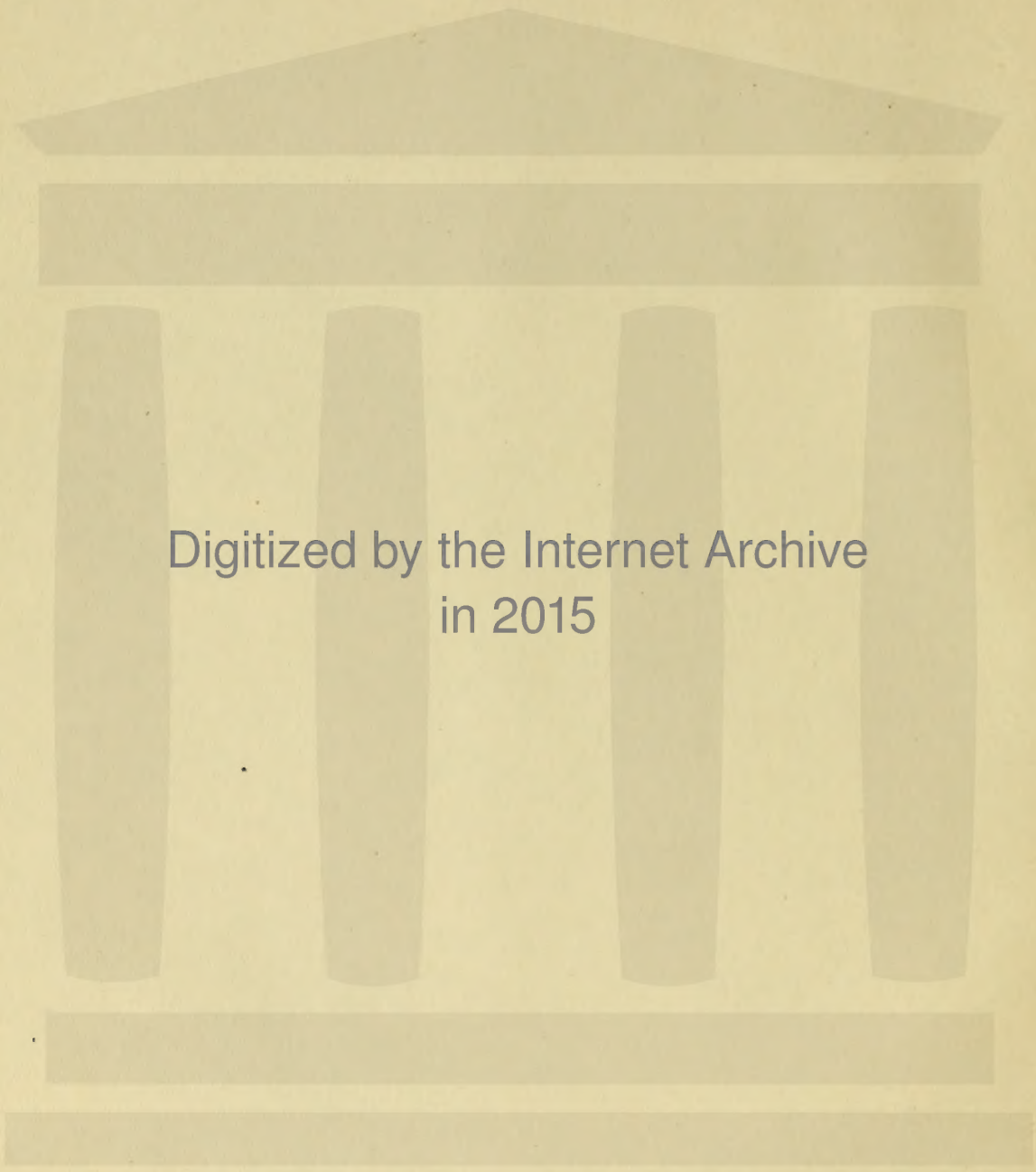

# ANNALS OF THE

# BOTANICAL SOCIETY OF CANADA.

## ORIGIN OF THE SOCIETY.

Towards the latter end of November, 1860, a proposal was made to organize a Botanical Society. There being no such Institution in operation in Canada, it was thought that much benefit might result from its establishment. Accordingly an advertisement was inserted in the Newspapers, requesting the attendance of all persons favorable to the proposal at a Meeting to be held in the Chemistry Class Room, in the University of Queen's College, on Friday Evening, 7th Dec., 1860. In order to explain more fully the object of the Meeting, the following statement was inserted in the Newspapers, simultaneously with the advertisement referred to :—

Her natural resources have enabled Canada to take a conspicuous place among the British Colonies as a cultivator of natural science and useful art. Our Colony is as yet far behind in the race in regard to one department of useful knowledge, that which relates to her indigenous vegetable productions. In Britain, Botany is a universal pursuit. Some persons follow it merely as a favorite amusement, which affords the most healthful combination of physical and mental exercise,—a stream of thought that may be most pleasantly followed, through the meadows and woods, in the rosy time of the year; others pursue it as a scientific study, which unfolds the mysteries of life, as they are displayed in the varied phenomena of growth and reproduction; while a large number are engrossed with it as a science, whose relations to the useful and ornamental arts enable man to render tributary to these the products and forces of nature. In countries like Canada, whose inhabitants are wholly occupied in industrial production and trade, Botany is not apt to be pursued for its own sake. As a scientific pursuit, it is chiefly inviting to persons of leisure and taste. But its relations to industry are so important that no civilized land can allow it to fall into neglect without suffering thereby in its material interests. In England, and France, and Belgium, and Prussia, it will not be believed that a great agricultural and timber-producing country, like Canada (young as it is), is pushing on its industry in ignorance of the very science by which that in-

dustry ought to be guided. Much good botanical work is now being done in Australia, in various parts of India, in Ceylon, in the West Indies, at the Cape of Good Hope, and many other less important stations. It has been proposed that Canadian botanists should follow the examples set before them, and unite together to develope a knowledge of the Forest Flora, which is, in every sense, the richest blessing to man with which nature has gifted this great land. In accordance with the above proposal, a meeting is to be held in Queen's College, Kingston, on Friday Evening, the 7th December, at eight o'clock, to consider the propriety of originating a Botanical Society. The special objects of the new body, the mode in which it is proposed that these should be carried out, and various other matters of detail, will be brought forward for consideration and discussion in an address to be delivered by Professor Lawson. We cordially commend the project to the attention of our readers. It has been well considered, and, if carried out with energy, will be productive of benefit to the country, both in contributing to raise the fallen standard of botanical science among us, and as a means of directing public attention to neglected sources of industrial wealth. Professional and amateur botanists in Canada—few and far between—will hail, in the Botanical Society, a means of communication and interchange of information, and also a means of exchanging specimens and seeds, which will not only facilitate their labors in their respective localities, and give a new relish to the study, but will so enable them to work together, under a common plan, as to give a value to their researches that no desultory observations, however interesting and important in themselves, can ever attain. This is the manner in which investigations have been carried out most successfully in regard to the distribution of the Floras of other countries, and the only means by which certain results can be obtained where there are numerous observers. Some of the leading Botanists, both of this continent and of Europe, have already signified their approval of the scheme in their readiness to co-operate. May it meet with its due measure of success!

### *First Meeting.*

### FRIDAY EVENING, 7TH DECEMBER, 1860.

A meeting, called by public advertisement in the Newspapers, was held in the Chemistry Class Room of Queen's College, Kingston, on Friday evening, 7th December, to consider the propriety of organizing a Botanical Society. There was a large attendance of gentlemen, including the Very Rev. Principal Leitch, D. D., Queen's College, Mr. Drummond, Manager of the Montreal Bank, Professors Williamson, Weir, Mowat, Stewart, Yates, and Lawson, Mr. May, B. A., Queen's College School, Dr. Octavius Yates, Dr. Dupuis, Odessa, C. W., Mr. Thibodo, Mr. Skinner, Member Pharm. Society, Mr. Ferguson, Bellevue Terrace, Mr. Danson, F. C. S.,

Mr. Hobart, Mr. Duff, Princess Street, Mr. J. Machar, Jr., M. A., Mr. Andrew T. Drummond, Jr., B. A., Mr. Smith, Librarian of Queen's College, Mr. M. Flanagan, City Clerk of Kingston, and many other citizens, as well as graduates and students in the Faculties of Theology, Arts, and Medicine.

The Very Rev. Principal Leitch, D. D., of the University of Queen's College, was called to the Chair.

Letters of apology for unavoidable absence, but warmly expressing approval of the object of the meeting, were read from Professor Litchfield, M. D., Rockwood, Dr. Sullivan, Hotel Dieu, and Mr. Briggs. Professor Lavell was also unavoidably detained from the Meeting.

## OPENING ADDRESS.

By the Very Rev. Principal Leitch, D. D., the Chairman.

The Rev. Principal Leitch, Chairman, announced that the object of the meeting was to consider the propriety of originating a Botanical Society, having for its object the investigation of the Canadian Flora. Universities (he said) do not discharge all their functions by merely teaching the acknowledged truths of literature and science; it is a part of their duty to organize and instigate original inquiry in the different departments of knowledge. Systematic research must not only be directed, but, to a large extent, carried out by the personal labor of those who are connected with Universities. This is especially the case in a comparatively new country, where amateur laborers are few and scientific appliances not generally available. In a new country the prosecution of scientific research is needful, for various reasons; we have here commenced at the right point. Industrial production and commerce are all important to a new country; and botany, as now pursued, yields to no other science in its bearings on field industry and other useful arts of life. The country, too, is comparatively unexplored. The shores of the St. Lawrence, along which settlements have existed from an early period, have no doubt yielded up most of their botanical treasures to travellers and residents; but we have still an extensive back country that is comparatively unexplored. There is ground, therefore, for the establishment of a Botanical Society, for we have here the great stimulus of being able to add to existing knowledge. In old countries a botanist may long pursue his studies, not indeed without great benefit to science, but without having his labors rewarded by meeting with anything new, with plants not previously collected and described by his predecessors in the science. But here there is room for new discovery; the student may go forth to the woods, and hope, sooner or later, to set eyes upon a plant which no human eye has seen before. His name, it may be, will become associated with it, and thus a permanent record of his discovery will be inscribed in the book of science. All sciences have not such

advantages; some have not the same direct appeal to commerce; some may be as well pursued in other countries as in Canada, and thus do not present the same attraction to the Canadian resident, who desires to extend the sphere of knowledge. An Astronomical Society, for example, would not have the peculiar advantages of a Botanical Society in a country like this. Referring to the large attendance, and the interest manifested in the object of the meeting, the chairman alluded to the early history of the scientific societies in older countries. The Royal Society of London and other leading scientific institutions in Europe began at an early period, under humble auspices and with unambitious objects. They gradually increased as science progressed and a taste for it was diffused; and so it will be with the Botanical Society, if we do not at the first attempt too much. It may be said that now is scarcely the time to commence a Botanical Society, that the country is not yet far enough advanced, that botany is not sufficiently studied, to warrant the establishment of a Botanical Society. It is true that botany has been neglected in this country. While this is a reproach to Canada, it affords no reason why a society should not be established. On the contrary, it is a strong reason why an attempt should be made to form one. There is a patriotic feeling rising up in Canada, which is especially strong in the youth of the province, and every well-wisher of Canada must be delighted to see it. Here then is an opportunity, by the establishment of this Society, to wipe off a reproach that has long hung over the country, by prosecuting a path of research that has been neglected. The proper method, then, is to begin early, to engage in the work, and the Society will progress, increasing not only our botanical knowledge, but fostering the taste for its study. Thus, as the science progresses among us, the Society will extend, so that we may hope in time to see the germ which we this evening cast into the soil grow up into a goodly tree, spreading its branches over the length and breadth of Canada, which is yet destined to be a great country.

## REMARKS ON THE PRESENT STATE OF BOTANY IN CANADA, AND THE OBJECTS TO BE ATTAINED BY THE ESTABLISHMENT OF A BOTANICAL SOCIETY.

By George Lawson, Ph D., F. B. S. E., Professor of Chemistry and Natural History in the University of Queen's College.

Dr. Lawson pointed out the peculiar sphere in which the botanist is called to labor, the range of his studies, and the means required for their pursuit. It is of great importance (he said) that at the outset the real object of our proposed Society should be understood. The establishment of a Botanical Garden, and other appliances, must be regarded as secondary to the great object of the Society, the prosecution of scientific botany. Botany is at a low ebb in Canada, at a lower ebb

than in most civilized or half civilized countries on the face of the earth. At the close of the eighteenth century only five dissertations on botanical subjects had been published by the whole medical graduates of the great continent of America. Since then the indefatigable labors of such men as Michaux, Torrey, Harvey, Curtis, Boott, Engelmann, Tuckermann, Sullivant, Lesquereux, and especially of one whose name and fame rise above all the rest, Asa Gray, have brought our knowledge of the botany of the United States on a level with that of the best botanized countries of Europe. The Flora of Canada has also been elaborated since then by one who still presides over the destinies of botanical science, not in England alone, for his authority is recognized wherever the science is pursued. But, during a period of nearly thirty years, very little has been added to our published knowledge of Canadian botany. Information respecting our indigenous plants must still be sought in the work of Sir William Hooker, issued from the Colonial office in England in 1833. That work, founded as it necessarily was, on dried specimens carried home by passing travellers, afforded to the botanical world an admirable example of how much could be made out of slender material when in good hands. Unimpeachable as a work of science, unsurpassed in the whole range of botanical literature in the accuracy and beauty of its illustrations, the *Flora Boreali-Americana* afforded the means of developing still more fully a knowledge of the Canadian Flora. The North American Flora of Torrey and Gray, and the Manual of the Botany of the Northern States, offered additional temptations to the pursuit; but advances have not been made commensurate with the advantages that were offered: we have still, therefore, the singular anomaly of a country distinguished by its liberal patronage to science, dependent for its information respecting its native plants on the descriptions of specimens culled by early travellers. What was thirty years ago, and is now, of the highest value, can only in a partial manner meet the wants of the country in these days, when new manufactures and new forms of industry, seeking new products to work upon, are daily springing up around us. We desire to place the science of Botany on a more satisfactory footing in Canada than that which it now holds; we desire to increase the existing stock of knowledge; we desire to diffuse a taste for the study, so as to add to the number of laborers now in the field; and we desire to place on record new observations and discoveries, as they arise. The Botanical Society is designed as a means of carrying out purposes such as these. Extensive circulation was given sometime ago, by Canadian newspapers, to a report that Sir Wm. Hooker was on his way to Canada with a staff of assistants, to explore the botany of the country. I have the best authority for stating that that report was without foundation. It probably originated in certain proposals that were made to the Colonial office regarding the publication of a series of popular Manuals of Colonial Botany; but no expedition was ever contemplated by Sir Wm. Hooker, or any one else, at the instance of the Government. On the contrary, recent com-

munications from the botanical advisers of the Home Government indicate that Canada must follow the salutary example of other old established British Colonies, and conduct for herself investigations into the nature and distribution of her indigenous productions. We already possess in Canada several important scientific societies in active operation. While the Canadian Institute is of a comprehensive character, embracing all branches of science, literature and philosophy, the special department of geology is amply cultivated by the Natural History Society of Montreal, which has also, however, made valuable contributions to zoology and botany. In addition to such institutions as these, we have, of still more special character, the Government Geological Survey, which has been instrumental in carrying out investigations of the greatest importance to the country, whether their results be viewed as intellectual achievements or as contributions to material industry. It is proposed that our Society shall have for its object the advancement of Botanical Science in all its departments—Structural, Physiological, Systematic and Geographical; and the application of Botany to the useful and ornamental arts of life. The means by which this object may be accomplished are various, and will come before us for discussion from time to time. In the meantime, it is proposed that there shall be monthly evening meetings in Kingston during the winter for the reading of papers, receiving botanical intelligence, examining specimens, and discussing matters of scientific interest in relation to the science; also that there shall be field meetings during the summer in distant localities in Canada, as well as in the other British Provinces of North America, and occasionally also in the adjoining States, whereby our members may have an opportunity of investigating the botany of districts that have been imperfectly examined. By the above, and similar means, much important information may be brought together. Such facts and results, new to science, as are laid before the Society, from time to time, will afford materials for a periodical publication, whereby our stores may be rendered available to the public in Canada, and to botanists in other parts of the world. In addition to such means, the Society may greatly promote its objects by correspondence with botanists in other countries, and especially with those who are located beside the extensive public herbaria, botanical libraries, and gardens, in various parts of the United States and Europe. By correspondence with such persons, many doubtful points in nomenclature may be set at rest, while the existence of information relating to Canadian Botany may be ascertained that might otherwise remain unknown. Botanists distinguished in certain branches of the science may be called upon to furnish reports on their special subjects, for which materials may be brought together by the members. Such aid will be of the greatest value to the Society, and I have therefore gratification in informing you that communications have already been received from some of the most active botanists in the United States, England, Scotland and Prussia, promising cordial co-operation. So soon as

preliminary operations enable us to proceed to the discussion of scientific business, you will also have an opportunity of ascertaining that we already have observers throughout the length and breadth of Canada, as well as in the other North American Provinces, from the Red River in the far West to the Island of Prince Edward in the East. In common with the botanists of other countries, we must necessarily take cognizance of those discoveries in structural and physiological botany which are daily challenging a careful examination. But our position in a comparatively new country points out to us a special path of research which it will be our duty to follow—that which has for its object the investigation of the species botany of Canada, the geographical and local distribution of the plants. The indigenous plants, whose products are now used or are capable of being applied to the useful arts, will deserve a large share of attention, and no doubt regard will also be had to those that are suited to our climate, but have not yet been introduced. Strewed around our path in the woods and on the shores of our lakes are many plants capable of yielding food and physic, dyeing and tanning materials, oils, fibres for spinning and paper-making, &c. Even in the midst of the City of Kingston, growing on vacant lots, and in court yards, there are drug-plants enough to stock a Liverpool warehouse. Such will no doubt be brought into use when better known, and thus an increase will be effected in the production of the country. Two things are necessary for the successful prosecution of such researches—a good botanical library and a good herbarium. During the past year botanical works of great value have been added to the library of Queen's College, and these, together with others in private hands, which will be accessible to members of the Society, embrace almost all the works that have a direct bearing on the Canadian flora. There is thus laid in Kingston the basis of a botanical library, which it will be the object of this Society to foster, by additions obtained by purchase or exchange with other scientific bodies, provided a suitable arrangement can be made with the University authorities. With respect to a herbarium, or collection of dried plants, this is justly regarded by every Botanical Society as absolutely necessary to enable members to refer specimens correctly to their species. It will therefore be satisfactory to know that arrangements are now in progress, whereby the herbarium, presently attached to the Natural History Chair of Queen's College, will be re-arranged in a convenient form, so as to become available for this purpose. The Herbarium embraces a fair representation of the Floras of Europe, Asia, Africa and Australia, and is especially rich in American species; it has been named with great care, under favorable circumstances, many of the specimens, in difficult and obscure families, having passed through the hands of such botanists as Balfour, Greville, Gray, Babington, Heldreich, Hooker, Lindley, Bruch and Schimper, Syme, Wilson, Berkeley, Moore, Mitten, Tuckermann, Carrington, Watson, Lowe, Lindsay, Harvey, Leighton, and other authorities in nomenclature. In addition to such means as the above, there is now an abundant supply

of excellent Microscopes in Queen's College, with all needful apparatus for the prosecution of minute researches and microscopical analysis. It will be observed that we propose to occupy a new field of research, to cut a new sod that has hitherto been walked over by Canadians in comparative neglect. And, as before cultivation can take place, a clearance must be made, so I have endeavored to answer some of the objections that might be started to the formation of such a Society, and to point out the nature of the ground which it proposes to occupy. While leaving to other Societies the discussion of the more general questions of science, and to special Societies their peculiar topics, we propose to employ the Botanical Society as an instrument for the collection of facts and the working out of details which are of immediate interest to the botanist alone, but of the greatest importance in leading to correct results in general science. Scientific societies on a broader basis have too often degenerated into popular institutions, calculated rather for the amusement of the many than for the encouragement and aid of the few who are engaged in the prosecution of original discovery. We shall be guarded against such a result, in a great measure, by the special object of our Institution, but it will be needful, also, while we attempt to spread a taste for Botany, and to diffuse correct information as to its objects, its discoveries, and its useful applications, that we should seek rather to bring our members and the public into scientific modes of thought and expression, than to allow our Society to yield up its scientific character to suit the popular taste. There is much reason to believe that the want of an organization of this kind, whose duty it is to collect and record facts and discoveries, has been the means of losing to science materials of great value. There have been casual residents in Canada, at different times, who have made collections of greater or less extent, and who have, in some cases, carried out special investigations in Botany, without leaving any printed record of their labors. Some of these may still be rescued from oblivion; but there are also other observations and discoveries, made by present residents in the country, which we may confidently hope will be made available to the Society's purposes. Professor Williamson's long residence in Kingston has enabled him to make an extensive series of observations on our local flora, which are of the greatest interest, and other Professors of Queen's College have followed his example. Some of our graduates and students have also, of late years, made collections of greater or less extent, during their vacation residence in different parts of the country. The neighborhood of Kingston, and the adjoining islands, have been investigated by Mr. Andrew T. Drummond, B. A., who obtained a prize for his valuable collection, in the Natural History Class, two years ago. Dr. Dupuis has collected the plants of the rear of Frontenac and Ernestown, while Newboro', Perth, the Ottawa country, have each their collectors. Dr. Giles has, I believe, been devoting special attention to Lichens. Mr. Schultz has had an opportunity, during the past season, of botanizing the Red River Settlement, and I have received notices of

collections, formed by our students in other distant localities, that may prove of great interest. Circumstances such as these give us reason to hope that our efforts to raise up a Botanical Society will be attended with success, and that its labors will be beneficial in leading to a more extended knowledge of the indigenous productions of Canada. The objects sought by the establishment of a Botanical Society in this country are of great importance, both in a scientific and economical point of view. The field is broad, and the soil is rich. The extent to which we can cultivate it will depend entirely upon the number of the laborers, and the zeal and industry which they display. Let us not be disappointed, therefore, with our first results. Let us lay a foundation, and persevere in the work, and workers will gather around us as they have done before in the Botanical Societies of other countries. To organizations of this kind, more than to any other means, are we indebted for the advanced state of botanical science at this day ; and in a country such as this, it is especially needful to have a wide-spread organization in order to elicit satisfactory results. In an attempt to organize a Society such as this, we may confidently appeal to many classes of the community. The theologian and moralist see in the vegetable kingdom a display of the power and wisdom and goodness of our Creator, and beautiful types of spiritual teaching ; the medical man recognizes in it the source of his most potent drugs ; the sanitary reformer knows that the simpler forms of vegetation are often the cause, and more frequently the index, of widely spread diseases; the lawyer finds in the microscopical structure of vegetable products a ready means of detecting frauds, adulterations and poisonings ; the commercial man recognizes the value of a science having such bearings, and directly devoted to the extension of the sphere of industry ; the spinner and paper-maker must here obtain their knowledge of the mechanical condition of vegetable fibres ; the farmer, the gardener, the orchardist, the vine-grower, the brewer, the dyer, the tanner, and the lumberman, must all apply to botany for an explanation of matters that daily come before them in their various avocations. As an utilitarian institution then, our Society is worthy, and will no doubt receive, warm support ; but it is to be hoped that many zealous laborers will enter the field from a higher motive—a desire to promote the cause of science.

## NOTES AND SUGGESTIONS RELATIVE TO THE ESTABLISHMENT OF A BOTANICAL GARDEN.

By J. P. Litchfield, M. D., Professor of Medical Jurisprudence in the University of Queen's College, and Physician-Superintendent of the Criminal and Female Asylums for Lunatics, Rockwood.

Dr. Litchfield has pleasure in complying with the request to make a note of any suggestions that occur to him in regard to the formation of a Botanical Soci-

ety in Kingston. Dr. L. aided in the formation of the Royal Botanic Society of London, and will do all in his power to aid a similar Society here. Canada is interested in diffusing a knowledge of her botanical productions, and equally so in acquiring productions from other countries suited to her soil and climate. The University of Queen's College is interested in the formation of a Botanical Society and Garden, Botany being taught in the College. The piece of land in front of Queen's College has a fine aspect and excellent drainage. It is well situated as a site for glass hot-houses. If the College land is found insufficient in quantity for a botanical garden, other lands might be obtained for extending the garden. The new garden of the London Horticultural Society will be small in extent, but promises to be all the more perfect in its arrangements, partly perhaps in consequence of its circumscribed area. The gardens of the Apothecaries' Society at Chelsea, and of the Botanic Society in Regent's Park, London, are of comparatively small extent. A garden of small size, with space for subsequent extension, involves less outlay, and is more easy of accomplishment. Half an acre of hot-house on the new and economical plan invented by Sir Joseph Paxton could be conveniently and cheaply placed on the ground referred to in front of the main building of Queen's College. I send sketches of the plan. The cost would be small, the frames being made by machinery of Canadian wood, and the glass procured from Birmingham, St. Helens, or Newcastle. The glass houses are portable, as well as cheap, when constructed upon this plan. A terrace walk being constructed to run parallel to the broad balcony in front of the College building, and beneath this terrace a Paxton or Ormson glass house, good space would be afforded for delicate or exotic productions during the Canadian winter, and admirable exhibition buildings during the summer and autumn. From the balcony, in fine weather and during exhibitions, addresses and announcements might be made to members and visitors on the terrace beneath. In the College class-rooms lectures might be delivered, and scientific meetings and conversaziones held. The balcony would serve the purpose of a music stand when music is deemed desirable. To establish a Botanical Garden as well as a Botanical Society in connection with the College it would be necessary, first, to obtain the sanction and assistance of the College authorities; second, the cordial concurrence and co-operation of the public, and more especially of those who take an interest in horticultural pursuits. The equivalent to the College would be that the Botanical Garden would render its organization more complete, and would furnish the Professors of Botany and Materia Medica with specimens to illustrate their lectures and teachings. The interest excited in a scientific subject taught in the College would add to the number of pupils in the classes. The public would find an equivalent in having, in the very centre of the city, and of easy access, a Botanical Garden furnished with all that is needed for horticultural and florticultural displays—a place of high intellectual resort, to which they may hereafter proudly point as one of the

first institutions formed in Canada for the advancement of botanical science. The Electoral Division Society for promoting horticulture, agriculture, &c., and the City of Kingston Horticultural Society, which this year united to render their exhibitions more complete, would doubtless come frankly forward to aid a society whose objects are in a great measure identical with their own. These two societies collected in the locality in 1860, with the addition of a Government grant for the furtherance of the objects, a sum of nearly $1500. One half this amount would be sufficient, on the simple and economical plan of Sir Joseph Paxton, for the construction of a glass house 100 feet long with 12 feet lights. I quote these figures to show that the object is not unattainable if there is a desire to accomplish it. The proposed Botanical Society would materially strengthen itself by opening communication and exchanging courtesies with older societies in other parts of the world. Contributions to the garden might be procured from London and Paris, Edinburgh, Glasgow, and other places. Such men as Professor Lindley, Sir W. J. Hooker, Dr. Balfour, and others connected with Botanical Societies and Gardens, should be invited to take an interest by being nominated Associates of the Society. * * * After all, however, the success of the proposed Botanical Society must depend upon the intelligence, earnestness, and activity of its members. Botany is a science that may be taught in a popular as well as scientific form, to the young as well as to the old, and to one sex as well as to the other. The botanical garden has charms which can be appreciated by all. The country around is rich in specimens of interest to the botanizing student, and the formation and labors of the Society may alike tend to develope latent talent, improve our knowledge of the North American Flora, and extend the area of scientific knowledge and research.

The Rev. Principal Leitch reviewed the leading points brought forward in the addresses, and referred briefly to some of the more important advantages that might accrue to the country from an institution such as the one that had been proposed, alluding especially to the inducements which it would give to botanical research. Dr. Lawson, he said, when enumerating the grounds for the establishment of a Botanical Society, omitted the weightiest of all, viz., that we can count upon his services. Without his large and valuable experience in the management of such societies, I fear we would have little heart to carry out the scheme. He for a long period acted as the Secretary of the Edinburgh Botanical Society—one of the most active in the world; and from his accurate knowledge of the details of management, and his well merited distinction in botanical science, he is qualified in no ordinary measure for organizing such a society as the one we contemplate. The labor will fall chiefly upon his shoulders, but we must pledge ourselves to lend him every assistance in our power. He concluded by moving the following resolution, viz: THAT THIS MEETING RESOLVE TO FORM A BOTANICAL SOCIETY. The motion was second-

ed by Professor Williamson, and, having been put to the meeting, was unanimously agreed to.

The Rev. Professor Mowat read to the Meeting a draft of Laws which the promoters of the Society had framed for the consideration of the meeting, whereupon the chairman called for any additional suggestions.

Dr. Dupuis moved that the draft submitted by Professor Mowat be approved of and adopted as the Laws of the Botanical Society. The motion was seconded by Dr. H. Yates and unanimously agreed to.

Professor Lawson, seconded by Professor Williamson, moved the appointment of a Committee to suggest Office Bearers for election at next meeting, which was agreed to. Members of Committee: Principal Leitch, Professors Mowat, Williamson, Stewart and Lawson,—Prof. Lawson, Convener.

