.

With regard to the poisonous properties of the parsley family referred to above, Dr. Trimen says, "The properties of the *Umbelliferæ* are of three principle and remarkably different kinds. In one section a watery and acrid matter is present; in a second a milky gum-resinous secretion; and in a third, an aromatic and oily one. When the first of these predominates, they are poisonous; the second in excess converts them into stimulants; and the third renders them carminative and serviceable as pleasant condiments. If both the acrid and gum-resinous secretions be absent they are often useful articles of food, as happens with the sweet roots of the carrot and the parsnip, and the foliage of the samphire, fennel, chervil, parsley and celery."

Before closing I should like to say a few words concerning the Botanic Garden and Arboretum at the Central Experimental Farm. I have there in my charge a tract of 65 acres of rolling land admirably suited to the purposes of a Botanic Garden. The higher portion is virtually a plateau with a wide bottom running round three sides of it and with banks sloping down to the bottom land. This variety of aspect is very convenient for the purposes to which it has been assigned. The soil is not particularly good but will improve with treatment. The different natural orders and families of plants will be represented by groups, many of which have been already located. There are at the present time about 400 species of trees and shrubs planted out, and of most of these there are two specimens—all are labelled and a record has been

taken of their time of planting. Special efforts will be made to have the collection illustrating the Canadian flora as complete as possible, and I now appeal to the members of the Ottawa Field-Naturalists' Club to help me in securing roots of as many as possible of our native plants for cultivation. Every working botanist knows the difficulty of deciding specific limits from dried herbarium specimens. I shall, therefore, make a specialty of trying to clear up some of the botanical problems, which now bother botanists, by growing several specimens from seed, where possible from various localities. I have already several species under cultivation, the seeds of which were collected by Professor Macoun, myself or some of my correspondents, and I shall be glad to experiment with any seeds sent to me for that purpose. I would particularly request now the seeds of Asters and Solidagoes, as I am convinced there is yet much to be done, in working up the Canadian representatives of these two genera, which can only be satisfactorily accomplished by growing them from the seed.

Besides the solution of such scientific problems as the above, economic plants from other parts of the world will be tested as to their suitability for profitable cultivation in Canada. Forestry now becoming so important in Canada, will also receive attention. Already enormous numbers of young trees have been grown from the seed and distributed to settlers on the treeless praries of Manitoba and the North-West Territories. Before long it will become necessary in Canada to grow trees for timber, in the same way as is now systematicaliy done in Germany. This however will not be done for many years to come and by that time, I hope, valuable data will be available from the growth of the specimens on the Experimental Farm to show what kinds of trees can be profitably grown.

Many other benefits, I trust, will come from this Botanic Garden now begun, by which general botanical knowledge, economic and scientific, will be advanced, and I look forward to the time when the Botanic Garden of Ottawa, shall be one of the chief attractious of this part of the Dominion.

LIBRARIAN'S REPORT, 1890-91.

To the Council of the Ottawa Field-Naturalists' Club.

Ladies and Gentlemen,—I have the honour to report that since our last annual meeting the library of the Club has been removed from its old quarters in the Literary and Scientific Society's rooms to a room kindly provided for that purpose in the Normal School building by Principal MacCabe, Partly owing to lack of time on my part and partly to the delay of a carpenter intrusted with the making of a set of shelves, the books have not yet been placed in order, for which an apology is due and is hereby tendered to Principal MacCabe as well as to the Council of the Club. I am assured, however, that the shelves are now being made and will shortly be completed. Their cost is not to exceed $6.00. An appropriation of $10.00 has been made for binding periodicals received in exchange for the OTTAWA NATURALIST, and arrangements will be made for the binding of fourteen volumes, which will probably contain upwards of twenty volumes of periodicals, as some of them are small enough to be bound two or more together. Eight names have been added to our exchange list during the year, as follows:—

Botanische Gesellschaft, Munich, Bavaria.
Iowa Academy of Sciences, Des Moines, Ia.
Jardin Botanique, Rio de Janeiro, Brazil.
Natural History Society of British Columbia, Victoria, B.C.
Natural History Society of P. E. I., Charlottetown, P. E. I.
Rochester Academy of Sciences, Rochester, N.Y.
Scudder S. H., Cambridge, Mass.
Victoria University, Cobourg, Ont.

The total number of exchanges now on our list is 71.

A list of publications received as donations and exchanges during the year is appended to this report.

Respectfully submitted.

WM. A. D. LEES,
Librarian.

OTTAWA, 17th March, 1891.

PUBLICATIONS RECEIVED 1890-81.

Auk, The (organ of the American Ornithologists' Union).
American Museum of Natural History—Annual Reports and Bulletins.
American Association for the Advancement of Science—Proceedings.
American Geologist.
Botanical Gazette.
Bulletin of the Torrey Botanical Club.
Boston Society of Natural History—Proceedings
Canadian Entomologist.
Canadian Record of Science.
Cincinnati Society of Natural History—Journal.
Central Park Menagerie—Report.
California Academy of Sciences—Proceedings and Occasional Papers.
Department of Agriculture, Canada—Reports of Experimental Farms.
Elisha Mitchell Scientific Society—Journal.
Entomological Society of Ontario—Annual Report.
Entomologica Americana.
Essex Naturalist.
Geological Survey of Canada—Reports and Maps.
Hummingbird, The.
Iowa Academy of Sciences—Proceedings.
Illinois State Laboratory—Bulletin.
Johns Hopkins University— Circulars.
Journal of Comparative Medicine and Veterinary Archives.
Kansas Academy of Sciences—Transactions.
Kansas Naturalist.
Manitoba Historical and Scientific Society—Transactions.
Massachusetts Historical Society—Transactions and Prize Lists.
Meteorological Service of Canada—Weather Review.
Nautilus, The (Conchological).
Natural History Society of New Brunswick—Bulletin.
Natural Science Association of Staten Island—Proceedings.
Nova Scotian Institute of Natural Science—Proceedings.
New York Microscopical Society—Journal.
New York State Entomologist—Sixth Report.

North Staffordshire Field Club—Annual Report.
New York Academy of Sciences—Transactions.
Ohio Agricultural Experiment Station—Bulletin.
Ornithologist and Oologist.
Ormerod, Miss Eleanor A.—Reports on Injurious Insects, 1889, 1890.
Physik-Oekonomischen Gesellschaft (Konigsberg, Prussia)—Schriften.
Psyche (Entomological).
Queen's College—Calendar.
Royal Society of Canada—Proceedings and Transactions.
Rochester Academy of Sciences—Transactions.
Smithsonian Institution—Reports and Price List of Publications.
U. S. Department of Agriculture—Insect Life—Journal of Mycology—Bulletins and Circulars.
U. S. Geological Survey—Monographs I, XV, XVI—Mineral Resources of the U. S. 1889—Bulletins 54 to 66.
Université Laval—Annuaire.
West American Scientist.
Wisconsin Naturalist.

Non-periodical publications have also been received from the following:—

American Ornithologists' Union.
Chamberlain, Montague.
Edwards, Henry.
Ells, Dr. R. W.
Forster, Dr. E. J.
Farlow, Prof. W. G.
Geological Survey of Canada.
Ormerod, Miss E. A.
Piers, Harry.
Scudder, S. H.
Smith, John B.
U. S. Department of Agriculture.
White, Lt.-Col. William.

———:o:———

WINTER SOIREES.

The Soiree Committee requests such members of the Club as are willing to read papers during the coming winter to send in the titles to the Secretary as soon as possible, and at the same time to indica approximately the date when they prefer to present them.

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.