Professor Yates, seconded by Mr. Darrach, moved the appointment of a Committee to prepare Rules for regulating the exchange of specimens among the members, distribution of seeds, &c., which was adopted. Members of Committee: Principal Leitch, Professors Yates, Williamson and Lawson, Mr. Duff,—Professor Yates, Convener.

Professor Williamson moved the appointment of a Committee to consider the propriety of printing a Catalogue of Canadian Plants, and to suggest a plan for the same, the object of the catalogue being to facilitate the exchange of specimens, and obtain the returns of local floras. Professor Williamson pointed out the great disadvantages under which students and collectors labor at the present time, there being no convenient modern list of Canadian plants; and he drew attention to the uses to which such a list might be applied. He concluded by alluding to the various works that might be used for determining species, the most convenient of which is Gray's Manual of the Botany of the Northern States, which, of course, does not cite stations in Canada for the various plants. Professor Williamson's motion was seconded by Mr. O'Reilly, and agreed to. Members of Committee: Professors Williamson, Weir, Lawson, and Dr. Dupuis,—Professor Williamson, Convener.

The Rev. Professor Weir, after a few remarks on the importance of such a Society, and the cheering manner in which the proposal to establish it had been received by so large a meeting, moved the appointment of a Committee to nominate foreign botanists and others suitable for election as honorary and corresponding members, in terms of the Laws; the Committee's Report to be given in against next meeting of the Society. The motion was seconded by Professor Williamson, and agreed to. Members of Committee: Professors Weir, Williamson, Mowat and Lawson,—Prof. Weir, Convener.

All business of detail which it was proposed to take up at this meeting being concluded, the Chairman called upon those gentlemen who were desirous of becoming members of the Society to give formal expression to their adherence by signing

the Laws, whereupon the following gentlemen adhibited their names, and were declared to constitute the original Fellows of the Society, viz:—

William Leitch, D. D., Principal of Queen's College, Andrew Drummond, Manager, Montreal Bank, James Williamson, L L. D., Prof., Dr. John Stewart, Prof., George Weir, M. A., Prof., Horatio Yates, M. D., Prof., J. B. Mowat, M. A., Prof., J. P. Litchfield, M. D., Prof., M. Lavell, M. D., Prof., George Lawson, Ph D., Prof., M. Sullivan, M. D., Hotel Dieu, Thomas R. Dupuis, M. D., Odessa, C. W., Octavius Yates, M. D., David Hamilton, John F. Farrell, Cayuga, A. T. Drummond, Jr., B. A., H. Skinner, Mem. Pharm. Soc., Joseph Danson, F. C. S., Wm. George Hinds, Banker, John A. Wilson, Alexander N. McQuarrie, Nova Scotia, Horace P. Yeomans, B. A., Odessa, C. W., John Newton, Portsmouth, C. W., M. Flanagan, City Clerk, Kingston, William Ferguson, Bellevue Terrace, W. B. Ferguson, J. F. Ferguson, John Duff, Princess Street, John Machar, Jr., M. A., Thomas Briggs, Jr., Williamsville, Anthony O'Reilly, William F. Taylor, J. A. McDonell, Provincial Penitentiary, J. A. Kemp, J. Chanonhouse, C. A. Irwin, A. H. Johnson, J. R. Cogan, J. Lochead, North Gower, Wm. B. Thibodo, Alex. McDonald, Charles Innes Cameron, A. E. Malloch, Brockville, Wilson J. Switzer, Camden, Alfred S. Oliver, Charles R. Martin, Thomas Sullivan, J. M. Fraser, B. A., London, C. W., Robert J. Holmes, A. McPherson, Lancaster, S. D. Pope, Lindsay, C. W., George J. Caie, Chatham, N. B., John D. Kellock, Perth, C. W., P. K. Branigan, William M. Thornton, Perth, C. W., Thomas F. McLean, Perth, C. W., John J. Grafton, Alexander T. C. Comer, John May, B. A., Queen's College School, Archibald Currie, B. A., John Gordon, Pictou, N. S., John McMillan, T. F. Harkness, R. Kincade, Duncan Morrison, Brockville, T. F. Chamberlain, Farmersville, Robert V. Rogers, St. James', William Darrach, Queen's College, John R. Ross, James Hope, G. S. Hobart, Medical Hall, E. G. Ferguson, R. Thibodo, B. W. Day, Dentist, J. F. Ingersoll, Fredericksburgh, Robert Blakely, Brockville, Thomas Chanonhouse, M. D., Shannonville, John Bigham, Orono, C. W., James McCammon, Jr., Alexander McLennan, B. A., Walter Ross, B. A., William Black, Port Hope, Robert Ramsay, Newmarket, John R. Smith, Neil Dunlop, David Kelly, Milford, Andrew Moore, T. B. Tracy, P. P. Gilmartin, Boston, U. S., James B. Mullan, Chatham, William P. Maiden, Belleville.

Dr. Stewart moved that the thanks of the Botanical Society be voted to the Rev. Principal Leitch, the Chairman, for conducting the business of the meeting, and leading the proceedings to so successful an issue. The motion was seconded by Prof. Lawson, and cordially agreed to.

After the meeting, the members retired to the laboratory, where tea was served, and some time was spent in examining specimens, microscopical preparations, and books of plates, such as Schnitzlein's Iconographia, Hooker's Rohodendrons, Seemann's Botany of the Voyage of the Herald, Harvey's American Algæ, &c.

# LAWS OF THE BOTANICAL SOCIETY OF CANADA.

## I.

### Objects of the Society.

The Botanical Society shall have for its objects the advancement of Botanical Science in all its departments—Structural, Physiological, Systematic and Geographical; and the applications of Botany to the useful and ornamental arts. There shall be periodical meetings of the members, in Kingston, during winter, for the reading of papers, and field meetings during the summer, for personal investigation, in such localities in Canada and other American Provinces of Great Britain, as may be arranged from time to time. In addition to these means, the Society shall seek to promote its objects by correspondence; the mutual interchange of specimens among the members; experiments on the indigenous and domestic plants of Canada; the introduction and distribution of new plants and seeds adapted to the wants of the country; the encouragement of Arboriculture, Forest-Conservation, and the culture of Fibre, Dye, Oil, Food, and Medicinal Plants; together with the publication of papers, embodying the results arrived at, and the information brought together by the above means. The ultimate establishment of a Botanical and Experimental Garden shall be held in view as an important means of carrying out the Society's objects. In the meantime, such seeds and plants sent to the Society as are likely to become useful to the country, shall be experimented with, and reported upon by special committees of the members.

## II.

### Five Classes of Members.

The Society shall consist of five classes of members, viz: 1. Honorary Members; 2. Fellows; 3. Lady Members; 4. Annual Subscribers; 5. Corresponding Members.

## III.

### Honorary Members.

Honorary Members shall be nominated by the Council, and balloted for at the first General Meeting subsequent to that at which the Council's nomination has been announced; three negative balls to exclude an individual. Honorary Members shall, in all cases, be selected for their eminence in Botanical Science, and the number shall be limited to twenty-four; six of whom shall be resident in Britain, four

in Canada, four in other Colonial Possessions of the British Empire, four in the United States of America, and six in other Foreign countries.

## IV.

### Fellows.

A canditate for admission into the Society as a Fellow, must be recommended by at least two Fellows. The recommendation shall be presented to the Council, accompanied either by an original Memoir on a Botanical subject, containing the results of investigations by the author, or by specimens of plants discovered by him; and, should the recommendation so presented be sustained by the Council, the candidates name shall be exhibited in the Society's meeting room for four weeks. A ballot shall take place at the first General Meeting after the expiry of that period, when a majority of affirmative balls shall determine the election. A Fellow shall, on admission, sign the Laws, and pay his first annual subscription of Two Dollars to the funds of the Society, whereupon he shall receive a Diploma, and shall be entitled to vote at all General Meetings of the Society ; to receive specimens in exchange, seeds, and copies of the Society's publications, and to enjoy all other privileges of membership to the fullest extent, subject to such bye-laws as may from time time, be enacted by the Council. Each Fellow shall have the further privilege of introducing one visitor to the ordinary meetings of the Society, at the close of the private business.

## V.

### Lady Members.

Ladies who comply with the requirements relating to the admission of Fellows, shall be termed Lady Members, shall receive a Diploma, and be entitled to the same privileges as Fellows.

## VI.

### Annual Subscribers.

Any person may become an annual subscriber on payment of the annual subscription of Two Dollars, without the formality of recommendation and ballot. An Annual Subscriber shall be entitled to participate in the annual distribution of seeds, to exchange specimens, to attend all ordinary meetings for scientific business, and generally to enjoy the same privileges as a Fellow ; but shall not receive a diploma, nor be entitled to vote in the ballots for Fellows and office-bearers.

## VII.

### Corresponding Members.

Corresponding members shall be elected on the special recommendation of the Council, who shall, from time to time, select candidates for that honor from among those Foreign Botanists and others who have contributed specimens to the Society, or Memoirs to be read at the Monthly Meetings, or who have claims otherwise on the Society's regard. From such no annual subscription or other payment shall be required.

## VIII.

### Payment of Subscriptions.

Fellows who omit, for a period of two years, to pay their subscription, shall have their names struck from the roll, with or without previous notice. Annual subscribers shall not be entitled to any of the privileges of membership until their subscription has been paid for the current year.

## IX.

### Office Bearers.

The Council shall consist of a President, two Vice-Presidents, twenty-one Councillors, a Secretary, Treasurer, four Curators, and a Librarian, who shall be annually elected by the Fellows at the General Meeting in December. The President, senior Vice-President, and four senior Councillors (or those at the top of the list), shall retire at each election, but all the others may be re-elected. At least one-half of the new office-bearers at each election shall be chosen from among the Fellows, and the other half may be selected from among the Annual Subscribers. It shall be the duty of the Council to act as a Committee of Management in the general direction of the Society's affairs, (subject to the approval of the Fellows).

## X.

### Local Secretaries.

Local Secretaries shall be appointed at convenient stations, whose duty it shall be to furnish information to persons desirous of becoming members, and to the officers of Horticultural and Agricultural Societies, or other bodies, who may be disposed to co-operate with the Botanical Society in carrying out its important objects.

*Second Meeting.*

## FRIDAY EVENING, 11TH JANUARY, 1861.

The Society met in the Chemistry Class Room of Queen's College,—the Very Rev. Principal Leitch, D. D., in the Chair. Notwithstanding the coldness of the Evening (the temperature being 20° below zero) there was a large attendance of Fellows and Subscribers, about 103 being present. Among those observed were, Professor Williamson, Dr. Trousdale, from Newboro', Mr. Flanagan, City Clerk, Professor Weir, Mr. Hinds, Banker, Dr. Brown, Waterloo, Prof. Mowat, Prof. Stewart, Prof. Dickson, Prof. Yates, Prof. Lawson, Mr. Creighton, Prof. Lavell, Mr. May, B. A., Dr. Octavius Yates, Mr. Machar, Jr., B. A., Mr. Macdonell, M. A., Mr. Thomas Gordon, Mr. A. T. Drummond, B. A., Mr. Grant, Cataraqui Cemetery, Mr. Alex. Cowan, Mr. Ferguson, Mr. J. M. Fraser, B. A., Mr. Agnew, B. A., Mr. Skinner, Mr. Schultz, Mr. Duff, and many other citizens, Members of the University of Queen's College, and others. Letters of apology for unavoidable absence from the meeting were read from Professor Litchfield, Rockwood, Mr. Baxter, Pittsburgh, Mr. Briggs, Williamsville, and Dr. Dupuis, Odessa. Letters, expressing a warm interest in the Society's proceedings were also read from numerous botanists in Canada and the United States, including Professor Asa Gray, of Harvard University, Professor Hincks, Toronto University, Sir William Logan, Principal Dawson, McGill College, Professor Blackie, University of Nashville, Mr. Laing, Hamilton, C. W., and Mr. Macoun, Belleville.

The Minutes of last Meeting were read and approved of, and the Laws therein recorded were finally adopted as the Laws of the Botanical Society of Canada.

The following names were added to the list of Fellows and Subscribers, viz:—Mrs. Weir, Heathfield; Mrs. Lawson, Kingston; Rev. T. H. M. Bartlett, Chaplain to H. M. Forces, Kingston; Hon. John A. Macdonald, Attorney General West, Quebec; Hon. Alexander Campbell, M. L. C., Kingston; John R. Dickson, M. D., Professor of Surgery, Queen's College; Orlando S. Strange, M. D., ex-Mayor of Kingston; Marshal J. Brown, M. D., Waterloo; J. J. Burrowes, Barrister, County Crown Attorney, and Law Lecturer to Queen's College, Kingston; Peter E. Hubon, M. D., Worcester, Mass.; Wm. Mostyn, M. D., Almonte, C. W.; Thomas W. Robison, M. D., Kingston; George S. Rose, M. D., Smith's Falls; James D. Trousdale, Newboro'-on-the-Rideau; Alex. Cowan, King Street, Kingston; John Creighton, City Book Store, Kingston; Alpine Grant, Superintendent Cataraqui Cemetery Co., Waterloo; T. B. Harper, Ordnance Department, Kingston; George Laing, Landscape Gardener, Hamilton, C. W.; John Macoun, Belleville; E. H. Parker, Market Square, Kingston; John Bell, L'Orignal, C. W.; John Agnew, B. A., Kingston; W. Sullivan, Kingston; John C. Schultz, Fort Garry, Red River Settlement;

George Baxter, Kingston; R. H. Perryn, Kingston; John Watkins, King Street, Kingston; Arch. J. Macdonell, Barrister, Recorder of Kingston; Benjamin C. Davy, Barrister, &c., Napanee; Henry Cunningham, Kingston; F. J. George, Princess Street, Kingston; Edward Berry, Kingston; S. Muckleston, Kingston; H. W. Day, M. D., Trenton, C. W.; Thomas Gordon, Head Master of Johnson Street School, Kingston; Robert Corry, Perth, C. W.; F. F. McNab, B. A., Head Master of the Grammar School, Kemptville; John Goodwill, Queen's College; George J. L. Spencer, Napanee.

The Committee appointed at last meeting to suggest a list of botanists suitable for election as honorary and corresponding members, presented their Report, in accordance with which the following honorary and corresponding members were elected, viz.:

## HONORARY MEMBERS.

### Canadian (limited to four).

J. W. Dawson, L L. D., Principal of McGill College, Montreal.

William Hincks, F. L. S., F. B. S. E., Professor of Natural History, Toronto University.

Sir W. E. Logan, F. R. S., Director of the Geological Survey of Canada.

### British (limited to six).

J. H. Balfour, A. M., M. D., F. R. S., L. & E., F. B. S. E., Professor of Medicine and Botany in the Edinburgh University.

R. K. Greville, L L. D., F. B. S. E., Edinburgh.

Sir Wm. J. Hooker, K. H., D. C. L., Oxon, L L. D., F. R. S., L. & E., Hon. M. B. S. E., Director of the Royal Gardens, Kew.

John Lindley, M. D., F. R. S., F. L. S., Hon. M. B. S. E.

J. T. Syme, F. L. S., F. B. S. E., Lecturer on Botany, London.

W. Lauder Lindsay, M. D., F. L. S., F. B. S. E.

### Colonial (limited to four).

Dr. Muller, Government Botanist, Melbourne.

G. H. K. Thwaites, Botanic Garden, Peradenia, Ceylon.

### American, U. S., (limited to four).

George, Blackie, A. M., M. D., F. B. S. E., Prof. University of Nashville.

Asa Gray, M. D., Prof. Harvard University.

John Torrey, M. D., Prof., State Assayer, New York.

FOREIGN (LIMITED TO SIX).

Nath. N. Blytt, Prof., Christiania, Norway.
Prof. Alph. DeCandolle, Geneva.
Fred. Traugott Kutzing, M. D., Prof., Nordhausen.
M. N. Pringsheim, Roy. Pr. Ac., Berlin.
Dr. Ludovic R. Tulasne, Paris.

## CORRESPONDING MEMBERS.

James Alexander, Isaac Anderson, and James Anderson, Edinburgh, F. Appavoo, Madras, Dr. Baikie, Africa, T. Barclay, Cupar, Prof. Bentley, London, Rev. M. J. Berkeley, King's Cliffe, A. O. Black, London, M. Bourgeau, Kew, F. Y. Brocas, London, A. O. Brodie, Ceylon, A. Bryson, Edinburgh, W. H. Campbell, Demarara, Dr. Carrington, Yeddon, A. Carruthers, British Museum, P. Clark, Glasgow, Dr. Cleghorn, Dr. Collingwood, Liverpool, A. Croall, Montrose, J. B. Davies, Edinburgh Museum, Dr. A. Dickson, Edinburgh, Dr. Duncanson, Alloa, Rev. Dr. Ephraim Epstein, Monastir, W. W. Evans, P. N. Fraser, Elias Fries, Rev. G. Gordon, A. M., L L. D., Birnie, W. Gorrie, Prof. Greene, W. Grigor, Otago, J. N. Haage, Erfurt, Dr. Hector, Dr. Heddle, Dr. H. Hoffman, C. Howie, W. Irvine, London, A. T. Jaffrey, Aug. Jolis, Cherbourg, W. Keddie, A. Kerr, Michigan, Moh. Ali Katib, M. D., Dr. Kirk, Zambesi, G. S. Lawson, Leo Lesquereux, Columbus, Ohio, Dr. J. Macadam, Melbourne, Dr. S. Macadam, Edinburgh, Dr. McBain, A. Mackenzie, Corfu, D. P. Maclagan, Berwick-on-Tweed, Rev. H. Macmillan, James McNab, P. Matthew, Gourdie, P. B. Mead, S. J. Meintjes, A. G. Melville, C. Montagne, D. Moore, T. Moore, A. Moore, Sidney, C. Muller, Berlin, A. Murray, Dr. M. Mustapha, W. M. Ogilvie, Prof. Oliver, E. Otto, W. Pamplin, Dr. Pappe, Cape Town, Dr. Parlatore, Florence, Dr. Priestley, J. Sadler, M. J. Schleiden, B. Seeman, Pacific Islands, W. Sharswood, M. Ali Soubki, M. D., Mrs. Col. Spottiswoode, Benares, R. Spruce, Brazil, R. C. Stapley, Stirling, L. Aug. Stapley, Fyzabad, N. Stewart, J. Stratton, Cambridge, E. Tuckermann, J. G. Veitch, Japan, Dr. Waddell, Paris.

The Committee appointed for that purpose at last meeting, presented a list of Office Bearers, in accordance with which, the following gentlemen were elected Office Bearers for the present session:

*President.*

Very REV. WILLIAM LEITCH, D. D., Principal of the University of Queen's College.

*Vice-Presidents.*

REV. JAS. WILLIAMSON, L L. D., Professor of Mathematics and Natural Philosophy.
FIFE FOWLER, M. D., L. R. C. S. E., Professor of Materia Medica and Therapeutics.

*Council.*

J. P. Litchfield, M. D., Prof. of Medical Jurisprudence, and Physican Superintendent of the Asylums, Rockwood.

Horatio Yates, M. D., Prof. of the Principles and Practice of Medicine.
Michael Flanagan, City Clerk, Kingston.
Wm. Ferguson, Bellevue Terrace.
J. J. Burrowes, Barrister, County Crown Attorney, and Law Lecturer.
H. Skinner, Mem. Pharm. Soc., Princess Street.
George Baxter, Pittsburgh.
J. R. Dickson, M. D., Professor of Surgery.
Marshal J. Brown, M. D., Waterloo.
Thomas Briggs, Jr., Williamsville.
Edward Berry, Barrister.
M. Lavell, M. D., Professor of Midwifery.
George Weir, A. M., Professor of Classics.
Wm. George Hinds, Cashier, Bank of Upper Canada.
John Duff, Princess Street.
Octavius Yates, M. D., King Street.
M. Sullivan, M. D., Hotel Dieu.
J. Trousdale, M. D., Newboro'-on-the-Rideau.
Aug. Thibodo, Johnson Street.
J. Creighton, King Street.
J. B. Mowat, M. A., Professor of Hebrew and Biblical Criticism.

*Secretary.*

George Lawson, Ph D., F. B. S. E., Professor of Chemistry and Natural History.

*Treasurer.*

Andrew Drummond, Manager, Montreal Bank.

*Curators.*

A. T. Drummond, Jr., B. A. | Anthony O'Reilly.
J. McCammon. | William B. Ferguson, Jr.

*Librarian.*

R. V. Rogers, St. James' Church.

The following donations to the Society's Library were announced :—From Dr. W. Lauder Lindsay, F. L. S., Physician-Superintendent of Murray's Royal Asylum, Perth, Monograph of the genus Abrothallus, De Not. et Tulasne emend. (with plates) ; on the Spermagones and Pycnides of Lichens, from Proceedings of the Royal Society of Edinburgh ; Experiments on the Dyeing Properties of Lichens ; on the Structure of Lecidea lugubris, Sommf., with plates ; Botanical Notes of a Visit to Schleswig-Holstein ; Summary of a Lecture on Substitutes for Paper Material, and an article on the same subject from the Scottish Review ; List of Dr. Lindsay's published Contributions to Botanical Science. From Herr Johann Nicolaus Haage, Erfurt, Prussia, his Nursery and Seed Lists, with engraving of Andropogon formosum, a new conservatory plant ; also colored drawings of two new ornamental annuals, varieties of Clintonia pulchella, viz., var. azurea grandiflora, and var. atropurpurea.

There were laid on the table some new botanical works, including Berkeley's Fungology ; the Annals of Natural History for November ; the Phytologist, and the Pharmaceutical Journal for December ; the Gardeners' Chronicle of 15th and 22nd Dec., containing Mr. Veitch's Reports on the Botany of Japan ; also the Edinburgh Courant of 27th Dec., containing a Report of the December Meeting of the Botanical Society of Edinburgh, embracing valuable information from Dr. Cleghorn on Tea and Cinchona culture in India.

Mr. O'Reilly exhibited Polypori. Dr. Trousdale placed on the table specimens of Lycoperdon pyriforme and Sarracenia purpurea, collected at Newboro' by Mrs. Trousdale. Several microscopical photographs of botanical subjects were also shown, nature prints of ferns, sea weeds, &c.

Before proceeding to the regular public business of the meeting, viz., the reading of scientific papers, the Chairman delivered a brief introductory address, in which he congratulated the members on the success that had attended their efforts to establish a Botanical Society. Instead of passing a long minority, as scientific societies often have to do, our Society has risen at once into importance, showing that it was wanted by the country generally. All the circumstances connected with its origin are of the most encouraging kind ; we have promises of cordial support and co-operation from all parts of Canada, and already the number of active paying members amounts to nearly 140. Besides these, we have added to our list a number of honorary members, and many other persons have expressed a warm interest in the Society's welfare, so that continued accessions will no doubt be made. The Rev. Principal then referred to the advantages presented in Kingston for the pursuit of science and literature in various departments, to the satisfactory footing upon which the Astronomical Observatory had been placed by the citizens of Kingston, the proposal to extend the sphere of Queen's College by the establishment of a Law Faculty, and other circumstances. He concluded by stating that no doubt,

in time to come, many now present would rejoice that they had assisted in laying the foundation of the Botanical Society of Canada.

The following papers were read:—

## ON THE CORNUS FLORIDA OF THE U. S.

By Professor George S. Blackie, M. D., Nashville, Tennessee.

Common throughout all our forests, conspicuous in Spring time by its festoons of large white blossoms, and equally so during the Fall months from its clusters of scarlet berries, a handsome little tree, usually about fifteen to twenty feet high, is the *Cornus florida*, L. of the U. S. I have brought this plant before your notice for no particular reason, but that it this morning attracted my attention as I walked in the neighborhood of my home, and I conceive that much service may be done to the existing state of the botanical knowledge of our country, should each member of the Society take up, meeting after meeting, some individual plant, no matter how common, and state all that he knows of that plant, whether such information be gleaned from his own studies or those of others. On my first visit to the United States, one of the first objects which attracted my attention on travelling down the Mississippi, from the snows of Canada to the balmy spring of Louisiana, was this plant, and its extreme beauty, contrasted with the gloominess of the scenery from which I had just emerged, made so strong an impression on me that I have ever since looked on it with a peculiar interest.

Cornus florida is probably the most generally distributed species of its genus in this country. In this genus, which is a member of the family of *Cornaceæ*, there are about twenty species, of which America has, north of Mexico, eleven, two are peculiar to Mexico, three are found in Nepaul, two in Japan, two are found in both Asia and Europe, and one is found in the north of both hemispheres. They are all shrubs, with entire, deciduous leaves, covered with adpressed hairs, the calyx four-toothed, minute, adhering to the ovary; the petals few, distinct, oblong, inserted with the calyx into an epigynous disk, drupes baccate; flowers in cymes. In this State (Tenn.) we have at least five species, viz., *C. paniculata*, *C. stricta*, *C. asperifolia*, *C. sericea*, and the subject of my present paper. In addition to these, in the north there are found the species *C. Canadensis*, *C. circinata*, *C. alba*, *C. alternifolia*, and *C. sanguinea*. The bark of all these has very bitter and tonic properties. Some of them have underground stems, dying annually down; others again have fine permanent stems, the wood of which is exceedingly hard, a fact which has given rise to the name, from *cornu*, a horn, the wood being believed to be as hard and durable as a horn. Hence the ancient Romans constructed spear shafts and other warlike implements from it, and Virgil alludes to it as *bona bello*

*cornus.* The wood of *C. florida* is not only remarkable for its hardness, but also for its extremely fine texture.

*Cornus florida*, the flowering Dogwood, is the most beautiful and showy plant of its genus. It is a round-headed, small tree, usually fifteen or twenty feet high, but often reaching a height of twenty-five or thirty feet, and a diameter of eight or nine inches. The new shoots are of a grayish green, covered with down; those of the previous year are purple, with slight rings, afterwards changing to gray and streaked with brown. The stem is rough, with short broken ridges, between which the bark is often divided into regular plates. The branches are numerous spreading, and disposed with regularity, sometimes opposite, sometimes arising by fours. The leaves are three inches long, opposite, oval, entire, acuminated, and at the base abruptly tapering to a short channelled foot-stalk. Smooth on their upper surface, their lower is whitish, with hairs along the midribs and veins, and a few scattered ones between; the upper surface having also numerous conspicuous ridges. The flowers are placed at the ends of the branches, supported by a club-shaped foot-stalk. They are extremely small, and aggregated together in numbers of twelve or more in a head surrounded by a showy involucre, three or four inches in length, and which is supposed by the non-scientific to be the flower. The flowers themselves are of a greenish yellow color, but the few large obcordate leaves of the involucre are white, and sometimes tinged with violet. The outer extremity of each is notched as if from injury, and this notch is purple or rose-colored. The calyx is extremely small. The petals and stamens are each four in number. There is one pistil with a filiform style nearly as long as the corolla. The fruit is a group of oblong, oval, shining, bright scarlet berries, crowned with the remnant of the calyx. These appear placed in the fork of two branches, which arises from the fact that while the flowers are terminal, yet, ere the fruit is perfected, the two branchlets for the succeeding years' flowers are developed and grown on each side. These berries ripen here about July or August, and are eagerly devoured, despite their bitterness, by birds during the winter months. In Louisiana, the *C. florida* flowers in February, in our vicinity in April and May, and farther north in June and July. It is in bloom for a fortnight, during which time the Indian farmers say, Indian corn should be planted. The plant is of a slow growth, and has a hard, heavy, solid wood, of a close texture, and susceptible of a high polish. It is often called Boxwood, and used as a substitute for it in the manufacture of handles for chisels, hammers, and such tools, for the cogs of wheels, teeth of harrows, spoons, etc. Soon after the fruit commences to ripen, the leaves begin to change their color, turning to a purple and then to a rich crimson or purple above, and a light russet beneath, forming one of the most beautiful objects during the Fall months.

Chemical analysis shows that the barks of the root, stem and branches, which are bitter, astringent and aromatic, contain in different proportions the same sub-

stances as are found in *Cinchona*, except that there is more gum, mucilage, gallic acid, and extractive matter, and less resin, quinine and tannin. The principle obtained from it is called *Cornine*, and has all the properties of the Sulphate of Quinine, though not so strongly marked. The principle is also difficult to obtain in any quantity. The extract of Dogwood, while inferior and less astringent than the best Cinchona, is yet superior to the inferior kinds. This extract contains all the tonic properties, while the simple resin is merely a stimulant. Prof. Barton says, "that it may be asserted with entire safety, that as yet there has not been discovered within the limits of the United States any vegetable so effectually to answer the purpose of the Peruvian Bark in the management of intermittent fevers, as the Cornus florida." It may be looked on as our best native tonic. In some respects, however, it differs from quinine, as the powdered bark quickens the pulse, and sometimes produces violent pain in the bowels. On this account the preparations employed are the sulphate of cornine and the extract. Dr. O'Keefe, of Augusta, Georgia, has prepared a valuable alcoholic and watery extract of the bark, which seems to possess all its medicinal properties. (See Trans. of American Medical Association, Vol. II, p. 671.) This may be used in intermittent and remittent fevers, also in typhus and all febrile disorders. In cases of debility Dogwood is a valuable corroborant, for which purpose it may be combined with Columbo, Gentian, Chamomile, or Seneca root. Country people often use it as a decoction, or chew the twigs as a prophylactic against fevers. Drunkards sometimes employ a tincture of the berries to restore the tone of the stomach, and combat the pains of dyspepsia. Many have recommended a decoction of equal parts of Dogwood and Wild Cherry barks as a remedy in dyspepsia, and the debility in convalescence from fevers. The flowers have similar properties, and a warm infusion of them was often employed by the Indians in cases of chills and indigestion. They named the plant *Mon ha-canni-min-schi.* The powdered bark of the plant makes one of the best tooth powders with which I am acquainted, as it preserves the gums hard and sound, and at the same time renders the teeth extremely white. Rubbing the fresh twigs on the teeth also has this effect, and the Creoles of the West Indies, the pearly whiteness of whose teeth is universally acknowledged, use another species in this way.

There are yet other uses to which Dogwood has been put. A sort of inferior ink may be made with the bark, using it instead of galls. A warm decoction of the bark, with sassafras, is a valuable wash for foul ulcers; and in veterinary medicine a decoction of the bark has been used with great good effect in a malignant disease called yellow water, Canada distemper, etc., very fatal among horses.

Thus I have endeavored to place before you a sketch of one of the denizens of our Tennessee woods, and if my effort has been of any interest to you, it will give me pleasure to repeat it should you on another occasion call on me.

University of Nashville, Tenn., December, 1850.

Prof. Williamson, in remarking upon the above paper, stated to the meeting that he had not observed the *Cornus florida* in the immediate neighborhood of Kingston, but he had seen it the Niagara district.

Prof. Lawson exhibited specimens of the plant from various parts of the United States, and alluded to its wide range, but apparently *southern* tendency. It is no doubt correctly regarded as a Canadian species; but it is absent from Prof. Barnston's list of the Holmes Herbarium, Montreal, from Mr. Billings' lists of Prescott plants, and other accessible local lists, as well as from the various collections made in the neighborhood of Kingston. It is not difficult to trace the distribution of so showy a plant, and it is to be hoped that Prof. Blackie's remarks will lead to the publication of Canadian localities.

## ON THE BOTANY OF THE RED RIVER SETTLEMENT AND THE OLD RED RIVER TRAIL.

By John C. Schultz, F. B. S. C.

The Red River Settlement has of late years attracted much attention in Canada on account of its isolated position and the many and vague reports that were in circulation regarding it, some describing it as a land of milk and honey, others as a cold barren waste. But little was known of the real resources of the country till the years 1857 and 1858, when the attention of our Government was directed to it, and they ordered two Expeditions to be fitted out, one under the charge of Mr. Hind, and the other under Mr. Dawson. These gentlemen, on their return, after an absence of eighteen months, submitted their Reports, accompanied by maps and a geological description of the country traversed. These were published and widely distributed, and many of you no doubt have seen them. Therefore any account that I give of the settlement will be as short as possible. It is situated on the Red River, near its entrance into Lake Winnepeg, occupying both banks of the Red River and the Assiniboine, which empties into the Red River at the Hudson's Bay Company's post Fort Garry, the centre of the settlement. The settlement extends from the mouth of Red River up about forty miles, and on the Assiniboine River about twenty miles. The distance of the settlement from St. Paul is said to be six hundred miles, and from Lake Superior about three hundred. The population is estimated (rather high I think) at 10,000, including the roving population, who live altogether by hunting. The climate resembles that of Montreal in the length and continued cold of the winters, and the rapid vegetation in the spring after the snow is off the ground. All the cereals are raised in abundance, the average produce to the acre exceeding that of Canada. Garden vegetables are also grown in abundance. Indian corn, however, is not so successful, being nipped by the early frosts.

While residing last summer at Fort Garry (the Hudson Bay Co.'s post in the settlement) I had an opportunity of collecting specimens of plants, some of which are now exhibited to the Society. From want of the necessary material they were rather imperfectly prepared, but may perhaps serve to give a general idea of the botany of the immediate vicinity of the Fort. On referring to the list it will be observed that here, as in other prairie land, the richest family is the Compositæ, many species of which are found. At the Fort we have not only the ordinary Prairie Composites, but a great abundance of such plants as Artemisia Absinthium, especially on the drier and higher parts. Next in frequency come the Cruciferæ, which generally follow man; these are abundant in the immediate vicinity of the Fort. There are many species of Rosaceæ and Leguminosæ, truly indigenous; Umbelliferæ are not unfrequent, and we have interesting representatives of Ranunculaceæ, Xanthoxylaceæ, Violaceæ, Balsaminaceæ, Caprifoliaceæ, Rubiaceæ, Ranunculaceæ, &c. The timber trees near the Fort are small groves of aspen and balsam poplar, and on the banks of the rivers oak, ash, elm, maple, aspen, and balsam poplar.

As I had also an opportunity of collecting some specimens in the vicinity of the Trail, in coming from Fort Garry to St. Paul, I propose to give a description as short as possible of the character of the country coming down, so that it may be an assistance to those wishing to examine the specimens.

From the Red River Settlement to Canada there are three routes, more or less in use. The oldest and the one now least used is known as the old Red River Trail. This, leaving the settlement, passes up on the west side of Red River to Pembina (a small settlement of half breeds immediately on the international boundary line), and distant sixty-five miles from Fort Garry. Crossing the Red River, the Trail takes a nearly south-west course, crossing all the eastern tributaries of the Red River, the larger of which are the Pine, Red Lake, Wild Rice, and Otter Tail Rivers, and ends at Otter Tail City, the first settlement on the American side. From here there is a bridged road to Crow Wing, seventy-five miles, and from thence to the city of St. Paul, a stage road of one hundred and fifty miles. Thence the traveller passes by steamboat and railroad to Canada.

The second route is our Canadian route, which, I am sorry to say, is not so practicable as might be wished. This is a canoe route, passable about five or six months in the year, and always attended with a good deal of difficulty. This route is made by descending the Red River to Lake Winnipeg, ascending the Winnipeg River to Lake of the Woods, and from thence passing through the chain of rivers and lakes, and over the numerous portages or carrying places, to Fort William on Lake Superior. From Fort William there is a communication with Canada by the mail steamer *Ploughboy*, which leaves monthly during navigation for Collingwood.

The third, known as the new route, is the one now most travelled, and the one

through which the Hudson Bay Company bring their furs. It was opened up for travel last year by parties in St. Paul, who took a small steamer over to the head waters of the Red River, in pieces, on sleighs, the winter before, and put her together there, then cutting a road through from St. Paul to the head of navigation on Red River, they connected the boat with St. Paul by stages. By this route you leave the settlement in the little steamer referred to, ascend the river about three hundred miles to Georgetown, the head of navigation, and take the stages there for St. Paul. By this route it is possible to travel from the Red River settlement to Canada in twelve days, which is a great improvement on the ordinary time of twenty-five to thirty days by the other routes.

Now it was getting rather late in the season for the Lake Superior route, and the water of the Red River being too low to admit of the little steamer making the trips, I was compelled either to come down by the old Trail or postpone my journey till next spring. However, as my companion, Mr. Buckingham, was determined to come, we began preparing for the trip, first with two hardy Indian ponies, which are the only horses fit for travel of this kind, a common Red River cart to carry our clothes, blankets, and provisions, a few cooking arrangements, four blankets, two buffalo robes, a gun, cart-cover, and provisions, which last consisted of twenty pounds of pemmican, thirty pounds biscuit, butter, sugar, and tea. These were packed in small parcels, for convenience in crossing rivers, as in some cases the rivers were too deep to ford, and we had to raft the baggage in a kind of rude boat, made by stretching the canvass cart-cover around the body of the cart, and drawing this over with lines.

Before going on I may here describe the usual routine of travel on such trips. It is always a rule to start early in the morning, and we generally arose at about five, and while one caught the horses and saddled them, the other would have made a fire and cooked the breakfast, which consisted generally of a nondescript dish of Mr. Buckingham's (who was appointed cook to the expedition), made with pemmican, biscuit, and butter. This, with a kettleful of tea, as hot and strong as tea and water would make it, was eaten with a relish known only to those living in the open air and taking active exercise. Breakfast over, things were packed, and we started generally at sunrise, and travelled till about noon, when we would stop at some good pasturage and allow the horses to eat for a couple of hours, and cook dinner; then, starting again, travel till near night, or till we could find at one place the three essentials—water, wood, and grass. These we would find sometimes at five or six o'clock, or sometimes have to push on till eight or nine o'clock. When a suitable place was found the horses were let go, a fire made, and supper cooked. After supper, wood was cut and a fire built to last all night. If possible the horses were then brought in close to the camp and hopped—that is, had their fore legs tied together to prevent them wandering far; the cart was then wheeled close to

the fire, and, spreading the robes and blankets beneath it, we rolled ourselves in them, feet to the fire, and soon fell into a sleep, the soundness of which was in proportion to the fatigues of the day, the softness of the ground beneath, and the musical powers of the wolves, who occasionally gave us a serenade.

We left the settlement on the 16th October, the long Indian summer, as it is called, having just then commenced. Crossing the Assiniboine River at Fort Garry, we followed the river up on the west side till we arrived at Pembina, a small settlement immediately on the American side of the boundary line. The country here, like that at the settlement and between, is a perfectly flat treeless plain and well adapted for agriculture, the only drawback being the scarcity of wood, which is only found in narrow strips on the banks of the river, and already most of it has been used for fuel.

Crossing the Red River here, we travelled through a low, swampy country, dotted with small groves of aspen, and, along the banks of small streams, scrubby oaks. Here we began to find game in great abundance, prairie chicken, ducks, and the little ground squirrel, and occasionally fox, badger, elk, and the little prairie wolf, which generally annoyed us a good deal at night. In this part of the journey the rivers were very bad to cross, being deep, and the bottoms of soft mud, into which the horses would stick till assisted out. This continued for about fifty miles, till, arriving at Snake Hill River, we found the river bed sandy, and the land high and dry, consisting of long, narrow, sandy ridges, bordered on each side by marsh. These ridges, a singular feature in that part of the route, were generally only a few hundred yards wide, and extended five or ten miles, almost invariably in a north and south direction.

At Sand Hill, the next river, we found the country, though still sandy, very hilly and very bare of vegetation of all kinds. This gradually merged into a level prairie again, with abundant vegetation. The next river, and the largest was Red Lake River. This was crossed with a great deal of difficulty, on account of the rapidity of the current and the narrow width of the sand bar which formed the ford. However, by putting extra weight on the cart, to prevent it being swept off the bar, and both of us holding the horses' heads against the current, we finally got over. But here a change awaited us. After passing through the strip of oak, ash, and tamarack, that fills the wide bottoms of this river, and obtaining a view of the open country, as far as the eye could reach nothing could be seen but a scorched and blackened mass. The fire left by some careless hunter had spread and burned everything. This was a serious thing to us, as we knew that the fire had extended till stopped by the next river. However, after holding a council, we determined to push on that day, in hopes of getting grass before night. Night came, and no grass, and at ten o'clock the horses began to show signs of giving out, so we camped where the fire had spared a few rushes.

Next day, at noon, we arrived at Wild Rice River (so named from the abundant growth of tall grasses), and this had stopped the fire. Crossing this river, we travelled through a country with more timber than the last, and the surface of the prairie covered with boulders for many miles. At the next river—Buffalo River—the country became again very hilly, the hills inclosing innumerable beautiful little fresh water lakes, bordered as usual with oak. This continued to Detroit Lake, where the country became very rocky and densely wooded with oak, ash, beech, maple, poplar, and here, for the first time, we saw pine and spruce. At this lake we met a party of Ojibway Indians, with whom we exchanged courtesies, they giving us some fish, and receiving in return tea, sugar and tobacco. After remaining with us till ten o'clock, carrying on a rather unsatisfactory conversation by signs and illustrations in the sand, eating all that we could give them and stealing our tin cups and hatchets, they finally went off to their lodge. They were here catching fish for their winter's provisions with gill nets, and seemed to be taking them very rapidly. This lake, like all the lakes in this region, abounds in many kinds of fish, among which are whitefish, pickerel, perch, pike, and a little fish called goldeyes.

Leaving this lake, the Trail passes through many miles of dense woods, consisting chiefly of oak, and other hard woods. In these woods, and southward, is found the Ginseng (*Aralia quinquefolia*). Crossing Otter Tail River, Rush Lake, and some small streams, we finally arrived at civilization again, in the shape of a collection of a dozen of houses, named in Minnesota maps Otter Tail City, and inhabited by travellers who purchase the furs of the Chippeways. After taking dinner here at a two-roomed hotel, for which we paid two dollars, we left the city, and crossed Leaf Mountain, the height of land or apex of the two great water sheds of the Red River and Mississippi valleys. Here, as on the rest of the route, the prevailing timber was pine and spruce, with occasional tamarac swamps. The Trail here follows down the course of Leaf River till it empties into the Crow Wing River. Here the Trail ended, and, crossing this river in a scow, we had now a bridged road, forty-five miles, to the little town of Crow Wing, where we arrived on the second of November, completing a trip of something over four hundred miles in fifteen days. At this place we left our horses, and took stages, 150 miles, to the city of St. Paul, and from thence by Mississippi boat and railroad to Canada.

I may mention here that in St. Paul I noticed several barrels of Ginseng root, which had been collected by Indians and others, and was intended for export from New York or elsewhere to China. This American Ginseng is the *Aralia quinquefolia*, a different species, it is believed, from the Chinese one, but nevertheless highly esteemed in that country. It is said to be used there as a medicine in cases of debility, but its medicinal properties are not so highly esteemed in this country. Its uses in China must be very extensive, as, independent of the Ginseng obtained in China, and the enormous quantities exported from America, imports are regis-

tered at Shanghai of the enormous quantity of 55,000 catties, from the 11th Nov., 1858, to 30th June, 1859. This root is found in abundance in the western part of Minnesota, principally in the woods on oak ridges, and there are persons who make large sums by collecting it, and selling at St. Paul for one dollar per lb.; by sending it to New York, they get a much higher price. Now, as this root is so valuable, and as the climate and soil in some parts of Canada resemble that of Minnesota, I wish merely to mention the possibility of cultivating it in Canada. Hitherto the market has been supplied by indigenous growth, and the consequent disappearance of the plant in many parts of Canada and the States suggests the propriety of adopting measures by which its production may be increased by artificial means.

The following is a list of the specimens collected, with their localities. Most of the species were determined or confirmed by Professor Lawson.

RANUNCULACEÆ.

*Anemone Pennsylvanica*, L. Fort Garry, Red River Settlement.
*A. Virginiana*, L. Wild Rice to Red Lake River.
*Delphinium Ajacis*, L. Wild Rice to Red Lake River.
*Actæa spicata*, L. Wild Rice to Red Lake River.

PAPAVERACEÆ.

*Papaver somniferum*, L. Wild Rice to Red Lake River.

CRUCIFERÆ.

*Erysimum cheiranthoides*, L. Fort Garry.
*Sisymbrium canescens*, Nutt. Fort Garry.
*Sinapis alba*, L. Fort Garry.
*Camelina sativa*, Crantz. Wild Rice to Red Lake River.
*Capsella bursa-pastoris*, L. Fort Garry.
*Thlaspi arvense*, L. Fort Garry.

CAPPARIDACEÆ.

*Polanisia graveolens*, Raf. Wild Rice to Red Lake River.

VIOLACEÆ.

*Viola tricolor*, L. Fort Garry.

CARYOPHYLLACEÆ.

*Agrostemma Githago*, L. Fort Garry.

GERANIACEÆ.

*Geranium Carolinianum*, L. Snake Hill River to Pembina.
*G. Robertianum*, L. Snake Hill River to Pembina.

TILIACEÆ.

*Tilia Americana*, L. Red Lake River.

BALSAMINACEÆ.

*Impatiens fulva*, Nutt. Snake Hill River to Pembina. Red Lake River.

XANTHOXYLACEÆ.

*Xanthoxylum Americanum*, Willd. Snake Hill River to Pembina.

ANACARDIACEÆ.

*Rhus glabra*, L. Snake Hill River to Pembina.

VITACEÆ.

*Ampelopsis quinquefolia*, Michx. Snake Hill River to Pembina.
*Vitis cordifolia, var. riparia*, Michx. Snake Hill River to Pembina.

CELASTRACEÆ.

*Celastrus scandens*, L. Wild Rice to Red Lake River.

LEGUMINOSÆ.

*Amorpha canescens*, Nutt. Wild Rice to Red Lake River.
*Psoralea esculenta*, Pursh. Fort Garry.
*P. argophylla*, Pursh. Fort Garry. Wild Rice to Red Lake River.
*Lathyrus ochroleucus*, Hook. Wild Rice to Red Lake River.
*Glycyrrhiza lepidota*, Nutt. Wild Rice to Red Lake River.

ROSACEÆ.

*Potentilla Norvegica*, L. Fort Garry.
*P. anserina*, L. Fort Garry.
*Rosa blanda*, Aiton. Fort Garry. Wild Rice to Red Lake River.
*Spiræa salicifolia*, L. Wild Rice to Red Lake River.
*Geum album*, Gmelin. Leaf and Crow Wing Rivers.
*Rubus strigosus*, Michx. Leaf and Crow Wing Rivers.
*Prunus serotina*, Ehrh. Otter Tail Lake and River.
*Fragaria Virginiana*, Ehrh. Wild Rice to Red Lake River. Leaf and Crow Wing River.
*Rubus triflorus*, Richardson. Leaf and Crow Wing River.

ONAGRACEÆ.

*Œnothera biennis*, L. Fort Garry. Wild Rice to Red Lake River. Otter Tail Lake and River.
*Epilobium palustre*, L. Snake Hill River to Pembina.

UMBELLIFERÆ.

*Daucus Carota*, L. Wild Rice to Red Lake River.
*Sanicula Marilandica*, L. Leaf and Crow Wing River.
*Zizia aurea, Koch?* Snake Hill River to Pembina.
*Z. integerrima*, D C. Leaf and Crow Wing River.

ARALIACEÆ.

*Aralia racemosa*, L. Red Lake River.

CORNACEÆ.

*Cornus sericea*, L. Wild Rice to Red Lake River.

CAPRIFOLIACEÆ.

*Symphoricarpus occidentalis*, R. Br. Wild Rice to Red Lake River.
*S. vulgaris*, Michx. Fort Garry.
*Viburnum acerifolium*, L. Wild Rice to Red Lake River.
*Viburnum scutatum* L. Wild Rice to Red Lake River.

COMPOSITÆ.

*Solidago Canadensis*, L. Fort Garry,
*Artemisia biennis*, Willd. Fort Garry.
*A. Absinthium*, L. Fort Garry.
*Achillea Millefolium*, L. Fort Garry.
*Lactuca scariosa*, Willd. Wild Rice River to Red Lake River.
*Xanthium echinatum*, Murr. Fort Garry.
*X. Strumarium*. L. Fort Garry. These two forms of Xanthium are doubtfully referred. The species of this genus appear to want revision.

LABIATÆ.

*Mentha Canadensis*, L. Fort Garry. Snake Hill River to Pembina.

RUBIACEÆ.

*Galium boreale*, L. Snake Hill River to Pembina. Wild Rice to Red Lake River. Leaf and Crow Wing River.

GENTIANACEÆ.

*Gentiana crinita*, *Frœl.* Fort Garry. Leaf and Crow Wing River.
*G. Amarella*, L. Fort Garry.

POLYGONACEÆ.

*Polygonum aviculare*, L. Fort Garry. Snake Hill River to Pembina.

CUPULIFERÆ.

*Corylus Americana*, Walt. Snake Hill River to Pembina.

URTICACEÆ.

*Humulus Lupulus*, L. Snake Hill River to Pembina.

CHENOPODIACEÆ.

*Chenopodium album*, L. Fort Garry.

SALICACEÆ.

*Populus balsamifera*, L. Red Lake River.

PLANTAGINACEÆ.

*Plantago major*, L. Fort Garry.

CONIFERÆ.

*Abies nigra*, Poir. Otter Tail Lake and River.
*A. alba*, Michx. Leaf and Crow Wing River.

ARACEÆ.

*Arisœma triphyllum*, Torr. Snake Hill River to Pembina.

ORCHIDACEÆ.

*Cypripedium spectabile*, Swartz. Fort Garry.

LILIACEÆ.

*Smilacina stellata*, Desf. Wild Rice to Red Lake River.
*S. racemosa*, Desf. Wild Rice to Red Lake River.
*S. gigantea*, Dietrich. Snake Hill River to Pembina.
*Lilium Philadelphicum*, L. Fort Garry.

CYPERACEÆ.

*Cyperus filiculmis*, Vahl. Fort Garry.

GRAMINEÆ.

*Bromus ciliatus*, L.

EQUISETACEÆ.

*Equisetum limosum*, Gray. Otter Tail Lake and River. Greedily eaten by horses.

FILICES.

*Pteris aquilina*, L. Snake Hill River to Pembina. Red Lake River. Wild Rice to Red Lake River. Otter Tail Lake and River.

## CONTRIBUTIONS TO THE LOCAL FLORA OF KINGSTON.

BY A. T. DRUMMOND, JR., B. A.

During the summers of 1859 and 1860 I made several excursions in the rear of this city, to collect botanical specimens. Occasional visits were also made, for the same purpose, to the neighboring islands. The appended list of plants, obtained during these excursions, as a local Flora must certainly be regarded as very incomplete, since several of our most important natural orders, as for example, Umbelliferæ, Gramineæ, Musci, &c., are entirely unrepresented; yet, taken as it it is, it serves to show how many specimens may, with little difficulty, be collected even within such a small area as the neighborhood of our town. Among Phanerogamous plants, the natural orders Ranunculaceæ, Rosaceæ, Compositæ, Coniferæ and Gramineæ, are well represented in this vicinity; among Cryptogams, Lichens, Mosses and Fungi are to be found in considerable variety, although, with the exception of the Fern tribe, I have not, comparatively, paid any attention to this class of plants, as will be seen by referring to the list. The prevailing growth of timber is Maple, Pine and Oak.

As may be inferred from the proximity of this portion of Canada to the State of New York, and the consequent similarity of the climates of both districts, the plants which occur in this locality are likewise, for the most part, to be found within the limits of that State. It may, in fact, be said of the whole of Canada that nearly all the plants which compose its Flora occur in the Northren States of Amer-

ica, since the northern boundary of the United States, varying as it does through upwards of five degrees of latitude, nearly embraces Canada proper on the east and west.

In this township, and in general throughout the southern portion of the County of Frontenac, the land is rather undulating. The soil in our neighborhood seems, for the most part, to be a stiff loam on a clay subsoil, with a limestone base. Sand, however, occurs in tolerable abundance on the south-west side of Wolfe Island, at Waterloo, and a few other localities. In many places there is but a small depth of soil above the limestone, and timber trees in consequence do not attain the size which they would under more favorable circumstances. The dearth of soil is also very apparent in those localities, as for instance, Cedar Island, where the base is granite. What soil there is, however, is generally very rich, so that shrubs and herbs grow luxuriantly, whilst the face of the granite where even these cannot flourish, from a want of earth, is clothed with lichens and mosses.

Although specimens, whether of herbs, shrubs or trees, may be obtained in whatever direction you may search for them, there are yet particular localities in which they can be procured in greater variety and better condition than in others. As such, Dr. Sampson's farm west of Portsmouth, the Penitentiary Bush in the rear of the same village, Cedar Island, and the vicinity of Haldimand Cove, or Navy Bay, may be recommended. Aquatic plants occur in considerable abundance at and above Bell's Island. Such Cryptogmas as Lichens and Mosses can be obtained on Cedar Island, at Kingston Mills, &c. Lichens will also be found in greater or less abundance on almost every stick of cordwood that is brought into the city. Fungi, too, are frequently procurable on wood, for they are always to be looked for on decaying vegetable as well as animal matter. There is thus, in fact, within the reach of all, specimens enough to form a large herbarium, and whose generic and specific names, together with the localities and dates in full, would fill a volume of no inconsiderable size. And it is to be hoped that, when there are so many facilities afforded for obtaining specimens, not a few will be found who will take sufficient interest in Canadian Botany to make contributions to its Flora.*

## PHANEROGAMEÆ OR FLOWERING PLANTS.—EXOGENÆ.

### RANUNCULACEÆ.

*Hepatica triloba*, Chaix. Penitentiary Bush. May 8th, 1859.
*Ranunculus abortivus*, L. Union Street. May 8th, 1859.
*R. acris*, L. Cataraqui Creek. June 25th, 1859.
*Caltha palustris*, L. Cataraqui Cemetery, Waterloo. May 6th, 1860.
*Aquilegia Canadensis*, L. Haldimand Cove. May 20th, 1859.

* The accompanying is not merely an enumeration of plants observed in the neighborhood, but is a list of beautifully prepared specimens, for which the author obtained a first prize in the Natural History Class of Queen's College.—G. L.

BERBERIDACEÆ.

*Podophyllum peltatum*, L. Penitentiary Bush. June 1st, 1859.

NYMPHÆACEÆ.

*Nymphœa odorata*, Ait. South side of Bell's Island. August 1st, 1859.
*Nuphar advena*, Ait. South side of Bell's Island. August 1st, 1859.

SARRACENIACEÆ.

*Sarracenia purpurea*, L. *S. heterophylla*, Eaton. Lemoine's Farm. June 29th, 1860.

FUMARIACEÆ.

*Dicentra Cucullaria*, D C. Penitentiary Bush. May 8th, 1859.
*Corydalis glauca*, Pursh. Winter Green Island. June 6th, 1859.

CRUCIFERÆ.

*Dentaria diphylla*, L. Penitentiary Bush. May 8th, 1859.
*Turritis stricta*, Graham. Haldimand Cove. June 11th, 1860.
*Sinapis arvensis*, L. Cultivated grounds. June 25th, 1859.
*Capsella bursa-pastoris*, Mœnch. Waste places. May 8th, 1859.

VIOLACEÆ.

*Viola pubescens*, Ait. Penitentiary Bush. May 8th, 1859.
*V. blanda*, Willd. Kingston Mills. May 8th, 1860.

HYPERICACEÆ.

*Hypericum perforatum*, L. Cataraqui Cemetery. June 30th, 1860.

CARYOPHYLLACEÆ.

*Silene noctiflora*, L. *S. nocturna*, Bigelow. Cultivated grounds. July 1st, 1860.
*Agrostemma Githago*, L. *Lychnis Githago*, Lam. Wheat field of John Duff. Aug. 20th, 1859.
*Alsine Michauxii*, Fenzl. *Arenaria stricta*, Michx. Cedar Island. July 5th, 1859.
*Stellaria media*, Smith. Cultivated grounds. July 28th, 1859.

PORTULACACEÆ.

*Portulaca oleracea*, L. Cultivated grounds. July 1st, 1860.

MALVACEÆ.

*Malva rotundifolia*, L. Cultivated grounds. July 27, 1859.

TILIACEÆ.

*Tilia Americana*, L., *var. pubescens*. *T. pubescens*, Ait, and *T. laxiflora*, Michx. Penitentiary Bush. Sept. 5th, 1859.

OXALIDACEÆ.

*Oxalis stricta*, L. Cultivated grounds. July 1st, 1860.

GERANIACEÆ.

*Geranium maculatum*, L. Haldimand Cove. June 6th, 1859.
*G. Robertianum*, L. Portsmouth. July 7th, 1859.
*G. Carolinianum*, L. Winter Green Island. June 10th, 1859.

BALSAMINACEÆ.

*Impatiens fulva*, Nutt. Point Frederick. Sept. 1st, 1859.

VITACEÆ.

*Vitis cordifolia*, Michx. Garden Island. July 6th, 1859.

ACERACEÆ.

*Acer rubrum*, L. Penitentiary Bush. Sept. 5th, 1859.

*A. saccharinum*, Wang. Penitentiary Bush. Sept. 5th, 1859.

STAPHYLEACEÆ.

*Staphylea trifolia*, L. Cedar Island. June 5th, 1859.

LEGUMINOSÆ.

*Trifolium pratense*, L. Wolfe Island. June 25th, 1859.

*T. repens*, L. Cultivated grounds. July 27th, 1859.

*Midicago lupulina*, L. Cataraqui Creek. July 7th, 1859.

*Robinia viscosa*, Vent. Near Kingston Mills. June 7th, 1859.

*Vicia sativa*, L. Field of wheat, John Duff. Sept. 16th, 1859.

*V. Cracca*, L. Cataraqui Cemetery. July 10th, 1859.

*Lathyrus ochroleucus*, Hook. Near Kingston Mills. June 6th, 1859.

*L. palustris*, L. Dr. Sampson's Farm. Sept. 6th, 1859.

ROSACEÆ.

*Spiræa salicifolia*, L. Cedar Island. June 16th, 1859.

*Agrimonia Eupatoria*, L. Kingston. Aug. 1859.

*Fragaria vesca*, L. Penitentiary Bush. May 10th, 1859.

*Rubus odoratus*, L. Cedar Island. July 5th, 1859.

*R. Canadensis*, L. *R. trivialis*, Pursh, Bigelow, &c. Haldimand Cove. May, 1860.

*Rosa blanda*, Ait. Haldimand Cove. June 11th, 1859.

*Cratægus tomentosa*, L. Near Railway Station. June 6th, 1859.

*Potentilla Canadensis*, L. *P. sarmentosa*, Muhl. Kingston Park. May 16th, 1859.

*Rubus strigosus*, Michx. Cedar Island. June 1st, 1850.

ONAGRACEÆ.

*Epilobium angustifolium*, L. Kingston Mills. July, 1859.

GROSSULARIDCEÆ.

*Ribes Cynosbati*, L. Penitentiary Bush. May 8th, 1859.

CAPRIFOLIACEÆ.

*Lonicera parviflora*, Lam., *var. Douglasii*. *L. Douglasii*, D C. Cedar Island. June 1st, 1859.

*Lonicera hirsuta*, Eaton. Wolfe Island. June 25, 1859.

*Diervilla trifida*, Moench. *D. Canadensis*, Muhl. Cedar Island. June 5th, 1859.

CINCHONACEÆ.

*Mitchella repens*, L. River Shore, Pittsburgh. July 7, 1859.

COMPOSITÆ.

*Inula Helenium*, L. Pittsburgh. August 15th, 1859.
*Achillea Millefolium*, L. Common. Sept. 1859.
*Leucanthemum vulgare*, Lam. (Chrysanthemum Leucanthemum, L). Dr. Sampson's farm. July 7th, 1859.
*Tanacetum vulgare*, L. Kingston. Sept. 9th, 1859.
*Gnaphalium polycephalum*, Michx. Cedar Island. August 16th, 1859.
*Cirsium lanceolatum*, Scop. Barriefield. July 23rd, 1859.
*C. arvense*, Scop. Barriefield. July 23rd, 1859.
*Lappa major*, Gærtn. (Arctium Lappa, L). Waste places. August 25th, 1859.
*Nabalus albus*, Hook. Dr. Sampson's farm. Sept. 5th, 1859.
*Taraxacum Dens-leonis*, Desf. Common. May 2nd, 1859.

LOBELIACEÆ.

*Lobelia inflata*, L. Penitentiary Bush. Sept. 10th, 1859.

The whole plant is highly narcotic; it is used as a medicine in various complaints, but particularly in nervous diseases.

CAMPANULACEÆ.

*Campanula rotundifolia*, L. Cedar Island. July 6th, 1859.

ERICACEÆ.

*Gaultheria procumbens*, L. Winter Green Island. July 25th, 1859.

MONOTROPACEÆ.

*Monotropa uniflora*, L. Cataraqui Cemetery. Sept. 8th, 1859.

PLANTAGINACEÆ.

*Plantago major*, L. Moist places. August 5th, 1860.

PRIMULACEÆ.

*Lysimachia ciliata*, L. Cataraqui Cemetery. July 30th, 1860.

SCROPHULARIACEÆ.

*Verbascum Thapsus*, L. Barriefield. July 23rd, 1859.
*Scrophularia nodosa*, L. (S. Marilandica, L. S. lanceolata, Pursh.) Near Kingston Mills. August, 1860.

LABIATÆ.

*Lycopus Europœus*, L. Moist Grounds at Queen's College. Sept. 8th, 1860.
*Calamintha Clinipodium*, Benth. (Clinipodium vulgare, L.) Haldimand Cove. July 25th, 1859.
*Monarda fistulosa*, L. Dr. Sampson's Farm. Sept. 5th, 1859.
*Nepeta Cataria*, L. Barriefield. July 25th, 1859.
*Prunella vulgaris*, L. Common amongst grass. July, 1860.
*Scutellaria galericulata*, L. Cataraqui Creek. July 27th, 1860.
*S. parvula.* Michx. (S. ambigua, Nutt.) Kingston. June, 1860.

POLEMONIACEÆ.

*Phlox divaricata*, L. Penitentiary Bush. May 12th, 1859.

CONVOLVULACEÆ.

*Ipomœa purpurea*, Lam. (Convolvulus purpureus L. Pharbitis hispida, Choisy.) A weed in gardens. August 27th, 1859.

ASCLEPIADACEÆ.

*Asclepias Cornuti, Decaisne.* A. Syriaca L. Cataraqui Cemetery. July 30th, 1860.

OLEACEÆ.

*Fraxinus Americana*, L. (F. acuminata et F. juglandifolia, Lam. F. epiptera, Michx.) River bank, Pittsburgh. May, 1860.

ARISTOLOCHIACEÆ.

*Asarum Canadense*, L. Penitentiary Bush. May 8th, 1859.

CHENOPODIACEÆ.

*Chenopodium album*, L. A weed in gardens. July 28th, 1859.

*C. hybridum*, L. Dr. Sampson's farm. July 23rd, 1860.

AMARANTACEÆ.

*Amarantus hybridus*, L. A weed in gardens. August, 1860.

POLYGONACEÆ.

*Polygonum Convolvulus*, L. Cultivated places. August 11th, 1859.

*Rumex Acetosella*, L. Barriefield. July 7th, 1859.

ELÆAGNACEÆ.

*Shepherdia Canadensis*, Nutt. Dr. Sampson's farm. July 23rd, 1860.

SANTALACEÆ.

*Comandra umbellata*, Nutt. Dr. Sampson's farm. July 23rd, 1860.

EUPHORBIACEÆ.

*Euphorbia Helioscopia*, L. A weed in gardens. August 23rd, 1859.

*E. humistrata*, Engelm. A weed in gardens. August 23rd, 1859.

JUGLANDACEÆ.

*Carya alba*, Nutt. Kingston. May, 1859.

The fruit of this tree is the well known Hickory Nut of commerce. Its wood is rather tough and elastic, making good adze, hammer, axe and pickaxe handles. It is also sometimes employed in shipbuilding. For heating purposes it is about the most valuable wood in Canada. It is also the heaviest of all our woods, its specific gravity being about 0.93.

CUPULIFERÆ.

*Quercus coccinea*, Wang. Penitentiary Bush. May, 1859.

*Q. alba*, L. Penitentiary Bush. May, 1859.

The timber of this tree forms an important article of export from this country to Britain and the West Indies. Of all the eighteen species of oak to be found upon our North American Continent, the timber afforded by Q. alba approaches nearest

in quality to that of the English oak. Although used for a great variety of purposes, it is especially valuable in ship building and the construction of machinery. The bark is employed in tanning and as a medicine.

*Fagus ferruginea*, Ait. (F. ferruginea et sylvestris, Michx). Penitentiary Bush. May, 1859.

A common tree throughout Canada, furnishing edible three cornered nuts, known as beech nuts. Its wood from its fineness of grain, and the ease with which it can be worked, is in much request for the manufacture of all kinds of furniture, carpenter's tools, ornamental wood-work, and for the construction of machinery.

*Carpinus Americana*, Michx. Penitentiary Bush. Sept. 1859.

CONIFERÆ.

*Pinus resinosa*, Ait. (P. rubra, Michx. F). Haldimand Cove. March, 1859.

This pine affords a very strong, durable timber, much valued in naval architecture. It contains a considerable quantity of turpentine.

*Pinus Strobus*, L. Haldimand Cove. March, 1859.

One of the most valuable of Canadian Timber trees. Its tall, straight trunk, which is frequently 150 feet high, is much sought after for the masts of ships, whilst the timber generally is used in the construction of bridges, houses, &c. It forms an important article of export from Canada to the United States and Britain.

*Thuja occidentalis*, L. River bank, Pittsburgh. August, 1859.

The wood obtained from this tree is light, but very durable, and is on this account valuable for posts.

*Juniperus communis*, L. Haldimand Cove. April, 1859.

*J. Virginiana*, L. Cedar Island. July, 1859.

An odorous, reddish, very compact and durable wood is afforded by this tree. The heart wood is used by lead-pencil manufacturers.

*Taxus baccata*, L., var. *Canadensis*. [T. Canadensis Willd.] Dr. Sampson's farm. July, 1860.

## ENDOGENÆ.

ARACEÆ.

*Arisæma triphyllum*, Torr. [Arum triphyllum L. Arum atrorubens, Ait]. Penitentiary Bush. May 8th, 1859.

TYPHACEÆ.

*Typha latifolia*, L. Pond at Queen's College. July 25th, 1859.

ALISMACEÆ.

*Alisma Plantago*, L., var. *Americanum*. [A. trivialis and A. parviflora, Pursh]. Pond at Queen's College. August 16th, 1860.

*Sagittaria variabilis*, Engelm. In a pond on Dr. Sampson's farm. July 23rd, 1860.

IRIDACEÆ.

*Iris versicolor*, L. Cataraqui Creek. July 7th, 1859.

The fleshy, perennial rootstock of this plant is used medicinally as an emetic and purgative. The effect produced is much more powerful if it is taken when in the fresh than of in the dried state.

*Sisyrinchium Bermudiense*, Pluk, L., var. *mucronatum*, [S. mucronatum, Michx]. Wolfe Island. June 25th, 1859.

SMILACEÆ.

*Trillium grandiflorum*, Salisb. Garden Island. May 24th, 1859.

LILIACEÆ.

*Polygonatum biflorum*, Ell. [Convallaria biflora, Walt. C. pubescens, Willd. Polygonatum pubescens, angustifolium et multiflorum, Pursh]. Wolfe Island. June 25th, 1859.

*Smilacina racemosa*, Desf. [S. ciliata, Desf.] Wolfe Island. June 25th, 1859.

*S. bifolia*, Ker., var. *Canadensis*. Wolfe Island. June 25th, 1859.

*Lilium Philadelphicum*, L. Wolfe Island. June 25th, 1859.

*Erythronium Americanum*, Smith. Cedar Island. May 5th, 1860.

## CRYPTOGAMIA.

EQUISETACEÆ.

*Equisetum limosum*, L. [E. uliginosum, Muhl.] Marsh near Railway Station. April 20th, 1859.

LYCOPODIACEÆ.

*Lycopodium annotinum*, L. Haldimand Cove. May 1st, 1860.

*Selaginella rupestris*, Spring. [Lycopodium rupestre, L.] Haldimand Cove. July 23rd, 1858.

FILICES.

*Polypodium vulgare*, L. Haldimand Cove. March 24th, 1859.

*Pteris aquilina*, L. var. *caudata*. [P. caudata L.] Haldimand Cove. July, 1859.

*Athyrium Filix-femina*, R. Brown. Cataraqui Cemetery. July 30th, 1860.

*Cystopteris bulbifera*, Bernh. [Aspidium bulbiferum, Swartz. A. atomarium, Muhl.] Wolfe Island. June 25th, 1859.

*Aspidium marginale*, Swartz. Cedar Island. July 25th, 1859.

*A. acrostichoides*, Swartz. Cataraqui Creek. July 7th, 1859.

*Onoclea sensibilis*, L. Cataraqui Creek. August 20th, 1860.

*Osmunda Claytoniana*, L. [O. interupta, Michx. &c.] Near Kingston Mills. June 6th, 1859.

*Botrychium lunarioides*, Swartz. [Botrypus lunarioides, Michx. Botrychium fumarioides, et matricarioides, Willd ] Kingston. June, 1860.

*Third Meeting.*

## FRIDAY EVENING, 15TH FEBRUARY, 1861.

The Society met in the Convocation Hall of Queen's College, on Friday evening, 15th February. Dr. Fowler, V.P., afterwards Rev. Principal Leitch, P., in the chair. About 200 members and visitors were present. Minutes of Council were read, from which it appeared that arrangements had been made for printing the Society's "Annals," and that the first part of the "Annals" would be ready for delivery to members in April.

The following Members and Subscribers were formally admitted, viz: Mrs Dr. George, William street; Mrs Kirkpatrick, King street; Miss Bridger, Queen street; Miss Crooks, Hamilton, C. W.; Miss Kirkpatrick, King street; Miss Mulkins, Hawthorn Cottage; Mrs. Isabella Mackenzie, Mrs. Colin Miller, Rev. James George, D.D., Professor of Logic and Mental and Moral Philosophy, Queen's College; Rev. J. A. Allan, Alwington House; Judge Logie, Hamilton; Thomas Kirkpatrick, Q. C.; Archibald H. Campbell, Commercial Bank, Kingston; Colonel Robert Jackson, Kingston; G. F. De R. Jackson, Kingston; John Paton, Kingston; John Kerr, Manager of the Kingston Gas Works; Jeremiah Meagher, Union street, Kingston; W. George Draper, M.A., Barrister, Lecturer in the Law Faculty of Queen's College; John Carruthers, Earl street; James McCaul, B.A., Grammar School, Bath, C.W.; James C. Smith, Librarian of Queen's College; G. M. Kinghorn, Wellington street; G. B. Kirkpatrick, Comer's Mills; Donald Ross, Queen's College; Colin Miller, Kingston; John McCoy, Napanee; John Fraser, Earl street; Hugh Fraser, Bellevue Terrace; John W. Slaven, Milford C.W.; Allan A. Y. Ramsay, Newmarket, C.W.

The following gentlemen were elected Corresponding Members, viz: Kenneth McIver, Koussanee Tea Plantation, near Almorah, Kumaon, India; Robert Bell, Assistant Geologist of the Government Geological Survey of Canada, Montreal; Guerin Meneville, Lamotte, Beuvron, France.

The following donations to the Society's Library were announced: From Dr. Dawson, Principal of McGill College Montreal, Hon. M.B.S. Ca., the following works by the donor: Acadian Geology, or the Geological Structure and Mineral Resources of Nova Scotia; Fossil Plants, from the Devonian Rocks of Canada; The Vegetable Structures in Coal; Notes on the Post Pliocene Deposits of the St. Lawrence Valley; Catalogue of the Holmes' Herbarium, McGill College, by Dr. Barnston. From J. J. Burrowes, Esq., Law Lecturer, University of Queen's College: Pursh's Flora of North America, 2 vols. 8 vo. From Mr. Holmes, Kingston: Botanical Sketches of the Twenty-four Classes of Linnæus, 50 plates; Exotic Cultivated Ferns, with Hints as to their Culture, and a Synopsis of Genera and Species, by Thomas

Moore, F. L. S., Cor. M. B. S. Ca.; The Linenan Artificial System of Botany, Illustrated and Explained, by Dr. Thomas Castle, F. L. S. From P. B. Mead, Cor. M. B. S. Ca., Editor of the New York Horticulturist: January Number of the Horticulturist and Journal of Rural Art and Taste. From Dr. Fowler, Professor of Materia Medica, Queen's College, V. P. Bot. Soc. Ca.: Don's Botanical Dictionary, 4 vols. 4to.

The following donations of Seeds were announced for distribution to Members: From Messrs. Vilmorin, Andrieux & Co., Paris, Seeds of the new upright Tomato, and of the new Double Zinnias. From Thomas Briggs, Jr., Esq., Seeds of the Hubbard Squash, the Mammoth Squash, and of improved China Asters. From Professor Lawson, Seeds of Dianthus Heddewigii, Linum grandiflorum rubrum, Cannabis gigantea, Hort., Lilium giganteum, and various other vegetable and flower seeds.

The Treasurer stated that John Carruthers, Esq., had presented to the Society a donation of twenty-five dollars.

Prof. Horatio Yates, M. D., presented the Report of the Committee appointed to draw up Rules for the distribution of Seeds, &c., in accordance with which the following Rules were adopted, viz:

### Rules for the Distribution of Seeds.

1. The annual distribution of seeds shall commence on the first day of March, in each year, before which time Members are requested to send in their donations of seeds, and lists of such cuttings and grafts as they can supply.

2. A List of the Seeds to be distributed shall be prepared and printed, and circulated to Members with the March billet, so that each Member may mark off those he desires, and return the marked list to the Secretary.

3. Members who have sent in contributions of Seeds, or who have undertaken to furnish cuttings or grafts at the proper season, shall be first supplied, *preference being given to those who desire the fewest kinds.*

4. Those Members who have not contributed to the general stock, shall then be supplied, beginning in the same way with those lists that contain the *fewest* marks.

5. Where there are more demands for a kind than can be supplied, the preference shall be determined by ballot.

6. The object of the Society in distributing seeds and plants is not to supply individual wants, but to acquire knowledge respecting the adaptability of plants to our climate, and the value of novelties in an economic point of view. It is expected, therefore, that Members, as well as the officers of Horticultural Societies, who may be furnished with seeds, will report to the Society the results of their cultivation, whether the same be successful or otherwise.

The following papers were read:

# ON THE SILK-WORM AND OTHER FIBRE-YIELDING INSECTS, AND THE GROWTH OF THEIR FOOD PLANTS IN CANADA.

By Mrs Dr Lawson.

Much attention is attached to the production of animal and vegetable fibres suited for spinning and the manufacture of cloth. The climate and soil of Canada are admirably adapted for the growth of hemp, flax, and other valuable fibre plants. The cultivation of grain and other crops which now form the staple agricultural products must be regarded as the primary sources of wealth in this country; still the production of fibres is also a branch of industry of great importance when we consider that it opens up occupation for women and young persons who do not find employment in ordinary labor. The whole subject of fibre prodution is deserving of consideration. I have always felt a great interest in those insects which produce silk, and so would anyone who had watched their labors. Believing that there is a wide field for female employment in Canada, I contribute these remarks especially as indicating a source of industry for women. The majority of the population of Upper Canada are composed of English, Irish, and Scotch. We all know that a certain class of women in their native country work in the fields, they cultivate hemp and flax, they hoe potatoes, and weed in the fields, and do other out-door work; but in Canada they too often lose their independence, and, as a consequence, suffer much misery. Seeing that we must have the luxury of silk dresses, I think we should try and do what lies in our power to cultivate silk in Canada. It may not be in our day and generation that we shall see our wishes wholly realised, but we may see a beginning made, and a prospect of others enjoying the benefit. I do not offer anything new or original to the Botanical Society; I merely make these suggestions in the hope that naturalists of the Society in their rambles will not pass over any fibre-producing insects they may meet with. The day may not be far hence when this Society may have the honor to pronounce to the world that they also have discovered an insect almost, if not quite equal to the mulberry silk worm. Attempts have been made at various times to introduce the silk culture to different countries, with often little success. Canada appears to me well suited for the cultivation of mulberry silk-worm. While the caterpillars are feeding they require a high temperature, which we here have in summer. It may be said silk-worm factories have hitherto been utter failures. In some instances this is true. The United States produced a small quantity of silk, and they have had great failures. I have tried the rearing of silk-worms on a small scale, and am convinced that profit and success would attend perseverance and economy. The silk-worm can be reared as well in the one apartment of the peasant as in the house of the rich or the most elaborate factory. The feeding and rearing

of silk-worms is in fact very simple. The difficult part is when the cocoons pass into the loomsters' hands to be woven into the different garments, ribbons, velvets, satins, stockings, nets, and blond. There is no secret in the rearing of the silk-worm, no complexity, no mystery, but far otherwise; it involves but few principles, and those of great simplicity. All that is required is a sufficient allowance of space for the insects, an abundance of fodder for their consumption, a constant supply of fresh air, and unremitting diligence in regard to cleanliness. This attention is needed only for the space of six weeks, which is the length of the silk harvest. Men's labor is not required; it is women's and children's work. Two persons (a woman and a girl) could attend the quantity of silk-worms that produce sixty pounds weight of cocoons, at twenty shillings a pound. Surely £60 for six weeks' work is a very good return.

The silk-worm's egg is the size of a pin's head. From each egg, in the month of June, a caterpillar emerges, a thin black speck, which immediately commences to feed, and each day we see a perceptible difference in size. The caterpillars devour an enormous quantity of fodder, and for nearly six weeks are continually feeding. When these little laborers have satisfied themselves they look for a suitable place in which to spin their cocoons. Having found a convenient corner, they envelope themselves in their silken shroud, there to remain until they are metamorphosed from the caterpillar to the moth with wings. The moth emerges from the cocoon, lays her eggs, and her allotted task is finished. In three weeks or a shorter time she dies. The eggs are preserved until the next season. In the case of the Cecropia silk-worm the caterpillar lies in the chrysalis state all winter.

There are many insects that produce silk, but some are inferior to others. The principal species are, the common silk-worm that feeds upon the white mulberry; the Ailante silk-worm that feeds upon Ailanthus glandulosa; and we have also the Cecropia, Polypheme, Luna, and Promethea moths, which make very large silk cocoons. These last are natives of North America. All are inferior to the common Chinese silk-worm, which feeds upon the mulberry. Now although this paper is expressly written for ladies, yet I have a favor to ask of the gentlemen of the horticultural societies, market gardeners, and nurserymen. It would be useless to hatch silk-worms' eggs, or the eggs of any other silk yielding insect without food for them to subsist upon; therefore I ask those gentlemen to aid in the cultivation of silk by planting the insect's food permanently in Canada. Horticultural societies might offer prizes for the largest white mulberry tree and Ailanthus glandulosa. Nurserymen could sell the young plants, and market gardeners could bring fresh leaves to market every day during the silk-worm's feeding season, which continues about six weeks. Silk-worms will subsist on lettuce leaves, but the silk produced on such food although similar in appearance to mulberry silk, (as will be seen from the specimens handed round,) is found to be quite useless for purposes of manufac-

ture. Two seedlings of the white mulberry reared in Kingston stood out all last winter with no covering except the snow, and grew luxuriantly during the summer. In the United States the mulberries are described as growing like willows. It would almost appear that the mulberry tree is an especial tree for the silk-worm, as no other insect feeds upon it, thereby ensuring the silk-worm its food. Another advantage the mulberry silk-worm has over other silk yielding insects, is that it stays in one place; you do not have to shut it up as we do other caterpillars; but there it quietly feeds on its mulberry leaves, and contentedly waits for the next supply; and when it has undergone its transformation into the moth, it perches itself on its cocoon, where it would stay if we did not take it off. They do not fly like other moths. There is no other silk-worm whose silk has so much lustre as the mulberry silk-worm.

The Cecropia Moth (Atticus Cecropia) appears to be common in Canada; specimens are frequently seen in the neighborhood of Kingston. Mr. Jaeger says this beautiful moth is found all the way from the Canadas down to the Mexican Gulf, as well as in all the Western States, and it appears in Canada between June and August, when the female deposits her white kidney-shaped eggs upon the apple, cherry or wild plum tree, the leaves of which constitute the food of the caterpillars, which are hatched out of the egg by the warmth of the atmosphere, which remains on the tree, feeding on its leaves, for two months, when it descends, and may be often seen creeping on paths and side-walks, searching for currant or barberry bushes, upon which it likes to build its cocoon. It lies in the cocoon and chrysalis state until the following summer. The series of specimens now on the table will show the aspect of the insect in its various stages. One hundred years ago the Rev. Samuel Pullien, of London, was the first to unwind the cocoon of the cecropia moth. I tried the same experiment last year, but did not very well succeed; with the mulberry silk-worm it is an easy matter. Although the cecropia cocoon may not readily unwind it might be valuable for spinning. All the waste cocoons of the common silk-worm are spun, and the material from it goes under the name of spun-silk. Spun-silk tartan is one of the fabrics made from the spoilt cocoons. The same could be made out of the cecropia cocoon, provided it would take on the dye. A pair of stockings made from the silk of the cecropia washed like a piece of linen.

The Ailante Silk-worm is at present attracting much attention in Europe, in consequence of the efforts of M. Guerin Meneville, who addressed a note to the Emperor in March, 1859, on its introduction into France. This new kind of silk-worm lives in the open air on a very hardy plant, the ailante or Japan varnish tree, and is described in the Morning Chronicle as producing two crops a year of a strong silky fibre, which has been employed for centuries past in China to make clothes for the great mass of the population. The chief object of M. Meneville's note was to request the Emperor to provide the means of making an experiment on

a large scale for the rearing of this silk-worm. The imperial authority was immediately granted, and the result, which is now published, surpasses all expectations. The new silk-worms were reared in several localities in France, and "it appears that more than three-fourths of the worms produced excellent cocoons, though the condition of the atmosphere was very unfavourable; and it is now fully ascertained that the new worm gives a profit of cent. per cent., and often much more, whereas the mulberry silk-worm is reckoned very successful when it makes a return of 15 per cent. on the capital employed. The silk of the ailante worm differs essentially from that of the mulberry worm. It is of an inferior quality, well adapted for coarse fabrics, and cannot enter into competition with that employed in the rich tissues of Lyons. The varnish tree will grow on the most barren soil. The cocoons may be prepared by the peasantry themselves, whereas the ordinary silk requires much skill and care in dressing it. The new silk will form an excellent substitute for cotton, of which France annually imports 69,604,000 kilogrammes from the United States. M. Guerin Meneville proposes to call the new silk ailantine, or cynthiane, in order to distinguish it from the other kind in use. He is now studying the best means of promoting the production and manufacture of the new silk, which he positively declares will ere long supply the chief clothing of the people." Professor Lindley, in commenting upon the above results, states that the earliest information respecting this insect was derived from Mr. Rutherford Alcock, when acting as H. M. Consul at Shanghae. About the year 1848 that gentleman sent to the Horticultural Society of London numerous pupæ and samples of cocoons as well as of the raw and manufactured silk. The samples of wove silk are described as having much the appearance of nankeen, rather coarse and very strong, and not likely to be taken for silk by an ordinary observer. An interesting paper has appeared in No. 86 of "All the Year Round," in which it is stated that "The eggs of the ailanthus silk-worm hatch at a temperature of from 64° to 68° Fahrenheit. They must therefore be kept in a cool place until the ailanthus plants are well in leaf. When hatched the young caterpillars may be placed on the ailanthus leaves in a tray, or on young branches furnished with leaves, and whose extremities are stuck into a jar of water. After the first moult they may be transferred to the growing trees and left thus in the open air until the cocoons are fit to be gathered. M. Meneville advises the stems of the alianthus plants to be cut down level with the ground, and only to use the suckers of the same year, which will start with great vigor. In the spring all last year's shoots must be pruned close, so that your ailanthus copse consists only of ligneous stumps and herbaceous branches, whose large and succulent leaves are more suitable for feeding the worms than those produced on the tops of small trees. The ailanthus may be planted in rows or in quincunx. It will grow even in stony soils, where little else that is useful, except the vine, will thrive, and that demands a far better climate with the best of aspects."

A few particulars respecting the plant on which the new silk-worm feeds may not be unacceptable. The genus ailanthus consists of large trees, whose timber is used for various purposes in the countries in which they grow. Ailanthus glandulosa is a native of China and Japan. The French name is Ailante. In Hortus Kewwensis we see that it was introduced into England by Father D'Incarville in the year 1751. It grows well in England, as well as in the United States, and is regarded as a valuable tree, as it is a quick grower and thrives on a poor soil. It has been recommended as a shade tree to be planted in the streets, or where shade is required. Trees of this and of the Mulberry planted in rows along the sidewalks in cities would answer three purposes—shade, food for silk-worms, and ornament. Groves and carriage drives so decorated would be pleasant and handsome-looking. Judging from the complaints of some horticultural writers as to its troublesome character, the Ailanthus would seem to grow too freely in the United States. See Horticulturist, N. Y., 2 ser., vol. v., page 379. In Gray's Manual it is described as having flowers, especially the staminate ones, which are redolent of anything but "airs of heaven." The bad odor, he observes, offers a serious objection to the planting of this ornamental tree near dwellings; but for the production of silk the trees are pollarded, or cut to stumps, and will not therefore produce flowers freely. When allowed to grow freely the Ailanthus attains a height of sixty feet. The bark, when wounded gives out a resinous juice, which hardens in a few days. The wood is hard and heavy, and is susceptible of a very fine polish. The late Dr. Neill of Edinburgh, in the account of his visit to Paris in 1817, says: In the Jardine de Plantes, next to the Seine gate, the cross-walk is shaded by rows of the Ailanthus glandulosa, here forming trees of considerable size. The Ailanthus, he remarked, seemed to have become a common ornamental tree at Paris. Again, the same writer observes that "at the back part of the garden there was a wall lined with the Ailanthus glandulosa, a Japan tree, which was growing vigorously, and remained quite green though standing in the hard gravel walks; while the Lime trees had been burnt up or nearly deprived of their foliage by heat or drought. It will grow in the coarsest and poorest soil, and sends its spreading roots abroad in search of moisture and nourishment. It is chiefly propagated by means of chips or cuttings of the roots, which are placed in shallow trenches, and grow readily." From these remarks we see that the tree has long been appreciated in France as an ornamental object, and now a rich harvest of silk will be reaped from it.

The importance of silk to our civilized world, not only in the present day, but in all ages, and the constant demand, still on the increase, have led naturalists to look out for insects that produce silk cocoons; and the last new discovery in France is that of the Ailante. We have thus at least three insects that could be reared in Canada for silk:—1. The Cecropia, a native of North America, and the food of which is already established, as it feeds upon the wild plum, the apple, and cherry

tree, and builds its cocoon upon currant bushes; 2. The Ailante, whose food is the Ailanthus glandulosa or Japan varnish tree, a very hardy tree, suited to our climate; and 3. The common silk-worm, which feeds on the white mulberry. Caterpillars and moths are very beautiful insects, and those we have had under consideration are particularly so. We have heard some people scream at a caterpillar and exclaim that they could not touch it. We grant you there are some things in nature that are not very loveable, but these moths we have been considering I think would satisfy the most fastidious, especially when we reflect upon the lines of the poet that:—

"We all are creeping worms of earth.
Some are silk-worms, great by birth;
Glow-worms some, that shine by night;
Slow-worms others, apt to bite;
Some are muck-worms, slaves to wealth;
Maw-worms some, that wrong the health;
Some to the world no good willers,
Canker-worms and caterpillars,
Found about the earth we're crawling,
And for a sorry life we're sprawling.
Putrid stuff we suck which fills us,
Death then sets his foot and kills us.

KINGSTON, CA., 15TH FEB., 1861.

## ON THE HUBBARD SQUASH.

BY THOMAS BRIGGS, JR.

This Squash, of which two fine specimens were exhibited to the meeting, was described by Mr. Briggs as having a thick hard shell or skin, when fully ripe, of a dark dull green color, sometimes with stripes of light green or lead color thereon. The flesh is of a rich golden yellow, fine grained, compact and dry, flavor delicious, and of first quality. It is superior to the Boston marrow, and there is no squash of which I have any knowledge that equals it in sweetness, firmness of grain, or in keeping qualities. It is not a large squash; its usual weight is from six to eight pounds, sometimes as heavy as twelve to sixteen pounds with good cultivation. In shape (as will be seen by the samples accompanying this,) it is a little elongated, and has always a small tapering point at the top, slightly twisted and turned aside. One of the many good qualities of this squash is that it keeps well during the winter; it is

also one of the best to use during summer, and before it is ripe. To prepare it for the table it requires but a short time to cook, say about ten minutes; the green outside shell of course being first taken off. Like all squashes it requires a rich soil and good culture to have it succeed well, and should be planted alone, so as not to mix with other varieties. I might here mention that the Hubbard Squash was first introduced by Mr. Gregory into Marblehead, Mass., more than forty years ago, but, from some cause, has been but little known beyond that locality, until within the last three or four years; of late it has become the favourite squash with all who know it, and continues to maintain that high character it held when first introduced.

In order to preserve the Hubbard, as well as other squashes, for winter use, it is necessary to gather them when ripe in the autumn, and place them in a dry room or carriage house until the first frost, after which they should be removed into a dry cellar, and there placed upon shelves where neither *damp* nor *frost* will affect them; with such care the Hubbard Squash will be good for use until May or June.

Two fine specimens of the Hubbard Squash, exhibited to the meeting by Mr. Briggs, were referred to a Committee of ladies for a report on their qualities.

## WHAT TO OBSERVE IN CANADIAN LICHENS.

By W. Lauder Lindsay, M. D., F. L. S., Hon. Mem. Bot. Soc. Ca.

An account was given of the importance of Lichens in the phenomena of nature and of their applications to the wants of man, in affording food, dyes and fodder. Specimens of many of the most valuable dye species were shown, including Roccella tinctoria from Greece; a series of Umbilicariæ named by Leighton in accordance with his Monograph; Sticta pulmonaria and dye prepared from it, from the woods around Kingston; an interesting collection of Lichens made in the United States by Mr. A. O. Brodie, of the Ceylon Civil Service; and Tuckermann's published series of American specimens. The points brought before the Society by Dr. Lindsay were the following:

1. There are no plants so variable in character as the lichens; none in which it is consequently so difficult to decide what are species and what are varieties. In order to a comprehensive knowledge of species, it is necessary to study individuals in every condition of growth and from every possible habitat. Hence the commonest species and varieties become of value—the more so if collected in countries comparatively unexplored botanically, for lichens are no exception to the rule that geographical differences are attended by corresponding differences in the characters of the same plants. Every Canadian collector of lichens—however common and well-known the latter may be—may therefore consider himself as contributing towards a more scientific and philosophical, because more comprehensive, knowledge of a very protean, but interesting, group of plants.

2. If the collector make a point of gathering specimens of everything he meets which belongs to the lichen family, he will run a good chance of including some novelties, perhaps new species or varieties. This is extremely probable in a country like Canada, seeing that it is seldom a miscellaneous collection of lichens is made in any part of Britain at all remote from the larger towns without the discovery of interesting novelties. New species are most likely to be met with among the very minute crustaceous lichens, which grow on rocks or trees, and which cannot be properly studied without the aid of the microscope; among species belonging, for instance, to such genera as Lecidea, Lecanora, Graphis, Opegrapha, Calicium. It is not to be expected that the tyro should make these microscopical examinations or discoveries for himself: he will probably require the assistance of some experienced microscopist or lichenologist.

3. The applications of lichens to the arts are daily becoming more numerous and important. New dye-lichens are being discovered in India and the East. Among specimens of the latter recently sent me from India, I have found species not hitherto known to be of any practical use. Again, recently the probability has been shown, on good grounds, that a lichen—the Lecanora esculenta of Pallas—was the Manna of the Bible.

4. The colorific capability of a lichen, so far as regards a red or purple dye of the nature of orchil or cudbear, may be readily discovered by simply macerating the lichen—chopped into small fragments or pulverised according to the nature of its thallus—in a weakish solution of common hartshorn or ammonia, (the quantity not much covering the lichen in a vial of any sort), allowing the mixture to stand a few days in a warmish part of the house, and shaking it frequently, so as to expose the mass to the action of the air. Colorific lichens of this class belong chiefly to the genera Roccella, Umbilicaria, Parmelia and Lecanora.

5. The colorific capability of a lichen, so far as regards other colors—chiefly brown and yellow—may be easily ascertained by simply boiling the lichen, chopped or pulverized as before, in a small quantity of water. Colorific lichens of this class belong chiefly to the genera Parmelia, Sticta, Cetraria, &c.

6. Whether a lichen contains, and, if so, how much, mucilage or starch may be ascertained by the same means as last mentioned, and allowing the mixture to cool, when it will gelatinise more or less, if it contain much mucilage. Cetraria Islandica and some of the Umbilicarias are illustrations.

7. Contributions may also be made to our knowledge of the economical applications of lichens by ascertaining whether any and what species are, or have been, used in Canada by the native Indians to yield food, dyes, &c., noting all the particulars of such uses.

8. Lichens are very easily collected and transported; they require no sort of preparation; they may be simply allowed to dry in the open air and packed as

convenient. Those growing on trees generally require the piece of bark on which they grow to be sliced off with a knife, and those on stones the piece of rock to be broken with a hammer. Both may be wrapped in paper like mineralogical specimens. In all cases the localities and dates of collection should be mentioned, and any further information as to uses, &c., which may be known to the collector.

## TEA CULTURE IN INDIA.

Dr. Lawson read a letter from Mr. W. McIver, Kingston, accompanying specimens of Tea leaves, with a brief description of the mode of growth and preparation, received from his brother, Mr. K. McIver, Kousanee Tea Plantation, near Almorah, Kumaon, India. Mr. McIver's description was in the following terms: "I enclose herein two or three leaves, pressed, of the Tea Plant, from large bushes, each bush containing five or six, or sometimes more plants, of two to four feet high, and two or three feet in diameter. We pluck only the young or new sprouting leaves, such as I enclose, for making the tea. The remainder of the large green leaves with which the bush is still covered are left untouched, as they crumble and break and cannot be rolled or manipulated. These young leaves are soft and pliant, and can be kneaded without breaking."

## A NEW CANADIAN DYE.

Professor Lawson exhibited specimens of a new Dye of great richness, prepared in the Laboratory of Queen's College, from an insect, a species of Coccus, found for the first time last summer on a tree of the common black spruce (Abies nigra, Poir), in the neighborhood of Kingston. This new dye closely resembles true Cochineal, a most expensive coloring matter capable of being produced in warm countries only, and which is used to give a fine and permanent dye in red, crimson and scarlets, to wool and silk. Unlike Cochineal, the new dye, discovered at Kingston, is a native Canadian product, and capable of being produced in temperate countries. Having been but recently observed, a sufficient quantity has not yet been obtained for a complete series of experiments as to its nature and uses; but the habits of the insect, as well as the properties of the dye, seem to indicate that it may become of practical importance. In color it closely resembles ordinary Cochineal, having rather more the scarlet hue of the flowers of Adonis autumnalis, and no doubt other shades will be obtained. The true Mexican Cochineal is now being cultivated in Teneriffe, and other vine growing countries of Europe and Africa, with such success as to displace the culture of the grape vine; yet the Directors of the East India Company offered in vain £2,000 for its introduction into India.

## SPECIMENS OF MATERIA MEDICA.

Dr. Fife Fowler, Prof. of Materia Medica, exhibited the following specimens, viz.; Fruit of the Colocynth plant, Cucumis (Citrullus) Colocynthus; rhizome of Lastrea Filix-mas, the Male Fern, used as an anthelmintic; seeds of the Croton Oil Plant, Croton Tiglium; and specimens of Kooso, and Veratrum viride.

Dr. Lawson exhibited specimens of Hamamelis Virginica, collected on Prince Edward Island, by Prof. Inglis, Prince of Wales College, Charlottetown. This tree is widely distributed over the North American continent, and is common in the woods along the lake shore, in the neighborhood of Kingston, producing its flowers in autumn and winter, while the fruit does not ripen till the ensuing summer or autumn. Specimens of Psilotum triquetrum were exhibited, in illustration of Principal Dawson's paper on Fossil Plants, which had been presented to the Society's Library.

The Rev. Principal Leitch, the President, in bringing the proceedings to a close, congratulated the Members on the success of the Meeting, and the wide interest manifested in the Society's proceedings. This meeting differed from those previously held in regard to one circumstance—the presence of the Lady Members. Botanical researches of great value had been carried out by ladies in other countries and all departments of scientific knowledge had benefitted by their exertions. It was gratifying, therefore, that the ladies of Kingston were not behind in this respect, and he looked forward with interest to the contributions which they would no doubt continue to make to the Society's Meetings, in imitation of the example set by Mrs. Lawson. The President concluded by giving some interesting details regarding the employment afforded by the silk culture in Judæa.

### *Fourth Meeting.*

### FRIDAY EVENING, 8TH MARCH, 1861.

The Very Rev. Principal Leitch, President, in the Chair. There was a full attendance of members, and also a large number of visitors, the Convocation Hall of Queen's College being filled, while the Laboratory adjoining was arranged for the exhibition of preparations under the microscope, botanical specimens, &c. Some of the lady members appeared with bouquets of green-house flowers.

On motion of Prof. Yates, seconded by Mr. Drummond, the following new members were elected:—LADY MEMBERS—Mrs. Carruthers, Earl Street; Miss Wilson, King Street. FELLOWS—Rev. William Bleasdell, M. A., Rector of Trenton, the Parsonage, Trenton; F. R. Stanton, Kingston; B. Billings, Jr., Prescott.

The following letters were read by the Secretary:—

ACTON GREEN, TURNHAM GREEN,
London, W., February 4, 1861.

DEAR SIR,—I have just received your letter of the 11th ultimo, informing me that I have had the honor to be elected an honorary member of the Botanical Society of Canada. I beg you to assure the Society that I much value so flattering a mark of distinction, and that I greatly rejoice to find one of our most important colonies making such rapid strides in the prosecution of arts and sciences. Pray believe me, yours faithfully,

JOHN LINDLEY, M. D., F. R. S.,
Emeritus Professor of Botany, University College, London.

PROFESSOR LAWSON, Secretary of the Botanical Society of Canada.

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NASHVILLE, TENNESSEE, U. S.,
February 5th, 1861.

SIR,—The honor which the Botanical Society of Canada has conferred upon me, by electing me one of the honorary members of the body, is gladly and gratefully accepted. You will please convey my thanks and heartiest good wishes to the members of the Society, and assure them that it shall ever be my endeavor to prove myself worthy of their honor, and that at all times, and in all places, I will bear their interests, and that of the noble science to which they are devoted, in mind. The establishment of such a body on this continent, will, I believe, prove of inestimable value, not only to Canada, but to the United States, and may, I trust, prove to be the means of increasing the small number of botanists in the Southern States. As Editor of a Scientific Journal, having an extensive circulation in the extreme South, I have it in my power to bring the proceedings and wants of the Society before a class of men which it could not otherwise reach, and will be happy to do so.

The Society will please accept a donation of a copy of the said journal, "The Nashville Journal of Medicine and Surgery," which will be mailed to its Secretary every month. I should like to call its attention to an article on Euphorbia prostrata, as an antidote for rattle-snake bites, published in the current number.

I hope it will be in my power to send occasional papers and specimens to the Society.

With the assurances of the highest esteem, I am, &c.,

GEO. S. BLACKIE, M. D., (Edin.) A. M., (N. Y.),
Professor of Botany.

PROFESSOR LAWSON, Secretary of the Botanical Society of Canada.

Letters were also read from Dr. P. E. Hubon, Worcester, Massachusetts ; Professor Torrey, New York, offering specimens from his Herbarium, and other members.

The Librarian presented the following list of donations to the Society's Library :—From Dr Lawson, Professor of Chemistry and Natural History, Queen's College, Kingston, the following works by the donor : 1. Remarks on Lepas anatifera ; 2. Papers read to the Botanical Society of Edinburgh ; 3. A paper on the occurrence of Cinchonaceous Glands in Galiaceæ ; 4. Paper on Rat-tail Radish ; 5. Lecture on Agriculture, from the Canadian Agriculturist ; also, a pamphlet by Professor Balfour, entitled "Arrangement of the Vegetable Tissues and Organs." From Professor Blackie, honorary member of Botanical Society of Canada : February number of the Nashville Journal of Medicine and Surgery. Copies of the Annual Report and Prize Lists for 1861, of the Hamilton Horticultural Society, from the Society. Nursery and Seed Lists from Mr. J. H. Bruce, Hamilton, C. W. ; Mr. Thos. Bog, Picton ; and Mr. J. A. Haage, Erfurt. Also the following donations of seeds : From Mrs. Berry, Kingston—Foreign seeds. From Mrs Dr. Trousdale, Newboro'-on-the Rideau—Seeds of Adlumia cirrhosa. From Mr. John Machar, M. A., Mr. Flanagan, City Clerk, and Mr. Holmes—various Flower Seeds. From Prof. Litchfield, M. D.—Seeds of prize beet and other vegetable seeds of improved sorts. From Mr. Thomas Bog, Picton—A very valuable collection of seeds, including Phaseolus ensiformis gigas, pickling turnip, varieties of lentils, numerous new and fine varieties of asters, and various greenhouse and annual seeds, imported from Erfurt, Prussia.

Mr. Briggs moved a vote of thanks to the donors, which was seconded by Dr. Yates, and accorded with applause.

Dr. Dickson, Professor of Surgery, exhibited beautiful specimens of Australian sea weeds, collected and transmitted by Samuel McGowan, Esq., Government Superintendent of Telegraphs, to Dr. Dickson. There were also accompanying them numerous specimens of Zoophytes of great beauty. The Society's thanks were voted to Dr. Dickson for the interesting exhibition.

An extensive collection of plants, neatly prepared and labelled, was exhibited from Mr. John Macoun, Belleville.

Mr. John J. Grafton exhibited a specimen of a singular variety of Indian Corn raised last summer in the Township of North Fredericksburgh, County of Addington, from one seed received from China.

At this meeting seeds of various new and interesting economic and ornamental Plants, were distributed to Members who had applied for them.

The following papers were read :—

# NOTE ON THE GENUS GRAPHEPHORUM, DESV., AND ITS SYNONYMY.

By Asa Gray, M. D.,

Honorary Member of the Botanical Society of Canada.

About six years ago, I received from Dr. Cooley, of Washington, Macomb Co., Michigan, a panicle, with a portion of the stem and leaves, of a grass which was entirely new to me. A memorandum stated that it was gathered on the borders of a swamp near the collector's residence. Having retained no specimen himself, and no particular recollection of this grass, Dr. Cooley has not been able to find it again.

In preparing the second edition of my Manual of the Botany of the Northern United States, (published in the year 1856), I was obliged to characterize this grass from the imperfect single specimen in my possession, which I did under the name of *Dupontia Cooleyi*, referring the plant, with some misgiving, to R. Brown's Arctic genus Dupontia. There is nothing Arctic in the appearance of this grass, which, from the specimen, seemed to have much the appearance and the size of Cinna arundinacea; and the habitat, south of lat. 43 °, and not far from the Lake and River St. Clair, is by no means boreal.

The very close affinity between Dupontia and Arctophila, Rupr. having been indicated by Ruprecht* and by Grisebach†, it was natural to regard our grass as intermediate between the two; and I further suggested the propriety of combining them along with the Scolochloa of Link or Fluminia of Fries (which Grisebach had adopted as a genus) under Dupontia, as the oldest name.

The main object of this communication is to state, that I have recently had the pleasure to receive from Dr. Charles Pickering, specimens plainly conspecific with the Michigan grass (although much smaller and more slender), which this excellent naturalist detected last August at the Falls of the Riviere du Loup, in Lower Canada, about 100 miles below Quebec.

Dr. Pickering not only identified his plant with my Dupontia Cooleyi, but, which is more important, suggested that it might be the obscure Aira melicoides of Michaux, a grass known only from the specimen preserved in the Michauxian herbarium, upon which specimen, Desvaux and Beauvois had characterized the genus Graphephorum. The genus was founded under this name by Desvaux, but

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* Flores Samojedorum Cisuralensium, ( in Beitr. Pflanzenk, Russ. Reiches), p. 62-65.

† In Ledebour, Flora Rossica, 4, p. 386.

first published by Beauvois. A comparison with the specific character in Michaux's Flora, with the Analysis in Beauvois' Agrostographia, and with a description in the Supplement to Kunth's Agrostographia Synoptica, (the only original sources, except Desvaux Journal, which I have not seen,) proves the correctness of Dr. Pickering's suggestion.

The great size of the panicle in the Michigan specimen, and an erroneous preconception in respect to Graphephorum, had wholly diverted my attention from this obscure genus. It is now clear, however, that Beauvois' figure very well represents the Canadian grass, except that it wrongly restricts the villous beard of the rachis to the ultimate and sterile joint, and represents the inferior palea as tricuspidate through an exaggeration of a slight or casual erosion of the tip of each side of the submucronate termination of the mid-nerve, but these inaccuracies are both corrected in Kunth's supplementary description, drawn from original materials.

The grain is perfectly free and deciduous, as it doubtless will prove to be in Dupontia Fischeri.

Thus a long lost species of the North American Flora is rediscovered, and a genus which rested for almost half a century in obscurity and doubt, takes its appropriate position,—in my view, including not only its original species, but also Dupontia, R. Br., Arctophila, Rupr., and even Scolochloa, Link; for the firmer texture of the paleæ in the latter, the stronger nerves, and the vague teeth or eroded sinuses at the tip of the lower palea, are characters of small moment.

The name Graphephorum, is very appropriate, referring as it does to the penicillate tuft surrounding the base of each flower, which is a distinguishing character of the genus, if it be left (as I think it should be) among the Festucineæ, between Colpodium and Glyceria, while it also indicates an affinity with the Aveneæ, which was recognized by Mr. Brown when he established the genus Dupontia.

The several groups, or supposed genera here brought together, form so many sections of Graphephorum, which may be disposed as follows:—

## Genus: GRAPHEPHORUM.

*Graphephorum*, "Desv.," Beauv. Agrost., p. 76, t. 15, f. 8, (1812); Desv. Jour. Bot., ann. 1813, p. 71, ex auct.; Kunth, Enumer. (Agrost.), 1 p. 250, et Supple., p. 193, t. 14, f. 9 (pist. et squamulæ). G. *melicoides*, Desv.—*Aira melicoides*, Michx.

*Dupontia*, R. Br. App. Voy. Parry, p. 190 (1824). *D. Fischeri*, R. Br.

*Scolochloa*, Link. Hort. Berol. Descr., 1, p. 136 (1827). *S. festucacea*, Link. *Arundo festucacea*, Willd. *Festuca borealis*, Mert. et Koch. *F. arundinacea*, Lilijeb.

*Dupontia et Arctophila* (sub *Poa*,) Rupr., Fl. Samoj., p. 62-64, t. 6, (1845). Spp. plur.

*Fluminia*, Fries, Summ. Veg. Scand., 1, p. 247 (1845, 1846). *F. arundinacea*, Fries, seu *Festuca borealis*, Mert. et Koch.

*Scolochloa* (Link), *Dupontia* (R. Br.) et *Colpodium* § *Arctophila* (*C. fulvum* et *pendulinum*), Griseb. in Ledeb. Fl. Ross., 4, pp. 385, 386, 393, (1853).

§ 1. Paleæ firmiores, inferior nervis 7 prominulis; glumæ flores 3-4 æquantes.—Scolochloa, Link.

1. G. festucaceum. *Arundo festucacea*, Willd. *Festuca borealis*, Mert. et Koch; Hook. Fl. Bor. Am., 2, t. 231. *Scolochloa festucacea*, Link, Griseb. *Fluminia arundinacea*, Fries.

§ 2. Rhachis spiculæ etiam barbata; glumæ scabræ, inæqualis, flores 3-4subæquantes.—Graphephorum, Desv.

2. G. melicoides, Beauv. etc. *Aira melicoides*, Michx.

Var. majœr. *Dupontia Cooleyi*, Gray, Man. Bot. N. U. S., ed. 2, p. 556.

§ 3. Palcæ tenuiores, scariosæ; glumæ flores 2-3 subæquantes.—Dupontia, R. Br.

3. G. Fisheri. *Dupontia Fisheri*, R. Br. *Poa* (*Dupontia*) *pelligera*, Rupr. l. c.

Var. psilœanthum. *Poa* (*Dupontia*) *psilosantha*, Rupr. *Dupontia psilosantha*, Rupr., l. c., t. 6; Griseb. l. c.

§ 4. Glumæ spicula 2-7 flora breviores; flores parvuli.—Arctophila, Rupr.

4. G. fulvum. *Poa fulva*, Trin. *Poa* (*Arctophila*) *fulva*, *Scleroclada latiflora* et *pœcilantha*, Rupr. ex Griseb. *Glyceria fulva*, Fries. *Colpodium* (*Arctophila*) *fulvum*, Griseb.

5. G. pendulinum. *Poa pendulina*, Fl. Dan. t. 2343. *Poa* (*Arctophila*) *deflexa*, *remotiflora*, et *similis*, Rupr. *Glyceria pendulina*, Lœstad. *Colpodium* (*Arctophila*) *pendulinum*, Griseb.

All these species except the last (which may be expected) have already been detected in British or Russian America. G. festucaceum abounds on the Saskatchawan, and is likely to occur further South. This species, and especially G. melicoides, of which specimens are general desiderata, are particularly commended to the attention of Canadian botanists.

Cambridge, Mass., January 30th, 1861.

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# LIST OF PLANTS COLLECTED ON THE ISLAND OF ANTICOSTI AND COAST OF LABRADOR, IN 1860.

By John Richardson, while accompanying an Exploring Party of the Geological Survey of Canada.

The species determined by B. Billings, Jun., F. B. S. C.

Ranunculaceæ.

1. *Thalictrum dioicum*, L. Ellis Bay, Anticosti. July 4th, in flower.

Sarraceniaceæ.

2. *Sarracenia purpurea*, L. Corneille River. July 25th, in flower.

Violaceæ.

3. *Viola cucullata*, Ait. Ellis Bay, Anticosti. July 4th. Corneille River. July 25th, in flower.

Leguminosæ.

4. *Vicia Cracca*, L. Corneille River. July 25th, in flower.
5. *Lathyrus maritimus*, Bigelow. Ellis Bay, Anticosti. July 4th, in flower.
6. *Lathyrus palustris*, L. Indian Point, Pillage Bay. July 25th, on rock.

Rosaceæ.

7. *Dryas*, sp. (Petals rose-purple.) Ellis Bay, Anticosti. July 4th, in flower.
8. *Geum strictum*, L. Ellis Bay, Anticosti. July 4th, in flower.
9. *Geum rivale*, L. Ellis Bay, Anticosti. July 4th, in flower.
10. *Potentilla anserina*, L. Ellis Bay, Anticosti. July 4th, in flower.
11. *P. fruticosa*, L. South-west Point, Anticosti. July 5th, in flower.
12. *Fragaria vesca*, L. Ellis Bay. Anticosti. July 4th, in fruit.
13. *Rubus Chamæmorus*, L. Corneille River. July 25th, in flower.

Onagraceæ.

14. *Epilobium angustifolium*, L. Corneille River. July 25th, in flower.

Cornaceæ.

15. *Cornus Canadensis*, L. Ellis Bay, Anticosti. July 4th. South-west Point, Anticosti. July 5th, in flower.

Caprifoliaceæ.

16. *Linnea borealis*, Gronov. Indian Point, Pillage Bay. July 25th, in flower.

Ericaceæ.

17. *Vaccinium Oxycoccus*, L. Corneille River. July 25th. S. W. Point, Anticosti. July 25th, in flower.

18. *V. Pennsylvanicum*, L. Corneille River, July 25th.
19. *Arctostaphylos alpina*, Spreng. Large Island, Mingan Group. June 28th, in flower.
20. *Kalmia latifolia*, L. Corneille River. July 25th, in flower.
21. *Liosceluria procumbens*, Desv. Ellis Bay, Anticosti. July 4th.
22. *Pyrola rotundifolia*, L. Ellis Bay, Anticosti. July 4th, in flower.

PLANTAGINACEÆ.

23. *Plantago major*, L. Ellis Bay, Anticosti. July 4th, in flower.

PRIMULACEÆ.

24. *Primula farinosa*, L. Ellis Bay, Anticosti. July 4th, in flower.
25. *P. Mistassinica*, Michx. S. W. Point, Anticosti. July 5th, in flower.
26. *Trientalis Americana*, Pursh. Ellis Bay, Anticosti. July 4th, in flower.

GENTIANACEÆ.

27. *Menyanthes trifoliata*, L. Ellis Bay, Anticosti. July 4th, in flower.

SANTALACEÆ.

28. *Comandra umbellata*, Nutt. S. W. Point, Anticosti. July 5th, in flower.

ORCHIDACEÆ.

29. *Calypso borealis*, Salisb. S. W. Point, Anticosti. July 5th, in flower.
30. *Cypripedium parviflorum*, Salisb. Large Island, Mingan Group. June 28th, in flower.

IRIDACEÆ.

31. *Iris versicolor*, L. Ellis Bay, Anticosti. July 4th, in flower.

LILIACEÆ.

32. *Smilacina racemosa*, Desf. Ellis Bay, Anticosti. July 4th, in flower.
33. *S. trifolia*, Desf. Corneille River. July 25th, in flower.
34. *Clintonia borealis*, Raf. Ellis Bay, Anticosti. July 4th, no flower or fruit.

MELANTHACEÆ.

35. *Streptopus amplexifolius*, D C. Ellis Bay, Anticosti. July 4th, in flower.

GRAMINEÆ.

36. *Calamagrostis Canadensis*, Beauv. Indian Point, Pillage Bay. July 25th, in flower.
37. *Phalaris arundinacea*, L. Indian Point, Pillage Bay. July 25th, in flower.

NOTE.—Besides the above, a number of growing plants were brought from Labrador in boxes of earth; but these have not yet been determined. They include about forty young bushes of a fine native Gooseberry, which abounds in Labrador and Anticosti, and has also been met with in Gaspe.

# ABSTRACT OF RECENT DISCOVERIES IN BOTANY, AND THE CHEMISTRY OF PLANTS.

By Professor George Lawson, Ph D.

Venation of Mosses.—In Botany the term venation has reference to the distribution of the so called veins or nerves of the leaf. These veins or nerves have nothing in common with the apparatus to which those terms are applied in the animal kingdom; they form merely the framework upon which the cellular expansion of the leaf is, so to speak, stretched out; but they are in some cases important to the systematic botanist, as indicating the structural grade of plants. In mosses, the existence of a central leaf rib has been long recognized. In some cases this is absent. In others there is in addition a thickening of the leaf-margin. Mr. G. Gulliver, F. R. S., has published a paper in the Annals of Natural History (ser. 3, vol. V., p. 298), in which he suggests that these thickened margins are in reality marginal nerves or ribs. This is a very important suggestion, and may lead to useful results in reference to the morphology of the moss leaf. That in many cases the marginal thickenings of moss leaves structurally resemble, in every respect, the midribs, is a fact that cannot have escaped the attention of Muscologists, especially in such species as Atrichum undulatum, yet Mr. Gulliver is the first to suggest what seems to be their true nature. The details he gives are very meagre; it is to be hoped that he will follow out the subject, and, by a careful study of the details of leaf structure in the various families of mosses, deduce some general results that will lead to a recognition of his views by the describers of these interesting and beautiful plants. There are many points on which Bryologists have not yet agreed, and one of the most necessary, so far as regards descriptive Muscology, is to determine what is to be regarded as midrib and what as lamina. The new point of view will no doubt revive the discussion of such questions, with profit.

Phosphorus in the Atmosphere.—Mr. C. McLaren has lately given in the Edinburgh Scotsman, an abstract of a memoir on this subject by M. Barral, which was read to the Academy of Sciences on the 21st November, 1860. It appears that M. Barral had detected phosphate of lime in rain water some years ago, but doubts arose whether its presence might not be due to the glass or porcelain vessels in which it was kept. To obviate this difficulty he employed vases and eudiometers of platinum, and operated upon two portions of rain water, collected, during five successive years, under his own inspection; the one at the Luxembourg in Paris, the other in the Park of Soulins in the open country. The water was evaporated in large quantities, and the residuum examined chemically. Considering this residuum first, simply as *impurities* imbibed by water passing through the atmosphere, he found that 2278 English pints, or 570 gallons, of Paris rain water, yielded 350 troy grains of dry residuum. Of the rain water which fell in the country at the park of Soulins, 171 gallons yielded 46 grains of dry residuum. The impurities, therefore, in 100 gallons of Paris rain water, compared with an equal quantity from the open country, are as 226 to 78, or nearly as *three to one.* In London, with its coal fires, the impurities must be three times greater. M. Barral's experiments, directed to the discovery of the amount of *phosphorus* in the water collected in different localities, did not show any appreciable difference in this particular between the water at Paris, and that of the park of Soulins. The results of his experiments varied considerably; but taking a mean, he computed that 440 gallons of the rain water examined contained from 8 to 15 troy grains of phosphorus. This is an exceedingly minute quantity, and yet the effects deducible from it are not altogether without importance. By calculation, he computes, that the atmosphere delivers annually to the soil *about* 2400 *troy grains of phosphorus to each acre of land.* Phosphorus is extracted from bones, in which it exists, in the shape of a phosphate of lime. Phosphate of lime is an essential part of the food of cereal plants, and hence the wonderful effects of bone meal in increasing crops. That water, by itself, or its elements, oxygen and hydrogen, is necessary to the growth of plants, has been long known, but it is a new and interesting fact, if Mr. Barral's conclusions are correct, that *the clouds which supply water to the earth, send down a refined and valuable manure with it.* No doubt the quantity is inconsiderable, but small though it be, the restoration of fertility to exhausted lands by allowing them to lie fallow for a course of years—a practice followed by the Arabs —must be partly the effect of it. Wheat is an exhausting crop, because much of its substance consists of phosphoric acid, and Mr. Barral admits that the quantity of this substance carried off by one crop of wheat could not be replaced by the atmosphere in less than twenty years.

Of late years, the discoveries that have been made in regard to ammonia and the apparent power of plants to take up free nitrogen, have modified considerably

our views on the subject of the Chemistry of Plants, more especially with regard to the sources of plant food. The above researches have also an important bearing in this respect, and if borne out by further investigation will lead us to attach still more importance to the atmosphere as a source of plant food.

In connection with this subject it may be mentioned that there is a singular want of direct and satisfactory experiments as to the real value, as a manurial application to the soil, of the mineral phosphate of lime, Apatite. Judging from the number of Canadian specimens that have been lately brought to the Laboratory of Queen's College for examination and analysis, an abundant supply of this material might be exported from Canada for agricultural purposes. The attention of English agriculturists is therefore invited to the subject.

Sea-Weed as a Manure.—The attention of the English farmer has been recently called to the use of sea-weed as a manure. This material is thrown up in enormous quantities on the shores of Britain, and on the east coast of Scotland it is extensively employed to fertilize sand dunes that would otherwise be worthless. In dry sandy soils it acts in two ways ; first, by directly contributing food materials to the crop, and, secondly, by the hygroscopic action of the mucilaginous tissues in maintaining a certain degree of humidity in the arid soil, a result that is no doubt aided by the presence of the sea-salt accompanying the weed. The richness of the ash of the common sea-weed in potash, soda, phosphates, and other materials of plant growth, shows that it has a high manurial value. In Greenland specimens, the ash has been found to contain ten per cent of phosphates. The proportion of water in the recent weed is so large, however, that sea-weed cannot be profitably carried to great distances, but along the shores of the lower St. Lawrence and in the other maritime provinces, where it can be readily obtained at certain seasons, its value can scarcely be over-rated. The processes that have been suggested for converting the sea-weed into a paste for transport, mixing with peat ashes, &c., do not seem likely to lead to any useful result, so far as the British American provinces are concerned.

Steeps for Seeds.—Of the many "steeps" that have been recommended to facilitate the germination of seeds, the most intelligible is that of caustic potash, or carbonate of potash, applied by M. Andre Seroy to seeds naturally protected by fatty or oily pulp. He reports that the seeds of Hollies, Magnolias, Yews, and the like, which often lie dormant in the ground for a couple of years, come up readily after treatment with potash and subsequent rubbing with sand.

Blanching of Flowers.—It is well known that light is as necessary to plants as a due supply of heat and moisture. The effects of its absence are often singular. We know that plants grown in darkness do not exhibit their usual healthy green color, light being required for the development of chlorophyll. Advantage is taken of this circumstance in the blanching of salads and vegetables, and the same

process is now being applied to flowers. It appears that in Paris there is a great demand for white lilacs for ladies' bouquets in winter, and as the common white lilac does not force well, the purple "Lilas de Morly" is used. The flowers of this variety, when made to expand at a high temperature, in total darkness, are of a pure white; those of the Persian lilac will not whiten.

Paper Materials.—The cry for "more rags" which the paper-makers raised some years ago, necessarily failed to increase the supply of rags, but it served to bring materials to the paper-mill that had not been previously thought of. Hollyhock stems and straw and heather, and a hundred other substances, were tried and found suitable in various degrees. Many of these, while capable of being converted into paper, could not be profitably used in the manufacture; but several have taken their place as really important sources of paper fibre. Plants that require to be cultivated exclusively for this purpose are not likely to yield satisfactory results, and of late years, therefore, attention has been especially directed to the waste products of agriculture. In all agricultural plants woody fibre is produced to a greater or less extent, and that of the straw of cereal grains has been used for a number of years to a considerable extent. The leaves and husks of Indian Corn (*Zea Mays, L.*) are also coming into extensive use, as appears from interesting details published by Professor Lindley in the Gardeners' Chronicle. Dr. Lindley's account of the manufacture appears to be founded upon statements that have appeared in the *Breslauer Gewerbeblatt* and the Daily Telegraph, a London paper. The following extracts will be of interest on this side of the Atlantic, where Indian Corn is produced in such enormous quantities:—"Recent experiments have proved Indian Corn to possess not only all the qualities necessary to make a good article, but to be in many respects superior to rags. The discovery to which we allude is a complete success, and may be expected to exercise the greatest influence upon the price of paper. Indian Corn, in countries of a certain degree of temperature, can be easily cultivated to a degree more than sufficient to satisfy the utmost demands of the paper market. Besides, as rags are likely to fall in price, owing to the extensive supply resulting from this new element, the world of writers and readers would seem to have a brighter future before it than the boldest fancy would have imagined a short time ago. This is not the first time that paper has been manufactured from the blade of Indian Corn; but, strange to say, the art was lost, and required to be discovered anew. As early as the seventeenth century, an Indian Corn paper manufactory was in full operation in the town of Rievi, in Italy, and enjoyed a world-wide reputation at the time; but with the death of its proprietor the secret seemed to have lapsed into oblivion. Attempts subsequently made to continue the manufacture were baffled by the difficulty of removing the flint and resinous and glutinous matter contained in the blade. The recovery of the process has at last been effected, and is due to the cleverness of one Herr Moritz Diamant, a Jewish writing-master

in Austria, and a trial of his method on a grand scale, which was made at the Imperial manufactory at Schlogelmuhle, near Glognitz (Lower Austria), has completely demonstrated the certainty of the invention. Although the machinery, arranged as it was for the manufacture of rag-paper, could not of course fully answer the requirements of Herr Diamant, the results of the essay were wonderfully favorable. The article produced was of a purity of texture and whiteness of color that left nothing to be desired; aud this is all the more valuable from the difficulty usually experienced in the removal of impurities from rags. The proprietor of the invention is Count Carl Octavio Zu Lippe Weissenfeld, and several experiments give the following results:—

"1. It is not only possible to produce every variety of paper from the blades of Indian Corn, but the product is equal, and in some respects even superior, to the article manufactured from rags.

"2. The paper requires but very little size to render it fit for writing purposes, as the pulp naturally contains a large proportion of that necessary ingredient, which can at the same time be easily eliminated if desirable.

"3. The bleaching is effected by an extraordinarily rapid and facile process, and, indeed, for the common light colored packing paper the process becomes entirely unnecessary.

"4. The Indian Corn paper possesses greater strength and tenacity than rag paper, without the drawback of brittleness so conspicuous in the common straw products.

"5. No machinery being required in the manufacture of this paper for the purpose of tearing up the raw material and reducing it to pulp, the expense, both in point of power and time, is far less than is necessary for the production of rag paper.

"Count Lippe having put himself in communication with the Austrian Government, an imperial manufactory for Indian Corn paper (*maishalm papier*, as the inventor calls it) is now in course of construction at Pesth, the capital of the greatest Indian Corn growing country in Europe. Another manufactory is already in full operation in Switzerland; and preparations are being made on the coast of the Mediterranean for the production and exportation on a large scale of the pulp of this new material."

New Upright Tomato.—A tomato has been introduced by Messrs. Vilmorin, & Co., of Paris, which is described as growing quite upright and requiring no artificial support. It branches less than the common sorts, does not bear so freely, but its fruit is larger and more regularly formed. Seeds of this variety have been received from Messrs. Vilmorin, for distribution among the Members of the Botanical Society of Canada.

Vilmorin's Double Zinnias.—A new race of Purple Zinnias, quite double, have been introduced by Messrs. Vilmorin, the seeds of which had been received from

India. These Zinnias form perhaps the most valuable addition that has been made to our flower garden plants during the year. A sufficient supply of seeds has been obtained for the Members.

Tea Culture.—Tea culture, long confined to China and Japan, is now being extended over the globe. A valuable report on this subject has been presented by Prof. Cleghorn, of the India Service, to the Botanical Society of Edinburgh. The following are notes made during his tours, upon the tea plants seen in the different districts of the Presidency of Madras:—1. Shevaroy Hills (4000 feet); several well grown trees at Yercaud, introduced by G. Fischer, which have not been picked or pruned, and have been left to nature, but are growing vigorously. 2. Coorg (4500 feet, rain-fall 120 inches, mean temp. 68 °). A case of plants was brought from China by Colonel Dyce in 1843; those at Mercara appear to be over luxuriant, producing a rapid growth of leaves, and not bearing seed with regularity. 3. Nundidroog (4800 feet). A number of plants have lately been sent to this Hill Sanatarium; they were beginning to droop in the Lal Bagh Garden, Bangalore, but there is hope of their thriving in their new location. The mean temp. of Bangalore is 75 °, and the average rain-fall 35 inches. The climate being too dry and too hot, the plants necessarily become dwarfed. 4. Bababooden Hills (5600 feet, rain-fall and mean temp. not known). Four plants from General Dyce's stock were received from Mercara in 1847; these grew well without care. Colonel Porter, superintendent of Nuggur, raised 23 plants above Ghat, near the Sicar bungalow, and a number of seedlings have been planted out about a thousand feet lower by Mr. Denton, coffee planter. 5. Nilgiri Hills—*a. Coonoor* (6000 feet, rain-fall 55 inches). *b. Ootacamund* (7300 feet, rain-fall 60 inches, mean temperature 50 °), introduced or raised by Mr. McIvor, Government Gardens, from Saharunpore seed, and by General F. C. Cotton, at Woodcote; *c. Kaity*—Introduced or raised by Sir S. Lushington and Lord Elphinstone; *d. Kulhutty*—Introduced or raised by Mr. Rae. 6. Pulni Hills (7100 feet). Major Hamilton reported that a considerable number of tea plants at Kudaikarnal, were several inches above ground, and appeared fresh and healthy. 7. Curtallum (1200 feet). Flowering specimens from the old spice gardens, correspond with the standard figures of *Thea Chinensis.* The shrubs are 20 years old, 12 to 15 feet high; where the seed came from is not known. 8. Travancore.—Tea trees grow luxuriantly in Messrs. Binney & Co.'s plantations (formerly Mr. Huxham's) 40 miles east of Quilon, on the road to Curtallam, and from whence some plants were procured ten or twelve years ago, which were planted at Vellymallay, near Udagiri (1800 feet, rain-fall 80 inches), and at Atkaboo, near Tinnevelly frontier (3200 feet, rain-fall 40 inches). At both places they are growing luxuriantly. These facts are taken from General Cullen's letter, and seeds received from him were planted and throve on the Nilgiris, at an elevation of 550 feet. In tea, as in all cultivated plants, there are variations, the dis-

crimination of which is of the utmost importance commercially, and also in an economical point of view. This much is known, that the seed having been obtained from different parts of China, the introduced plant varies in stature exceedingly, from a bushy shrub of 3½ feet to a ramous tree 25 feet high. There is also a vast difference between the narrow-leaved forms and broad-leaved specimens in some of the localities mentioned. At present the leaves are taken indifferently from several sorts, which should not be done when preparing tea for commercial purposes; and the means of manufacture are of the rudest description.

The tea shrub of commerce, though long confined to Eastern Asia, is now cultivated far beyond the limits of China and Japan—in Java (under the Equator), in Assam, the Northwest Provinces of Hindostan, on the banks of the Rio Janeiro, and recently in North America. From the published reports of Mr. Fortune and Dr. Jameson it appears to prefer a climate probably of 67 ° to 73 ° mean temperature. Such is nearly the mean temperature of the hillslopes near Kunur, Kotagiri, and of many of the valleys in the eastern and northern slopes of the Pulni and Nilgiri Hills, and also of the Bababooden range in Mysore, and of Kudra Muka in South Canara. It ought to be observed, as illustrative of the hardiness of the tea shrub, that the cultivation extends over a great breadth of latitude (from the banks of the Rio Janeiro, 22½ ° south latitude, to the province of Shanting in China, 36½ ° north latitude), and that, as we recede from the equator, the lower latitude compensates for the difference of altitude. The Chinese cultivate on the lower slopes of the hills, whilst in the Northwest Provinces the culture is carried on between 2000 and 6000 feet. This valuable plant has been found wild in Upper Assam and Cachar, whilst its congeners abound on the Nilgiri and other mountain ranges of southern India. Its cultivation, therefore, might be attempted with good prospect of success in some of the localities above mentioned. In the plantation near Kunur we have the opinion of four competent judges that the experiment had entirely succeeded as regards the growth of the plants. It now only remains to prove the merchantable character of the leaf, and this, I hope, will soon be tested. So far as Dr. Cleghorn could judge, the aid of a few practised manipulators is all that is required to conduct the manufacturing processes. This has been lately sanctioned by Government, and there will thus be opened up a new sphere for British energy and capital. The field is a wide one, and when occupied by private enterprise, it is not necessary that Government should give assistance further. A grant of land for tea cultivation has lately been made to Mr. Rae, near Utakamund. One remarkable advantage of tea cultivation is that it may be carried on, in a fine climate, above the range of jungle fever, which proves so injurious to many settlers in India.*

*The Botanical Society is desirous of obtaining particulars respecting American Tea culture.

Effects of Narcotic and Irritant Gases on Plants.—Mr. John S. Livingston has conducted a series of valuable experiments in the Royal Botanic Garden, Edinburgh, which lead to the conclusion that gases divide themselves into two classes as regards their action on plants—viz: into narcotic and irritant gases. This distinction, to whatever cause traceable, is as real in the case of plants as in that of animals. When subjected to the influence of a narcotic gas, the color, it was observed, never became altered, and the plants looked as green and succulent at the end of the experiment as at the beginning. Whenever the plant began to droop, though removed to a forcing bed, and watered, in no instance did it recover, but died down even more speedily than it would have done if left to the continued action of the gas. In one word, narcotic gases destroy the life of the plant. With irritant gases, on the other hand, action is more of a local character. The tips of the leaves first begin to be altered in colour, and the discoloration rapidly spreads over the whole leaf, and, if continued long enough, over the whole extent of the plant. But if removed before the stem has been attacked by the gas, the plants always recover—with, however, the loss of their leaves. In a short time they put out a new crop, and seem in no way permanently injured ; but of course, if repeatedly subjected to an atmosphere of irritant gas, the plant is destroyed.

## LIST OF PLANTS COLLECTED ON THE SOUTH AND EAST SHORES OF LAKE SUPERIOR, AND ON THE NORTH SHORE OF LAKE HURON, IN 1860.

By Robert Bell, attached to the Geological Survey of Canada, Corresponding Member of the Botanical Society.

The Species determined by B. Billings, Jr., F. B. S. C.

### Ranunculaceæ.

*Anemone Pennsylvanica*, L. Ke-we-naw Point. July 4th. Stoney bed of a brook. Schibwah River. August 6th. Bed of the river. In flower at both localities.

*Anemone nemorosa*, L. Opposite Gros Cap. June 15th, in flower.

*Thalictrum Cornuti*, L. Ke-we-naw Point. July 4th, in flower.

*Ranunculus aquatilis*, L., var. divaricatus. LaCloche Island. October 3rd. In shoal water, no flower.

*Ranunculus repens*, L. Ke-we-naw Point. July 4th.

*Caltha palustris*, L. Opposite Gros Cap. June 15th, in flower.

*Coptis trifolia*, Salisb. Opposite Gros Cap. June 15th, in flower.

*Actæa spicata*, L., var. rubra, Michx. Opposite Gros Cap. June 15th, in flower.

*Actæa spicata*, var. alba, Michx. Grand Island. June 22nd.

NYMPHÆCAEÆ.

*Nymphœa odorata*, Aiton. Goulais River and Sou-sou-wa-ga-mi Creek. July 25th, in flower.

*Nuphar advena*, Aiton. Sou-sou-wa-ga-mi Creek. June 29th, in flower, in still water.

FUMARIACEÆ.

*Corydalis glauca*, Pursh. Island east of Thessalon River. Sept. 21st and 22nd, in flower and fruit. Black mould on rocks.

CRUCIFERÆ.

*Nasturtium palustre*, DC. Goulais Point, in the dry bed of a pond. July 28th, in fruit and flower.

*Cardamine hirsuta*, L. Goulais Point, in the dry bed of a pond. July 28th, in flower.

*Arabis patens*. Sullv. Marquette. June 28th, in flower, near houses.

*Lepidium Virginicum*, L. Mississangi River. Sand on River Bank. Sept. 24th, in fruit and flower.

VIOLACEÆ.

*Viola Canadensis*, L. Grand Island. June 22nd, in flower.

HYPERICACEÆ.

*Hypericum ellipticum*, Hooker. Goulais Point, July 28th, and Sault Ste. Marie. July 20th, in flower.

*Hypericum mutilum*, L. Sault Ste. Marie. July 20th, in flower.

*Hypericum Canadense*, L. Mouth of Mississangi River. Sept. 22nd, in fruit.

CARYOPHYLLACEÆ.

*Stellaria longifolia*, Muhl. Sault Ste. Marie. Sept. 20, in flower.

OXALIDACEÆ.

*Oxalis Acetosella*, L. Opposite Grand Island. June 23rd, in fruit and flower.

GERANIACEÆ.

*Geranium Carolinianum*, L. Marquette. June 28th, in fruit.

*Geranium Robertianum*, L. Head of Goulais Bay, at the base of a cliff of quartz. Aug. 23rd, in fruit.

BALSAMINACEÆ.

*Impatiens fulva*, Nutt. Amagos Creek. Low wet sand. August 1st, in flower.

CELASTRACEÆ.

*Celastrus scandens*, L. Namainse. Aug. 14th. Climbing among rocks. Fruit ripe.

SAPINDACEÆ (ACERACEÆ).

*Acer Pennsylvanicum*, L. Island east of Mississangi River.

*Acer spicatum*, Lam. Two Heart River. June 29th, in flower.

*Acer rubrum*, L. Two Heart River. June 29th, in fruit. Portlock Harbor, Sept. 15th.

POLYGALACEÆ.

*Polygala paucifolia*, Willd. Near White Fish Point, growing in sand among Red Pines. June 17th, in flower.

LEGUMINOSÆ.

*Astragalus Cooperi, Gray.* East side of LaCloche Island, in reddish loom. Oct. 3rd. Fruit ripe.

*Lathyrus maritimus*, Bigelow. Very abundant in sand on both sides of Lake Superior, and the North side of Lake Huron.

*Lathyrus palustris*, L. Hilton Village, St. Joseph's Island. Sept. 12th.

*Lathyrus palustris*, L. var. myrtifolius. Grand Island. June 24th, in flower.

ROSACEÆ.

*Prunus Americana*, Marshall. Opposite Gros Cap. June 15th, in flower.

*Prunus pumila*, L. Amago's Creek. August 4th, in fruit.

*Prunus Virginiana*, L. Gros Cap. July 15th, in flower. July 25th; in fruit.

*Spiræa salicifolia*, L. Sault Ste. Marie. July 20th, in flower.

*Geum strictum*, Aiton. Opposite Grand Island. June 20th, in flower.

*Geum rivale*, L. Sault Ste. Marie. July 20th, in fruit.

*Potentilla Norvegica*, L. Near L'Anse. July 4th, in flower.

*Potentilla fruticosa*, L. Namainse. Open stoney ground. August 15th, in flower.

*Potentilla tridentata*, Aiton. Marquette. June 28th, in flower.

*Potentilla palustris*, Scop. West of Grand Island. June 25th. In a Marsh, Sou-sou-wa-ga-mi Creek. June 29th, in flower.

*Rubus odoratus*, L. Goulais Bay. July 27th, in flower.

*Rubus villosus*, Aiton. Grand Island. June 22nd, in flower.

*Rubus Canadensis*, L. Schib-wah River, gravelly bank. August 6th, no flower.

*Rosa lucida*, Ehrhart. Grand Island. June 23rd, in flower.

*Cratægus coccinea*, L. ? Pancake River. August 15th.

*Pyrus arbutifolia*, L. Opposite Gros Cap. June 15th, in flower.

ONAGRACEÆ.

*Epilobium angustifolium*, L. Sou-sou-wa-ga-mi Creek, burnt ground. June 15th, in flower.

*Epilobium coloratum*, Muhl. East end of Batch-ah-wah-nah Bay, on low land. August 2nd and 12th, in flower.

*Œnothera biennis*, L. L'Anse, sandy shore. July 5th, in flower.

*Œnothera pumila*, L. Shib-wah River. Shore. August 6th, in flower.

*Circœa alpina*, L. Gros Cap. June 25th, in fruit and flower.

GROSSULACEÆ.

*Ribes lacustre*, Poir. Gros Cap. June 25th, fruit ripe.

*Ribes prostratum*, L'Her. Grand Island. June 23rd, fruit ripe.

SAXIFRAGACEÆ.

*Saxifraga Virginiensis*, Michx. Mouth of Mississaugi River, bank of river. September 22nd.

*Mitella diphylla*, L. Ke-we-naw Point. July 4th, in fruit. Also at Gros Cap.

*Chrysosplenium Americanum*, Schwein. Sou-sou-wa-ga-mi Creek. June 22nd.

UMBELLIFERÆ.

*Sanicula Marylandica*, L. Grand Island. June 22nd, in flower. Gros Cap, July 25th, in fruit.

*Sium lineare*, Michx. Sault Ste. Marie. July 20th, in flower.

*Osmorrhiza brevistylis*, DC. Grand Marais. June 21st, in flower.

*Conium maculatum*, L. Grand Island, in a clearing. June 24th, in flower.

ARALIACEÆ.

*Aralia racemosa*, L. Opposite Grand Island. June 23rd, on good land.

CORNACEÆ.

*Cornus Canadensis*, L. Opposite Gros Cap, very common. July 15th, in flower.

*Cornus stolonifera*, Michx. Bank of a Creek, Grand Marais. June 21st, in flower.

CAPRIFOLIACEÆ.

*Symphoricarpus racemosus*, Michx. East side LaCloche Island. October 3rd, in fruit.

*Lonicera parviflora*, Lam. Point aux Pins. June 23rd, sand.

*Lonicera hirsuta*, Eaton. Pancake River. August 15th, sand.

*Lonicera ciliata*, Muhl. Opposite Gros Cap. June 15th, in fruit.

*Diervilla trifida*, Mœnch. Sault Ste. Marie. July 5th and 20th, in flower.

*Sambucus pubens*, Michx. Opposite Grand Island. June 23rd, in fruit. Fruit ripe at Limestone Mountain, Ke-we-naw Point, July 3rd.

*Viburnum nudum*, L. Ten miles west of Iriquois Point. July 16th, in flower.

*Viburnum Opulus*, L. Sault Ste. Marie. July 19th, in flower. Gros Cap, July 23rd, in flower.

RUBIACEÆ.

*Galium trifidum*, L. Sault Ste. Marie. July 19th, in fruit.

*Galium triflorum*, Michx. Grand Island. June 22nd, in flower; also, at Sigamouk, near LaCloche, Sept. 27th.

*Michella repens*, L. Opposite Grand Island. June 23rd, good land.

COMPOSITÆ.

*Liatris cylindrica*, Michx. East side LaCloche Island. Rocky Prairie land. Oct. 3rd, in fruit.

*Eupatorium perfoliatum*, L. Island east of Mississaugi River. September 25th, in flower.

*Aster macrophyllus*, L. Mouth of Thessalon River. Sept. 20th, in flower.

*Aster Tradescantii*, L. ? Mouth of Mississaugi River. Sept. 22nd, in flower.

*Aster oblongifolius*, Nuttall. LaCloche Island. October 2nd, in flower.
*Erigeron Philadelphicum*, L. Goulais River. July 26th, in flower.
*Erigeron strigosum*, Muhl. Sault Ste. Marie. July 20th, in flower.
*Solidago Virgaurea*, L., var. humilis. Gros Cap, on trap rocks. July 25th, in flower.
*Solidago altissima*, L. Island East of Mississaugi River, low and sandy. Sept. 22nd, in flower.
*Solidago Canadensis*, L. Barren stony land, East side of Goulais Bay. July 25th, in flower. East side Mississaugi River, Sept. 22nd, in flower.
*Solidago lanceolata*, L. Amago's Creek, August 1st, and Schib-wah River, August 6th, in flower.
*Helianthus decapetalus*, L. Mouth of Mississaugi. Sept. 24th, in flower.
*Achillea Millefolium*, L. Grand Island. June 23rd. Marquette, June 28th, in flower.
*Tanacetum Huronense*, Nutt. Ten miles West of Iriquois Point, sandy soil. July 16th, in flower.
*Artemisia Canadensis*, Michx.? Schib-wah River. August 6th, in fruit.
*Antennaria margaritacea*, R. Brown. Batch-ah-wah-nah Bay. July 28th, in flower.
*Senecio aureus*, L. Sault Ste. Marie. July 19th, in flower. Gros Cap. July 25th, in flower.
*Arnica mollis*, Hooker. Gros Cap. July 25th, in flower.
*Circium muticum*, Michx. Amago's Creek. August 1st, fruit ripe.
*Cynthia Virginica*, Don. Near L'Anse, in clearings. July 4th, in flower.
*Hieracium Canadense*, Michx. Schib-wah River. August 4th, in flower.
*Nabalus albus*, Hooker. Mouth of Thessalon River, sand. Sept. 20th, in flower.
*Lactuca elongata*, Muhl. Sault Ste. Marie. July 20th, in flower.

### Lobeliaceæ.

*Lobelia inflata*, L. Mouth of Mississaugi. Sept. 24th, in flower.
*Lobelia Kalmii*, L. LaCloche Island, shore of flat limestone rock. October 1st, in flower; also, at the Palledeau Islands.

### Campanulaceæ.

*Campanula rotundifolia*, L. L'Anse, amongst grass on a sandy shore. July 5th, in flower.

### Ericaceæ.

*Gaylussacia resinosa*, Torr and Gr. Sou-sou-wa-ga-mi Creek, sandy soil. June 29th, in flower.
*Vaccinium macrocarpon*, Aiton. L'Anse, low sandy flat. July 5th.
*Vaccinium Pennsylvanicum*, Lam. Two miles west of Two Heart River. June 19th, in fruit.

*Chiogenes hispidula*, Torr and Gr. Ten miles west of Iriquois Point, on sandy soil. July 16th.

*Epigœa repens*, L. Ten miles west Iriquois Point. July 16th.

*Cassandra calyculata*, Don. Sou-sou-wa-ga-mi Creek, in a marsh. June 29th, in fruit.

*Cassiope hypnoides*, Don. South side LaCloche Island. Dry silt on limestone rocks. October 6th.

*Kalmia glauca*, Ait. East side LaCloche Island. Oct. 1st, in fruit. Opposite Gros Cap, June 15th, in flower.

*Ledum latifolium*, Ait. Opposite Gros Cap. June 15th, in flower.

*Loiseleuria procumbens*, Desv. Two Heart River. June 19th.

*Pyrola rotundifolia*, L. Amagos Creek. August 1st, in flower.

*Pyrola minor*, L. Opposite Grand Island, on good land; commencing to flower. June 23rd.

*Moneses uniflora*, L. Ke-we-naw Point. Fine sandy soil on the banks of a creek. July 4th, in flower.

*Chimaphila umbellata*, Nutt. Sou-sou-wa-ga-mi Creek. July 9th, in flower.

*Monotropa Hypopitys*, L. Between Huron and Sou-sou-wa-ga-mi Creeks, in moss among Balsams, Spruces, &c. July 7th, in flower.

AQUIFOLIACEÆ.

*Nemopanthes Canadensis*, DC. Opposite Gros Cap, sandy soil. June 15th, in flower. Ten miles west of Iriquois Point, July 16th, in fruit.

PLANTAGINACEÆ.

*Plantago major*, L. Mouth of Mississaugi River. Sept. 22nd, in fruit.

PRIMULACEÆ.

*Trientalis Americana*, Pursh. Opposite Gros Cap, very common. June 15th, in flower.

*Lysimachia stricta*, Ait. Sault Ste. Marie. Moist ground on road sides. July 19th, in flower.

LENTIBULACEÆ.

*Utricularia vulgaris*, L. Sou-sou-wa-ga-mi Creek, in still warm water. June 19th, without flowers or fruit.

*Utricularia cornuta*, Michx. Pancake River, in mud on the edge of a marshy bay. August 15th, in flower.

SCROPHULARIACEÆ.

*Chelone glabra*, L. Shib-wah River, growing at the edge of water. August 6th, in flower.

*Melampyrum Americanum*, Michx. L'Anse. July 5th. Ten miles west of Iriquois Point, July 16th, not in flower.

VERBENACEÆ.

*Verbena hastata*, L. Little Current, Manitoulin Island. Sept. 29th, in fruit.

LABIATÆ.

*Mentha Canadensis*, L. Sault Ste. Marie. July 20th, in flower.

*Lycopus Europœus*, L. Shib-wah River. August 4th, in flower.

*Calamintha glabella*, Benth., var. Nuttallii. West side of LaCloche Island. Shore of flat limestone. October 1st, in flower and fruit. East side of same Island, October 3rd, in flower and fruit.

*Calamintha Clinopodium*, Benth. Sault Ste. Marie. July 20th, in flower.

*Nepeta Cataria*, L. Little Current, Manitoulin Island. Sept. 29th, in flower.

*Prunella vulgaris*, L. Sault Ste. Marie. July 20th, in flower.

*Scutellaria galericulata*, L. Ke-we-naw Point, in a little swamp. July 4th, in flower.

*Scutellaria parvula*, Michx. Islands east of Mississaugi River. Sept. 5th, in fruit.

*Galeopsis Tetrahit*, L. Sault Ste. Marie, July 20th, in flower. L'Anse, July 4th, in flower.

GENTIANACEÆ.

*Halenia deflexa*, Griseb. Sault Ste. Marie. July 20th, in flower.

*Gentiana crinita*, Willd. Palledeau Islands. Sept. 19th, in flower.

*Menyanthes trifoliata*, L. Opposite Gros Cap. June 15th, in flower.

APOCYNACEÆ.

*Apocynum cannabinum*, L. L'Anse, sandy shore. July 5th.

ARISTOLOCHIACEÆ.

*Asarum Canadense*, L. Ke-we-naw Point. Low, fertile, sandy soil. July 4th, in flower.

CHENOPODIACEÆ.

*Blitum capitatum*, L. Little Current. Sept. 29th, in flower.

POLYGONACEÆ.

*Polygonum Persicaria*, L. Mouth of Mississaugi. Sept. 22nd, in fruit.

*Polygonum aviculare*, L. Mouth of Mississaugi River. Sept. 22nd, in flower.

*Polygonum ramosissimum*, Michx. Mouth of Mississaugi River. Growing in cracks in rocks. Sept. 22nd, in fruit.

*Polygonum sagittatum*, L. Sault Ste. Marie. Moist ground on road sides. July 19th, in flower.

*Polygonum cilinode*, Michx. Head of Goulais Bay, climbing a cliff, May 23rd. Near L'Anse, July 4th, in flower.

*Rumex obtusifolius*, L. Sault Ste. Marie. July 20th, in flower.

*Rumex Acetosella*, L. Mississaugi River. Sept. 22nd, in flower.

ELÆAGNACEÆ.

*Shepherdia Canadensis*, Nutt. East side LaCloche Island. Oct. 3rd.

SANTALACEÆ.

*Comandra umbellata*, Nutt. Near Two Heart River. June 29th, in flower.

URTICACEÆ

*Urtica gracilis*, Ait. Sault Ste. Marie. July 2nd, in flower.

*Laportea Canadensis*, Gaudich. Ke-we-naw Point. July 4th, in flower.

CUPULIFERÆ.

*Quercus rubra*, L. Batch-ah-wah-nah River. Manitoulin Island and Portlock Harbour.

*Corylus rostrata*, Ait. Sou-sou-wa-ga-mi Creek. July 9th, in fruit.

MYRICACEÆ.

*Myrica Gale*, L. Sou-sou-wa-ga-mi Creek. June 29th, in fruit.

*Comptonia asplenifolia*, Ait. LaCloche Trading Post. Sept. 29th.

SALICACEÆ.

*Salix discolor*, Muhl. L'Anse. July 5th, in fruit.

*Salix sericea*, Marshall. L'Anse. July 5th, in fruit.

*Salix petiolaris*, Smith. Sault Ste. Marie. July 20th.

*Salix angustata*, Pursh. L'Anse. July 5th, in fruit.

*Salix rostrata*, Richardson. Gros Cap. June 15th, in flower.

CONIFERÆ.

*Juniperus Virginiana*, L. Namainse, gravelly and rocky shore, August 15th. South side LaCloche Island, October 2nd.

ARACEÆ.

*Arisæma triphyllum*, Torr. Opposite Grand Island. June 23rd, in flower.

*Calla palustris*, L. Opposite Gros Cap. June 15th, in flower.

NAIADACEÆ.

*Potamogeton prælongus*, Wulf. Goulais River. July 25th, in fruit.

*Potamogeton lucens*, L., var fluitans. Goulais River. July 25th, in fruit.

*Potamogeton natans*, L. Sou-sou-wa-ga-mi Creek, in still water. June 29th, in fruit.

ALISMACEÆ.

*Sagittaria variabilis*, Engelm. Sault Ste. Marie. July 20th, in flower.

ORCHIDACEÆ.

*Gymnadenia tridentata*, Lindl. Opposite Grand Island. June 23rd, in flower.

*Platanthera orbiculata*, Lindl. Opposite Grand Island. June 23rd, in flower.

*Platanthera Hookeri*, Lindl. Two Heart River. June 19th, in flower.

*Platanthera bracteata*, Torr. Grand Marais. June 21st, in flower.

*Platanthera psycodes*, Gray. Sault Ste. Marie. Wet pasture field. June 20th, in flower.

*Goodyeria pubescens*, R. Brown. Opposite Grand Island. Good soil. June 23rd, in flower.

*Listera convallarioides*, Hooker. Opposite Grand Island. June 23rd, in flower.
*Arethusa bulbosa*, L. Marsh near L'Anse. June 30th, in flower.
*Corallorhiza innata*, R. Brown. Opposite Grand Island. June 23rd, in fruit.
*Cypripedium pubescens*, Willd. East side LaCloche Island. October 3rd, in fruit.
*Cypripedium acaule*, Aiton. Opposite Gros Cap. June 15th, in flower.

IRIDACEÆ.

*Iris versicolor*, L. Amago's Creek. August 1st, in flower.

SMILACEÆ.

*Trillium cernuum*, L. Grand Marais. June 21st, in flower.
*Medeola Virginica*, L. St. Joseph's Island. Opposite Campment D'Ours. Sept. 10th, in flower.

LILIACEÆ.

*Smilacina racemosa*, Desf. Opposite Grand Island. June 23rd, in flower.
*Smilacina trifolia*, Desf. Opposite Gros Cap. June 15th, in flower.
*Smilacina bifolia*, Ker. Opposite Gros Cap, very common. June 15th, in flower.
*Clintonia borealis*, Raf. Opposite Gros Cap. June 15th, in flower.
*Allium Canadense*, Kalm. Batch-ah-wah-nah River. August 10th. South side of LaCloche Island. October 6th.
*Lilium Philadelphicum*, L. East side LaCloche Island. October 3rd, in fruit.

MELANTHACEÆ.

*Uvularia grandiflora*, Smith. Ke-we-naw Point. July 4th, in fruit.
*Streptopus amplexifolius*, DC. Grand Marais, good soil. June 21st, in flower.
*Streptopus roseus*, Michx. Opposite Gros Cap. June 15th, in flower.

JUNCACEÆ.

*Juncus effusus*, L. Opposite Gros Cap. June 23rd, commencing to flower. L'Anse, July 4th, in flower. Mississaugi River, Sept. 22nd, in fruit.
*Juncus nodosus*, L. LaCloche Island. October, in fruit.
*Juncus stygius*, L. Bruce Mines. Sept. 20th, in flower.

ERIOCAULONACEÆ.

*Eriocaulon septangulare*, Withering. Mouth of Pancake River, growing in mud at the margin of a marshy cove. August 15th, in flower.

CYPERACEÆ.

*Dulichium spathaceum*, Pers. Sou-sou-wa-ga-mi Creek. June 29th, before flowering.
*Eleocharis palustris*, R. Brown. L'Anse. July 5th, in flower. Batch-ah-wah-nah Bay, in water. August 4th, in fruit.
*Scirpus pungens*, Vahl. Upper end of Goulais Bay. July 27th, commencing to flower.
*Scirpus lacustris*, L. Near Schib-wah River. August 8th, in flower. This is the rush from which the Indians make their mats.

*Scirpus sylvaticus*, L. Sault Ste. Marie. July 20th, in fruit.

*Scirpus Eriophorum*, Michx. Sault Ste. Marie. July 21st, in flower.

*Eriophorum gracile*, Koch. West of Grand Island in a marsh. June 25th, in fruit.

*Carex canescens*, L., var. vitilis. Ke-we-naw Point. July 4th, in fruit.

" *stellulata*, Good. Opposite Gros Cap. June 15th, in fruit.

" *lagapodioides*, Schk. Ke-we-naw Point. July 4th, in flower.

" *stricta*, Lam. West of Grand Island, marsh. June 25th, fruit ripe.

" *aquatilis*, Wahl. Island east of Mississaugi River. Sept. 25th, fruit ripe.

" *plantaginea*, Lam. Grand Island. June 22nd, fruit ripe.

" *debilis*, Michx. Opposite Gros Cap. June 15th, in fruit. Ke-we-naw Point, July 4th, in fruit.

" *retrorsa*, Schw.? Grand Marais. June 21st, in flower.

" *intumescens*, Rudge. Grand Marais. June 21st, in flower.

GRAMINEÆ.

*Zizania aquatica*, L. (Wild Rice). Marsh at the mouth of Mississaugi River. Sept. 21st, in fruit.

*Sporobolus heterolepis*, Gray. East side LaCloche Island, barren prairie. October 3rd, fruit ripe.

*Agrostis scabra*, Willd. Namainse. Growing on a road. August 15th, fruit ripe.

*Agrostis alba*, L. Ke-we-naw Point. July 4th, in flower.

*Cinna arundinacea*, L. var. pendula. Marquette. June 28th, in flower.

*Muhlenbergia glomerata*, Trim. Gneiss. Point between Shib-wah and Batch-ah-wah-nah Rivers. August 9th, in flower.

*Brachyelytrum aristatum*, Beauv. Ke-we-naw Point. July 4th, in flower.

*Calamagrostis Canadensis*, Beauv. Sault Ste. Marie, July 20th. Ke-we-naw Point, July 4th, in flower. Mississaugi River, September 25th, in fruit.

*Glyceria Canadensis*, Trin. Ke-we-naw Point, coming into flower. July 4th. Sault Ste. Marie, July 20th, in flower.

*Glyceria nervata*, Trin? Ke-we-naw Point. July 4th, in fruit.

*Glyceria aquatica*, Trin. Sault Ste. Marie. July 20th, in fruit.

*Poa pratensis*, L. Grand Island. June 22nd, in flower.

*Poa compressa*, L. LaCloche Island, growing along cracks in flat beds of limestone. October 6th, in fruit.

*Festuca ovina?* LaCloche Island. October 6th. Barren prairie land.

*Bromus Kalmii.* Prairie land, east side LaCloche Island. October 3rd, in fruit.

*Bromus ciliatus*, L. Sault Ste. Marie. July 20th, in flower.

*Triticum repens*, L. L'Anse, sandy shore. July 5th, in flower.

*Hordeum jubatum*, L. Sault Ste. Marie, in a clearing, sandy soil. July 20th, in fruit.

*Elymus Canadensis*, L. Mouth of Thessalon River, September 21st, in fruit. Point Aux Pins, July 23rd, in flower.

*Avena striata*, Michx. Opposite Grand Island, June 23d. Ke-we-naw Point, July 4th, in flower.

*Phalaris arundinacea*, L. Sault Ste. Marie. July 19th, in fruit.

*Milium effusum*, L. Opposite Grand Island. June 23rd, in fruit.

*Panicum xanthophysum*, Gray. LaCloche Trading Post. September 28th, in fruit.

*Andropogon scoparius*, Michx. East side LaCloche Island, barren prairie. October 3rd, grains ripe.

EQUISETACEÆ.

*Equisetum sylvaticum*, L. Wet ground, opposite Gros Cap. June 15th.

*Equisetum hyemale*, L. Two Heart River. Ke-we-naw Point. July 4th, in fruit.

*Equisetum scirpoides*, Michx. Opposite Grand Island. June 23rd, in fruit.

FILICES.

*Polypodium vulgare*, L. North-west from Granite Point. June 28th, in fruit.

*Polypodium Phegopteris*, L. Opposite Grand Island. June 23rd, in fruit.

*Polypodium Dryopteris*, L. Opposite Grand Island. June 23rd, in fruit.

*Struthiopteris Germanica*, Willd. Ke-we-naw Point. July 4th, in fruit.

*Pteris aquilina* L. Grand Island. June 22nd, in fruit.

*Adiantum pedatum*, L. Ke-we-naw Point. July 4th, in fruit.

*Asplenium Trichomanes*, L. Namainse. Dry ground on the top of a mountain. July 4th, in fruit.

*Asplenium Filix femina*, R. Brown. Schibwah River. August 4th, in fruit.

*Woodsia Ilvensis*, R. Brown. North-west from Granite Point. June 28th, in fruit.

*Aspidium spinulosum*, Swartz. Goulais River, July 26th. Opposite Grand Island, June 23rd. Ke-we-naw Point, July 4th, with sori.

*Onoclea sensibilis*, L. Amago's Creek. August 1st.

*Osmunda regalis*, L. Opposite Gros Cap, June 15th. Sou-sou-wa-ga-mi Creek, June 29th. Schib-wah River, August 4th, in fruit.

*Osmunda Claytoniana*, L. Ke-we-naw Point, wet soil. July 4th, in fruit.

*Osmunda cinnamomea*, L. Opposite Gros Cap, June 15th. Two Heart River, July 19th, in fruit.

*Botrychium Virginicum*, Swartz. Opposite Grand Island. June 23rd, in fruit.

LYCOPODIACEÆ.

*Lycopodium clavatum*, L. Between Thessalon and Mississaugi Rivers. September 21st, in fruit.

*Lycopodium complanatum*, L. St. Joseph's Island, opposite Campment D'Ours. September 10th, in fruit.

MUSCI.

*Sphagnum cyclophyllum*, Sullv. & Lesqx. Opposite Grand Island. June 23, no fruit.

*Sphagnum squarrosum*, Pers. Opposite Grand Island. June 23rd, no fruit.

*Polytrichum commune*, L. Opposite Grand Island. June 23rd, no fruit.

*Polytrichum juniperinum*, Hedw. Grand Island. June 22nd, in fruit.

*Mnium rostratum*, Schwægr. Opposite Grand Island. June 23rd, no fruit.

*Neckera pennata*, Hedw. Goulais River, on dead trees. July 26th, in fruit.

*Hypnum triquetrum*, L. Goulais River. July 26th, no fruit.

*Hypnum splendens*, Hedw. Goulais River. Covers the ground in dark shady places. July 20th, no fruit.

*Hypnum Crista-Castrensis*, L. Goulais River, on dead logs. July 20th, no fruit.

HEPATICÆ.

*Fegatella conica*, Corda.

*Madiotheca platyphylla*, Dumort. Trunk of a dead cedar, Goulais River. July 26.

LICHENES.

*Cetraria lacunosa*, Ach. East side LaCloche Island. October 3rd, in fruit.

*Evernia jubata*, Fr. North end of Goulais Bay, hanging from small dead spruces. July 26th.

*Peltigera aphthosa*, Hoffm. Goulais River, on dead logs, lying on the ground.

*Sticta pulmonaria*, Ach. Goulais River, on logs and rocks. July 26th.

*Stereocaulon denudatum*, Floerk. Between Thessalon and Mississaugi Rivers, on metamorphic rocks. September 21st.

*Cladonia rangiferina*, Hoff. Between Thessalon and Mississaugi Rivers. Abundant on metamorphic rocks. September 21st.

*Umbilicaria Dillenii*, Tuckm. ("Tripe de roche"). North end Goulais Bay, growing on perpendicular cliff of quartz, July 27th. Schib-wab River, August 6th, on cliffs of syenite.

## SUPPLEMENTARY LIST OF TREES AND SHRUBS FOUND GROWING AROUND LAKES SUPERIOR AND HURON.

*Acer saccharinum*, Wang. Sugar Maple. Abundant and of large size on good land on both sides of Lake Superior and on the North shore and islands of Lake Huron.

*A. spicatum*, Lam. Ground Maple. Abundant almost everywhere; is the principal underbrush in the woods.

*Fagus ferruginea*, Ait. Beech. On good soil only.

*Corylus Americana*, Walt. Hazel Nut. South side Lake Superior; not common.

*Betula excelsa*, Ait. Yellow Birch. On both sides of Lake Superior and the North side of Lake Huron. Grows luxuriantly in the fertile valley of the Goulais River, the country between Goulais Bay and the Sault Ste. Marie, and on the Manitoulin Islands.

*B. papyracea*, Ait. White or Canoe Birch. Everywhere on poor soil.

*Alnus incana*, Willd. Alder. Bordering streams, around both lakes.

*Ulmus racemosa*, Thomas. Rock Elm. On the best lands along the South side of Lake Superior and on all the Manitoulin Islands.

*U. Americana*, L. Swamp Elm. Abundant in the vallies of the rivers entering the East side of Lake Superior and North side of Lake Huron.

*Fraxinus Americana*, L. White Ash. Small trees met with on Ke-we-naw Point.

*F. sambucifolia*, Lam. Black Ash. Common on low lands around both lakes.

*Quercus rubra*, L. Red Oak. Plentiful, but of small size, on the East side of Lake Superior. Grows to a good size on the Manitoulin Islands.

*Tilia Americana*, L. Basswood. A few trees on the best lands on the South side of Lake Superior.

*Pyrus Americana*, DC. Mountain Ash. Around both lakes ; not abundant. Best flower about the 28th of June.

*Prunus Americana*, Marsh. Wild Red Plum. Abundant on the Prairies on Bar River (Great Lake George), and on Walker's Creek (opposite St. Joseph's Island), and along the banks of streams entering Portlock Harbour.

*P. Pennsylvanica*, L. Pigeon Cherry. Extremely abundant on rocky burnt land on the East shore of Lake Superior, and North Shore of Lake Huron.

*P. Virginiana*, L. Choke Cherry. East side of Lake Superior. Grows in sheltered places, not shaded by larger trees, and bears abundance of fruit.

*P. pumila*, L. Dwarf Cherry. Abundant, growing on sand and gravel along the beach and banks of rivers on the east side of Lake Superior.

*Rhus typhina*, L. Sumach. East shore of Lake Superior, and North shore of Lake Huron.

*R. Toxicodendron*, L. Poison Ivy. Very abundant on the islands and North shore of Lake Huron. Frequently met with on the East shore of Lake Superior.

*Populus tremuloides*, Michx. Common Poplar. Plentiful on poor soil on the East side of Lake Superior and North side of Lake Huron.

*P. Grandidentata*, Michx. Large Leaved Poplar. East shore of Lake Superior; not common.

*P. balsamifera*, L. Balsam Poplar. Around both lakes, fringing rivers and sandy bays.

*Ribes Cynosbati*, L. Wild Gooseberry. East shore of Lake Superior.

*Rubus strigosus*, Michx. Red Raspberry. Very abundant on the East shore of Lake Superior and on the islands and North shore of Lake Huron.

*Abies Canadensis*, Michx. Hemlock Spruce. Scattered through hard-wood bush around both lakes.

*A. nigra*, Poir. Black Spruce. On poor land amongst the hills around both lakes.

*A. alba*, Michx. White Spruce. Very abundant around both lakes; attains a large size in the Goulais River country.

*A. balsamea*, Mar. Canada Balsam. Very abundant around both lakes; grows on both good and bad soil.

*Larix Americana*, Michx. Tamarack. Around both lakes; of small size and not abundant.

*Pinus Strobus*, L. White Pine. Scarce on the South side of Lake Superior; plentiful around Batch-ah-wah-nah Bay (east side); good trees scattered amongst the hard-wood timber of the fertile and extensive level track through which the Goulais River flows; groves in places on the North shore of Lake Huron.

*P. resinosa*, Ait. Red Pine. The sandy strip of country bordering the south side of Lake Superior, from Whitefish Point to the Pictured Rocks, is covered principally with groves of red pine. Sandy bays on the east shore of Lake Superior and north shore of Lake Huron, are generally bordered with red pines; they likewise grow abundantly on a red marly soil on the east side of LaCloche Island.

*P. Banksiana*, Lam. Northern Scrub Pine. Abundant on barren sand dunes along the South shore of Lake Superior and on dry, sandy and rocky situations on the east shore, and also on the north side of Lake Huron.

*Thuja occidentalis*, L. Common White Cedar. Abundant on low land near rivers and marshes around both lakes.

*Juniperus Virginiana*, L. Red Cedar, (prostrate variety). On rocky and gravelly situations on east side of Lake Superior and north side of Lake Huron.

*J. communis*, L. Common Juniper. With the last species.

*Taxus baccata*, L., var. Canadensis. Ground Hemlock. Abundant around both lakes, especially in the bottoms of shaded rocky glens.

# ON THE ECONOMICAL USES OF STICTA PULMONARIA HOFFM.

By A. T. Drummond, B. A.

The Lichen which forms the subject of the present paper, I have selected, not so much on account of any marked interest that is to be attached to it from the beauty of its structure, or the variety of its economical applications, as from its being one of the most common Lichens in our vicinity—so common, in fact, and so conspicuous from its large, handsome thallus, that it cannot but have attracted the notice of many of you. It occurs upon several kinds of trees, among which may be mentioned the Oak, Beach, Ash, and Maple, as well as upon rocks in moist situations. Saxicolous specimens, however, although sometimes very large, are generally sterile. Its geographical range is not very great when compared with some others of our Lichens, which are almost cosmopolites. Yet, besides occurring in Canada, it has been found in India upon the Himalayas, in Siberia, Britain, Sweden, Norway, France and Germany. Small and delicate as this Lichen is, when compared with the "time-stained" trunks upon which it flourishes, yet it is known to attain a very great age, one author stating that, after the lapse of upwards of fifty years, he had, upon the same tree, noticed the same specimen of Sticta pulmonaria, in precisely the same position.

It would be altogether foreign to the object of this paper to enter minutely into the distinctive characters of this Lichen; suffice it to say that it may be easily recognized from other species of the same genus, as well as from other Lichens generally, by its greenish or olive-colored thallus, which is reticulately pitted in a very perceptible manner, and frequently roughened by pale soredia; by the under surface being marked by gibbi, or discolored spots; and by the lacinæ or marginal segments of the thallus being broad, elongated, and very abruptly terminated. When moist, it is of a more or less vivid hue, which, on drying, changes to olive brown.

In treating of the economical uses of Sticta pulmonaria, I purpose making the following divisions, viz., first, its use as an article of food; secondly, its employment as a medicine; and thirdly, its applications in the arts. First, then, in regard to its use as an article of food. There is a marked resemblance in properties

between Sticta pulmonaria and Cetraria Islandica, the well-known " Iceland Moss." Like that Lichen, Sticta pulmonaria contains gum, starch, bitter and astringent principles, and a brownish colouring matter. Its nutritive and demulcent properties depend upon the presence of the former two, viz., the gum and starch. The starch, however, contained in it is of too small an amount to be of itself of much practical use. An article of diet which is said to be very light and pleasant is, with little difficulty, obtainable from this plant in the following way :—After having thoroughly disengaged from it all extraneous substances, let it be steeped in a weak solution of some alkali, as of carbonate of soda, or potash, in order to neutralize the effect of the bitter principle, already mentioned as existing in it, which would otherwise impart a disagreeable taste to the article to be prepared. Then let it be taken out and floated in cold water for a minute or two, that any of the solution adhering to it may be removed. On being boiled for a short time in water, sugar having been added during the process, and then allowed to cool, it will be found to yield a jelly of a brownish hue, which is due to the presence of colouring matter, extracted by the boiling water. To give the jelly an additional flavour, wine or spices may be added. It was, at one time, in Britain, a favourite article of diet for invalids. Secondly, in regard to its employment as a medicine. In mediæval medicine, in Britain, as well as other countries, Lichens were very extensively employed, chiefly as demulcents, purgatives, tonics, astringents, febrifuges and nutrients. Several were lauded as sovereign remedies in particular diseases. For instance, the common Peltigera canina was the basis of the celebrated " pulvis contra rabiem," or " pulvis antilyssus," the alleged never-failing cure for hydrophobia. Another instance is that of Sticta pulmonaria, which acquired its familiar designations, " Oak Lung," and " Lungwort," as well as its specific name "Pulmonaria," either from its supposed efficacy in all pulmonary diseases, as a nutrient demulcent, or tonic, or from a fancied resemblance between the reticulate-pitted thallus to the structure of the lungs. However its name may have originated, it was for a long time regarded, not merely as a speedy cure for such diseases as ulcers of the Lungs, consumption, spitting of blood, etc., but was used both as a tonic and astringent in a great variety of other complaints. As an external application for wounds, it was considered very beneficial. Allusion has already been made to its frequent use as a nutrient in the form of jellies or diet-drinks by invalids generally. In Sweden it was no unusual circumstance for the peasantry to give it to their cattle, but more particularly the sheep, in epidemic catarrh ; whilst in Germany it was mixed with salt, and given to the cattle for similar purposes. The virtues of the plant, are, however, generally believed to have been more imaginary than real, writers on the subject generally ascribing their origin to the already alluded to fancied resemblance between its thallus and the lungs. I now come to consider the last, but certainly the most important division of the subject, viz., the

applications of Sticta pulmonaria in the arts. Insignificant and apparently trifling as Lichens are, yet some of them yield products that render them very valuable in the arts. Dyes are the more important products at present obtained from them, though there is no doubt, now that attention is being more directed to them by scientific men, and that Chemistry is making such rapid progress, they will be found to possess many properties hitherto unknown to science—properties that will render them exceedingly useful from their contributing to the comforts or necessities of man. An advance has been made even within the last few years, several species having been found to yield dyes quite as valuable as those obtained from Rocella tinctoria, or Lecanora tartarea. Sticta pulmonaria, although not, at the present time, ranked among those Lichens which are thus important as furnishing some particular product, yet has properties that, in many respects, attach to it considerable interest. For instance, the bitter principle contained in it has, in Sweden and Siberia, been applied to the purposes of the brewer as a substitute for hops. The Monks of a certain Monastery in the latter country acquired quite a reputation for the beer which they brewed, they having been accustomed to flavor it with the bitter principle of this species of Sticta. Again, the tanner has made it subservient to his purposes. The astringent principle which it contains, and which renders it valuable to the tanner, is most likely due to the presence of tannic acid. However, even were this Lichen an efficient substitute for the bark of the Oak, Sumach and other trees which are employed in tanning, it could not be obtained in sufficient abundance to meet the probable demand for it. This fact, too, would, I think, be an effectual bar to its use in brewing, as a substitute for hops. It might, certainly, be propagated by artificial means, but, as it has not yet been proved that Lichens are undestructive to trees, such a proceeding, whilst beneficial in one way, might prove detrimental in another. The most valuable property of this Sticta, and which has been the most largely applied in the arts, is its capability of yielding a brownish colouring matter. There are several ways in which this dye may be obtained. The Lichen may be macerated in milk of lime, and its colorific principles precipitated by the addition of hydrochloric or acetic acid. Or, it may be steeped in a solution of carbonate of soda for several days. But the most simple method, and which most fully developes the colouring matter, is by ammoniacal maceration. Previous to being macerated in the solution, the plant should be carefully cleansed from earthy and other extraneous substances, which are generally found adhering to it, and then pulverized. The liquid, after the Lichen has been placed in it, should be frequently stirred in order that every part may be well exposed to the action of the oxygen of the atmosphere. If submitted to the above process for a period of about ten days, Sticta pulmonaria yields a very good brown dye, which has been, and is still, to a great extent, applied to the dyeing of various woolen goods by the peasantry of Norway and Sweden, and other countries. In

England, Ireland, and Scotland, where this Lichen is one of the "Crotals," it was also used by the same class of persons for similar purposes, but from the increased facilities now afforded for travelling and transit, the adoption by manufacturers of recent inventions, the application of new discoveries in Science to the improving of the quality of textile fabrics, and the cheapness of the article produced, all consequent on the progress of civilization, the employment of this, as well as other dyes formerly used by the lower classes, has been for the most part discontinued. I say for the most part, because in the collection of the vegetable products of Scotland at the Great Exhibition of 1851, yarns dyed by this and other "Crotals," were exhibited. In the collection of dye-lichens and lichen-dyes at the same Exhibition, specimens of this Lichen were shown, and its dye was stated by some manufacturers to be used by them, whilst others remarked that it might be employed with advantage to the orchil maker. The crotals are still commonly used in Inverness-shire

In conclusion, I would again remark that I did not select this Lichen for the subject of the present paper, on account of its having any great variety of economical applications. There are other Lichens which are far more valuable to the manufacturer, the physician and others. The Roccellas, Lecanoras, Cetrarias, and Umbilicarias are instances of this. But taking its uses few as they are, and pondering them well, all I think, will agree with the poet when he said,

"That not alone in trees and flowers
The spirit bright of beauty dwells;
That not alone in lofty bowers
The mighty hand of God is seen;
But more triumphant still in things men count as mean."

## REPORT ON THE HUBBARD SQUASH.

The Committee of Ladies appointed at last meeting to submit to trial the specimens of Hubbard Squash, presented to the Society by Mr. Briggs, beg to report that they have individually had the Squashes cooked in various ways, and have found this variety to possess valuable qualities. It is remarkably rich in flavor, easily cooked, and forms, both as a vegetable and in tarts, a better dish than any other squash.

Persons who do not relish squashes, and had not eaten them before, have found the Hubbard Squash to be delicious. The only drawback is, that the outer skin is remarkably hard, requiring the application of a saw or axe, before cooking.

*Fifth Meeting.*

## THURSDAY EVENING, 28TH MARCH, 1861.

The Very Rev. Principal Leitch, D. D., President, in the Chair. This being an Extra Meeting, called for the special purpose of disposing of an accumulation of Papers, no other business was brought forward. There was a full attendance of Members and Subscribers.

The following Letters and Papers were read :—

ROYAL GARDENS, KEW,
February 16, 1861.

SIR,—I beg you will present my sincere thanks to the Fellows and Subscribers of the Botanical Society of Canada, for the distinguished mark of respect they have shown me in electing me an Honorary Member of their body,—a compliment the more gratifying, because I have always felt, and still feel, the deepest interest in everything connected with Botanical research throughout British North America ; and I am persuaded that many new discoveries may yet be made in Canada, through the exertions of resident members of its Botanical Society.

I have the honor to be,

Sir,

Your faithful and obedient servant,

W. J. HOOKER.

To PROFESSOR LAWSON, &c., &c., Secretary, Botanical Society of Canada.

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ROYAL BOTANIC GARDEN, EDINBURGH,
25th February, 1861.

SIR,—I have to acknowledge the receipt of your letter of 11th January, announcing my election as an Honorary Member of the Botanical Society of Canada, and I beg to return my best thanks for the distinguished honor which the Society has thus conferred on me. I shall be happy if I can in any way advance the interests of the Society. With best wishes for its prosperity,

I am, Sir,

Your obedient servant,

J. H. BALFOUR.

DR. GEORGE LAWSON, Secretary, Botanical Society of Canada.

# SUGGESTIONS TO THE MEMBERS OF THE BOTANICAL SOCIETY OF CANADA, WITH REFERENCE TO A COLONIAL FLORA.

By Sir William J. Hooker, K. H.

Royal Gardens, Kew,
February 16th, 1861.

It gives me great pleasure to hear of the formation of a Botanical Society in Canada. It is now 20 years since the publication of my Flora of British North America;—and I had therein occasion to remark, "It is to be wished that the southern boundaries of Canada, adjoining the State of Maine and the great Lakes Huron and Superior were accurately searched, as it can hardly be doubted that this line of country would yield many plants not hitherto discovered in British North America, though known to exist in the United States under similar situations and of latitude and of elevation above the level of the sea." Indeed it is a singular fact, that we have a more complete knowledge of the extreme arctic vegetation of America, and of the remote shores of British Columbia than of the southern boundary of Canada. Not, indeed, that I expect new species of plants to be discovered there, but I believe many might be detected at present only recorded as natives of the United States.

Now, here would be an interesting field for the active working members of the Botanical Society to explore, and I would take leave most respectfully to recommend it to their attention, and, if possible, during the forthcoming summer.

The Flora Boreali-Americana has been long out of print, and it had the misfortune to be published on too expensive a scale. I am, at this time, in communication with His Grace the Duke of Newcastle, on the subject of the publication of a *cheap series* of *Colonial Floras* of ALL our Colonies; and I was required to give in to His Grace an enumeration of all the Colonies, the vegetation of which was sufficiently known to justify the Flora being published, and among those recommended for early notice is, doubtless, British North America. Already the Flora of Hong-Kong is completed and published; that of the British West Indian Islands is now complete, and the cost upon our Government for the assistance they kindly propose to give is all estimated for, and laid before the Treasury. Thus a first-rate publisher is enabled to sell them at a cost not exceeding 16s. a vol. of 500 pages. Now it is for the purpose of rendering such a Flora of British North America more complete that I would ask the aid of the active botanists of Canada. Any information connected with the discovery of plants new to their Colony will be faithfully recorded, as well as the names of the discoverers; and well prepared specimens confirmatory of their accuracy, with the exact locality, I shall thankfully receive.

I would recommend too that the country within our boundary about Lakes Ontario and Superior, and our most south-western boundary be carefully explored. The Americans have sent me some interesting plants from their side the boundary very recently, especially one or two good Ferns from Lake Superior.

The Cryptogamic plants generally of British North America, would well repay a careful search for them, and in *all* the orders. No doubt that they are numerous and beautiful ;—but unless the number was tolerably complete it would be better to omit them.

I do not know if any Botanist accompanied the late important expedition to the Red River Settlement, and to the plains towards the Rocky Mountains, which was sent out by the Canadian Government. If so, probably some good and even new species were found. Much cannot be expected from a plain country, which has been so well ransacked by Drummond, Richardson, Douglas, Hector, Palliser, and, above all, Bourgeau. The collections of the latter are very fine. I do not know what mountains you have in Canada proper, of such height as to change the nature of the vegetation as you ascend. Such elevations always produce good plants, especially Cryptogams.

I am, Sir,

Your faithful and obedient servant,

W. J. HOOKER.

To Professor Lawson, &c., &c., &c.

On the motion of Judge Logie, of Hamilton, seconded by Andrew Drummond, Esq., Manager of the Montreal Bank, the Society's thanks were voted to Sir William Hooker, and the Secretary was requested to communicate to him the desire of the Society, to aid by the personal exertions of the members, and in every other possible way, in forwarding the important object of a Canadian Flora.

## ON THE ASCLEPIAS INCARNATA, L., AS A FIBRE PRODUCING PLANT.

By Alexander Logie.

At the present time, when so much difficulty is felt in obtaining fibrous materials in sufficient quantity to satisfy the requirements of modern civilization, and particularly to supply the constantly increasing demand for materials suitable for the manufacture of paper, it may not be out of place to direct the attention of the members of this Society to one of our native plants, which possesses a fibre of great strength and beauty, apparently well adapted not only to be employed in the manufacture of paper, but also of textile fabrics of various kinds.

The plant to which I refer is the Asclepias incarnata, one of the natural order of Asclepiadaceæ, or milkweed family. The common milkweed Asclepias Cornuti, found in abundance in our fields, is well known from its singular looking flowers, the quantity of milky juice that exudes from it when broken, and from the pods which, in the autumn, are filled with a silky-cottony looking substance enveloping the seeds. The young shoots of this species are also frequently eaten in the country as a substitute for asparagus, and it is sometimes called wild asparagus. The Asclepias incarnata has a more showy flower than the Asclepias Cornuti; the divisions of the corolla being of a purplish color, and the hoods of the crown of a flesh color (hence the specific name incarnata), and it has scarcely any of the milky juice found in the other species. It is a perennial herbaceous plant, growing naturally in rich moist ground, and on low rich banks of streams; sometimes it is found growing in swamps, but it does not appear to thrive when growing in water. In the autumn of 1859, I found it growing in several places in the waters of Burlington Bay, near the shore; but, in the following year, on visiting two of the localities where I had observed it growing in water, not a plant was to be seen. The water in the Bay was unusually high in 1859 and 1860, and had evidently covered the low banks on which it had originally grown; and although the plants survived for a time their immersions in the water, they appear ultimately to have been killed by it. That it may be successfully grown on dry ground has been proved by Mr. John Freed, a gardener in Hamilton, who has had a plant growing in his garden for some years in a dry sandy loam. The cultivated plant appeared to me to possess a stronger and brighter fibre than the plant in its native state; but my opportunities of observing it have not been sufficient to enable me to say positively that such is the case.

In the spring of 1860 some of the stalks and fibre of the Asclepias incarnata, furnished by Mr. Freed, were exhibited at a meeting of the Hamilton Association, and a portion of it was taken by a member of the Association and handed to Mr. McMicking, a paper manufacturer in Dundas, for examination. A letter from him was, at a subsequent meeting, read to the Association, of which the following is a copy:—

"Dear Sir,—I have tested, in some measure, the sample of Asclepias incarnata you gave me, which results as follows:

"1. The sample was bleached in 3 minutes.
"2. Is of a beautiful high color.
"3. A brilliant lustre.
"4. Strong flexible silky fibre.
"5. Parts of shive (wood bark, &c.) 737.
" " lint (dressed fibre) 263—1000.
"6. Is worth dressed 5 cents per pound.

" QUERIES.

" 1. Can a quantity be had in an indigenous state ?
" 2. Will it be an advantage to cultivate ?
" 3. What will it cost to gather, cultivate, &c. ?

" Yours, &c.,

" (Signed) J. McMICKING.

" Gore Paper Mills, April 2, 1860."

With this note Mr. McMicking sent a specimen of the fibre, which had been bleached for three minutes, and a specimen of Manilla fibre, the substance generally employed in the manufacture of paper, which had been bleached for twenty-four hours. The fibre of the Asclepias was whiter and of a brighter color than that of the Manilla, notwithstanding the length of time the latter had been subjected to the action of the chemical substances used in bleaching. It is important to notice this, as the ease with which it may be bleached increases its value, both as a material for making paper, and as a material for making cloth.

Mr. McMicking stated to me lately, that while it is not worth more than five cents per pound for making paper, he considers it worth ten cents per pound for other purposes, and that there could be no doubt as to its utility and value as a fibre. The only doubt he felt was as to the possibility of cultivating it successfully and profitably.

The application of the fibre to the manufacture of coarse cloth is not new ; but I am not aware that its capability of making fine cloth has been tested, or that any attempt has been made to ascertain whether or not it can be cultivated successfully and profitably. I have sent some seed, in the hope that some of the members of the Botanical Society will give it a trial. The seed might be sown in any good, moist garden soil, and the plants be transplanted in the following spring to the place where it is intended they shall remain, and set out at distances not less than eighteen inches apart each way. By measuring the ground and weighing the fibre, an estimate might be formed as to the probability of its cultivation proving profitable.

An interesting series of specimens, including stalks of the plant, and samples of the fibre in various stages of preparation, were exhibited to the meeting, in illustration of Judge Logie's remarks.

# LIST OF PLANTS FOUND GROWING IN THE NEIGHBORHOOD OF HAMILTON, DURING THE YEARS 1859 AND 1860,

By Alexander Logie,

*Including Plants collected by Miss Kate Crooks, in the neighborhood, and a few found in other places in Canada West.**

## Ranunculaceæ.

*Atragene Americana*, Sims. Mountain side, east of Hamilton. End of May, 1860.

*Clematis Virginiana*, L. Glandford. 1st August, 1860.

*Anemone Virginiana*, L. Carrol's Point, East Flamboro'. 7th July, 1859.

*Anemone Pennsylvanica*, L. Carrol's Point. 7th July, 1859.

*Anemone nemorosa*, L. (var. quinquefolia). Oaklands. 31st May, 1859.

*Hepatica triloba*, Willd. Mountain side, west of Hamilton. 6th April, 1860.

*Thalictrum anemonoides*, Michx. Oaklands. 31st May, 1859.

*Thalictrum dioicum*, L. Mountain side. 12th May, 1860.

*Ranunculus aquatilis*, L. Burlington Beach, near Water-works. July, 1859.

*Ranunculus Purshii*, Richardson. Creek in Glandford. 25th May, 1860. A peculiar form, with less divided leaves and small flowers, was found in a marsh near Millgrove, growing with *Campanula aparinoides*. 31st July, 1860.

*Ranunculus recurvatus*, Poir. Sulphur Spring near Ancaster. July, 1859.

*Ranunculus repens*, L. Common. Summer of 1859.

*Ranunculus acris*, L. Common. Summer of 1859.

*Ranunculus abortivus*, L. Road side near city. 4th May, 1860.

*Ranunculus sceleratus*, L. Common. July, 1860.

*Ranunculus pusillus*, Pursh. 1859.

*Caltha palustris*, L. Wet ground east of City, near Mr. Aikman's house. 25th April, 1860.

*Coptis trifolia*, Salisb. Shore of Lake Medad. 17th May, 1860.

*Aquilegia Canadensis*, L. Mountain side west of Hamilton, common. 24th May, 1859.

*Actæa spicata*, L. vars. rubra and alba. Mountain side west of city, common. May and June, 1859.

## Magnoliaceæ

*Liriodendron tulipifera*, L. Field near toll gate west of city, on road to Dundas. 21st June, 1860. There are also two large trees near the Railway Station, Hamilton, and a large tree in Glandford, having a diameter of

*The dates cited indicate when the Plants were obtained in flower. A few localities and dates have been added of Plants found during the present summer, since the Society's meeting at which the list was presented.

between 4 and 5 feet. This tree is also found growing about Niagara, and between Niagara and Hamilton, below the Mountain. It is rather rare in this locality, but it is common in the western parts of the Province near Chatham.

BERBERIDACEÆ

*Caulophyllum thalictroides*, Michx. Mountain side near Hamilton. 4th May, 1860.

*Podophyllum peltatum*, L. Common. 7th June, 1860.

NYMPHÆACEÆ.

*Nymphœa odorata*, Aiton. Burlington Bay. July, 1860.

*Nuphar advena*, Aiton. Burlington Bay. July, 1860.

SARRACENIACEÆ.

*Sarracenia purpurea*, L. Shore of Lake Medad. 23rd June, 1860. Also found in great abundance in a bog near Millgrove.

PAPAVERACEÆ.

*Chelidonium majus*, L. Mountain side, behind Mr. Brown's house. 15th June, 1859.

*Sanguinaria Canadensis*, L. Mountain-side near Water-works Reservoir. 25th April, 1860.

FUMARIACEÆ.

*Adlumia cirrhosa*, Rafinesque. 2nd August, 1860.

*Dicentra Cucullaria*, D C. Mountain-side west of Hamilton. 28th April, 1860.

*Dicentra Canadensis*, D C. Same locality. 12th May, 1860. Both species of Dicentra are found in great abundance in the locality specified.

*Fumaria officinalis*, L. Burlington Beach, 1860.

CRUCIFERÆ.

*Nasturtium officinale*, Brown. Found at Galt by Miss Crooks. May, 1860.

*Dentaria diphylla*, L. Mountain-side west of Hamilton. 15th May, 1860.

*Dentaria laciniata*, Muhl. Same locality. 28th April, 1860. Both species are found in great quantities in the locality specified.

*Dentaria maxima*, Nutt. Found at Galt by Miss Crooks. May, 1860.

*Cardamine rhomboidea*, D C. Galt. Found by Miss Crooks. May, 1860. (Also in Dr. Craigie's list of plants found at Hamilton, and published in the Canadian Journal, Vol. II, page 222.)

*Cardamine rhomboidea*, var. purpurea. Woods west of city. 4th May, 1860.

*Cardamine hirsuta*, L. Wet ground west of city, near Cline's Mill. 24th May, 1860.

*Cardamine Virginica*, Michx. Found at Galt, by Miss Crooks. May, 1860.

*Cardamine pratensis*, L. Beaver meadow beyond Millgrove. 7th June, 1861.

*Arabis Canadensis*, L. Hamilton. July, 1860.

*Erysimum cheiranthoides*, L. Road sides. 12th August, 1859.

*Sisymbrium officinale*, DC. Roadside. 12th August, 1859.

*Sinapis arvensis*, L. Fields, Hamilton. 9th August, 1859.
*Lepidium Virginicum*, L. Roadsides. June, 1860.
*Lepidium intermedium*, Gray. Hamilton. June, 1859.
*Capsella Bursa-pastoris*, Mœnch. Hamilton. July, 1859.

CAPPARIDACEÆ.

*Polanisia graveolens*, Raf. Burlington Beach, common. July 1859.

VIOLACEÆ.

*Viola blanda*, Willd. Woods west of Hamilton, 15th May, 1860.
*Viola cucullata*, Aiton. Common. 4th May, 1860.
*Viola rostrata*, Pursh. Woods near Mr. Brydge's house. 4th May, 1860.
*Viola pubescens*, Aiton. Common. 4th May, 1860.
*Viola striata*, Aiton. Common. June, 1860.
*Viola Canadensis*, L. Common. August, 1859.
*Viola sagittata*, Aiton. Galt. Found by Miss Crooks, in June, 1860. (Also, in list of Hamilton plants published in the Canadian Journal, vol. 1, p. 222.)
*Viola Muhlenbergii*, Torr. Wood near Barton Lodge, on Mountain. 16th May, 1861.

CISTACEÆ.

*Helianthemum corymbosum*, Michx. Found by Miss Crooks at Galt. May, 1860.

DROSERACEÆ.

*Drosera rotundifolia*, L. Banks of a small lake near Paris, C. W. 15th August, 1859.

PARNASSIACEÆ.

*Parnassia Caroliniana*, Michx. Banks of the Rocky Saugeen, near Durham. 13th August, 1860. (In list of Hamilton plants published in Canadian Journal, Vol. II, page 222.)

HYPERICACEÆ.

*Hypericum perforatum*, L. Fields. July, 1859.
*Hypericum ellipticum*, Hook. Field in Hamilton. 5th August, 1859.

CARYOPHYLLACEÆ.

*Silene inflata*, Smith. Field in the city. 31st July, 1859.
*Silene antirrhina*, L. Galt. Found by Miss Crooks. June, 1860.
*Agrostemma Githago*, L. Wheat fields at Waterdown. June, 1860.
*Stellaria media*, Smith. Common. July, 1859.
*Stellaria longifolia*, Muhl. Beasley's Hollow. 28th May, 1860.

PORTULACCACEÆ.

*Portulacca oleracea*, L. Cultivated grounds, common. June, 1859.
*Claytonia Virginica*, L. Open woods west of the city, at the foot of the Mountain, common. April, 1860.

MALVACEÆ.

*Malva rotundifolia*, L. Road sides. July, 1859.

*Abutilon Avicennæ*, Gært. Road side at Binckley's, near Dundas. 8th Sept., 1860.

TILIACEÆ.

*Tilia Americana*, L. Woods. Common. July, 1859.

OXALIDACEÆ.

*Oxalis stricta*, L. Road-sides and waste places. July, 1859.

GERANIACEÆ.

*Geranium maculatum*, L. Fields and woods, common. 15th May, 1859.

*Geranium Robertianum*, L. Mountain side. Common. July and August, 1859.

BALSAMINACEÆ.

*Impatiens pallida*, Nutt. Wet places. Beverly and East Flamboro. July, 1859.

*Impatiens fulva*, Nutt. Same localities. July, 1859.

RUTACEÆ.

*Zanthoxylum Americanum*, Miller. Found by Miss Crooks, at Galt. End of May, 1860. (In list of Hamilton Plants published in Canadian Journal, Vol. II, page 222.)

ANACARDIACEÆ.

*Rhus typhina*, L. Fields west of city. June, 1860.

*Rhus Toxicodendron*, L. Carrol's Point and Princes Island. June, 1859.

VITACEÆ.

*Vitis cordifolia*, Michx. Carrol's Point and other places. June, 1859.

*Ampelopsis quinquefolia*, Michx. Woods at Ancaster. July, 1860.

RHAMNACEÆ.

*Ceanothus Americanus*, L. East Flamboro, along sides of road to Waterdown. Common. July, 1859.

*Rhamnus alnifolius*, L'Her.? Millgrove Marsh. 23rd May, 1861. This plant is not determined with certainty; it may be *Rhamnus lanceolatus*, Pursh.

CELASTRACEÆ.

*Celastrus scandens*, L. Mountain side near J. M. Williams' house. 9th June, 1860.

*Euonymus obovatus*, Nutt. Mountain side near Mr. Whyte's house. 4th June, 1859.

SAPINDACEÆ.

*Staphylea trifolia*, L. Mountain side, west of Hamilton. 9th June, 1860.

*Acer saccharinum*, Wang. Woods, common. May, 1859.

*Acer rubrum*, L. Woods, common. April, 1859.

*Acer spicatum*, Lambert. Mountain side west of Hamilton. 25th May, 1859.

POLYGALACEÆ.

*Polygala Senega*, L. Prince's Island. June, 1860.

*Polygala Nuttallii*, Torr. and Gray. Prince's Island. 31st August, 1860.

*Polygala paucifolia*, Willd. Near Lake Medad. 17th May, 1860, and at Galt, by Miss Crooks.

LEGUMINOSÆ.

*Lupinus perennis*, L. Found at London, C. W., by Miss Crooks. July, 1860.
*Trifolium arvense*, L. Near Dundurn. July, 1859.
*Trifolium pratense*, L. Fields. July, 1859.
*Trifolium repens*, L. Fields. July, 1859.
*Trifolium procumbens*, L. Fields. July, 1859.
*Medicago lupulina*, L. Fields. July, 1859.
*Astragalus Canadensis*, L. Burlington Heights near old Desjardins Canal. 4th August, 1859.
*Desmodium acuminatum*, D C. West Flamboro, near Dundas. August, 1859.
*Desmodium Canadense*, D C. August, 1859.
*Lespideza hirta*, Elliott. Prince's Island. August, 1860.
*Lespideza capitata*, Michx. Prince's Island. August, 1860.
*Vicia Americana*, Muhl. Paris, C. W. 13th June, 1860. In list of Hamilton flora, published in Canadian Journal, vol. 2, p. 222.
*Lathyrus palustris*, L. Carrol's Point. 9th June, 1859.
*Lathyrus myrtifolius*, Muhl. Carrol's Point. 9th June, 1859.
*Lathyrus ochroleucus*, Hook. Hill side in Cemetery grounds. 24th June, 1861.
*Apios tuberosa*, Mœnch. Prince's Island, and near Desjardins Canal. 25th Aug., 1860.
*Amphicarpæa monoica*, Nutt. Prince's Island. 25th August, 1860.

ROSACEÆ.

*Prunus Americana*, Marsh. Near Barton Church. 18th May, 1860.
*Cerasus Virginiana*, D.C. Mountain side, west of Hamilton. 18th May, 1860.
*Cerasus serotina*, D.C. May, 1860.
*Spiræa salicifolia*, L. Millgrove. 31st July, 1860.
*Spiræa opulifolia*, L. Found by Miss Crooks at St. Thomas, in fruit.
*Gillenia trifoliata*, Mœnch. Princes Island. 21st June, 1860.
*Agrimonia Eupatoria*, L. Oaklands. 23rd July, 1859.
*Geum album*, Gmelin. Foot of Mountain west of city. 25th June, 1860.
*Waldsteinia fragarioides*, Tratt. Found by Miss Crooks in Galt. May, 1860. (In list of Hamilton plants, published in Canadian Journal, Vol. II, page 222.
*Fragaria Virginica*, L. Fields. 12th May, 1860.
*Fragaria vesca*, L. Fields. 15th May, 1860.
*Dalibarda repens*, L. Millgrove. 31st July, 1860.
*Potentilla Norvegica*, L. Burlington Heights. 16th June, 1860.
*Potentilla Canadensis*, L. Oaklands. 30th June, 1859.

*Potentilla anserina*, L. Carrol's Point. 7th July, 1859.
*Rubus odoratus*, L. Borders of fields, common. 4th July, 1859.
*Rubus triflorus*, Rich. Marsh at Millgrove. 23rd May, 1861.
*Rubus occidentalis*, L. Field below mountain, Hamilton. 15th June, 1861.
*Rubus strigosus*, Michx. Fields. 7th June, 1860.
*Rubus villosus*, Aiton. Fields. 7th June, 1860.
*Rosa blanda*, Aiton. East Flamboro. Waterdown road. July, 1860.
*Rosa lucida*, Ehrhart. Fields west of city. 6th July, 1860.
*Rosa rubiginosa*, L. Fields west of city. 6th July, 1860.
*Pyrus coronaria*, L. Princes Island. 28th May, 1860.
*Pyrus arbutifolia*, L. var. melanocarpa. Millgrove Marsh. 19th June, 1861.
*Cratægus tomentosa*, L. Hamilton. June, 1860.
*Amelanchier Canadensis*, Torr. and Gr. (var. Botryapium). Sulphur Spring, Ancaster. 4th May, 1860. Var. rotundifolia (A. ovalis D.C.) Prince's Island. 20th May, 1861.

LYTHRACEÆ.

*Nesæa, verticillata*, Gray. Burlington Beach near Water-works, and in old Desjardins Canal, Burlington Heights. 25th August, 1860.

ONAGRACEÆ.

*Epilobium angustifolium*, L. Waterdown Road, and on Mountain west of city. 6th July, 1860.
*Epilobium coloratum*, Muhl. Ancaster. August, 1859.
*Œnothera biennis*, L. Mountain side near city. 9th August, 1859.
*Œnothera glauca*, Michx. Found on dry waste ground at Mount Forest. 12th August, 1860.
*Circœa alpina*, L. Sulphur Spring near Ancaster. 22nd July, 1859.

GROSSULACEÆ.

*Ribes hirtellum*, Michx. Fields west of city. 6th June, 1860.
*Ribes lacustre*, Poir. Wet grounds west of city. 6th June, 1860.
*Ribes floridum*, L. Fields west of city. 6th June, 1860.

CRASSULACEÆ.

*Penthorum sedoides*, L. Road sides. 29th July, 1859.

SAXIFRAGACEÆ.

*Saxifraga Virginiensis*, Michx. Top of Mountain west of city. 24th May, 1859.
*Mitella diphylla*, L. Mountain side. Common. 24th May, 1859.
*Mitella nuda*, L. Mount Forrest. 12th August, 1860.
*Tiarella cordifolia*, L. Mountain side. 24th May, 1859.

HAMAMELACEÆ.

*Hamamelis Virginica*, L. Waterdown Road. November, 1859.

UMBELLIFERÆ.

*Hydrocotyle Americana* L. Ancaster. October, 1860.

*Sanicula Canadensis*, L. Woods west of city. 21st July, 1860.
*Sanicula Marilandica*, L. Prince's Island. 14th July, 1860.
*Daucus Carota*, L. Found by Miss Crooks. August, 1860.
*Heracleum lanatum*, Michx. Beasley's Hollow. 22nd June, 1860.
*Thaspium aureum*, Nutt. Prince's Island. 26th May, 1860.
*Sium lineare*, Michx. Millgrove. 30th July, 1860.
*Zizia integerrima*, D.C. Prince's Island. 21st June, 1860.
*Cryptotœnia Canadensis*, D.C. Mountain side west of city. 16th June, 1860.
*Osmorrhiza brevistylis*, D.C. Mountain side west of city. 16th June, 1860.

ARALIACEÆ.

*Aralia racemosa*, L. Mountain behind Mr. Brown's house. July, 1859.
*Aralia nudicaulis*, L. Prince's Island. 28th May, 1860.
*Aralia quinquefolia*, Gray. July, 1859.
*Aralia trifolia*, Gray. Glanford. 25th May, 1860.

CORNACEÆ.

*Cornus Canadensis*, L. Marsh near Millgrove and at Lake Medad. 23rd June, 1860.
*Cornus florida*, L. Woods beside Waterdown Road. 17th May, 1860. This tree is found in great numbers about Ancaster, particularly in the valley below Ancaster and West Flamboro. It is also found near the Albion Mills.
*Cornus circinnata*, L'Heritier. Mountain side near the city. 9th June, 1860.
*Cornus paniculata*, L'Heritier. Filman's lot on Mountain. 29th June, 1860.
*Cornus stolonifera*, Michx. Oaklands. June, 1859.
*Cornus alternifolia*, L. Mountain side west of Hamilton. May, 1860.

CAPRIFOLIACEÆ.

*Linnœa borealis*, Gron. Shore of Lake Medad. 23rd June, 1860.
*Symphoricarpus racemosus*, Michx. Brow of Mountain above Hamilton and at Stoney Creek. July, 1860.
*Lonicera parviflora*, Lamarck. Mountain side west of city. 9th June, 1859.
*Lonicera ciliata*, Muhl. Mountain west of Hamilton. 15th May, 1860.
*Diervilla trifida*, Mœnch. Waterdown road, and on Prince's Island. 11th June, 1860.
*Triosteum perfoliatum*, L. Fields west of Hamilton. June, 1859.
*Sambucus Canadensis*, L. Sides of fields. 9th July, 1860.
*Sambucus pubens*, Michx. Mountain side. 12th May, 1860.
*Viburnum pubescens*, Pursh. Waterdown road. 11th June, 1860.
*Viburnum acerifolium*, L. Mountain west of city. 9th July, 1859.

RUBIACEÆ.

*Galium Aparine*, L. Mountain near J. M. Williams' house. 6th June, 1860.

*Galium trifidum*, L., (var. tinctorium.) Paris. 15th August, 1859.
*Galium asprellum*, Michx. Open woods near city. 16th June, 1860.
*Galium triflorum*, Michx. Woods west of city. 28th July, 1859.
*Galium boreale*, L. Carrol's Point. 4th July, 1860.
*Cephalanthus occidentalis*, L. Marsh near Millgrove. 31st July, 1860.
*Mitchella repens*, L. Woods, common. Not found in flower.
*Oldenlandia purpurea*, Gray, (var. longifolia.) Found by Dr. Craigie at Paris, C. W. 13th June, 1860.

COMPOSITÆ.

*Liatris cylindracea*, Michx. Found by Miss Crooks at Westminster, C. W. July, 1860. (In list of Hamilton flora published in Canadian Journal, vol. 2, p. 222.)
*Eupatorium purpureum*, L. At Millgrove. 31st July, 1860. Also a variety with opposite petioled leaves, broader, and more deeply serrate; flowers smaller and of a deeper purple. Paris. 15th August, 1859.
*Eupatorium perfoliatum*, L. Paris. 15th August, 1859. Also at Millgrove and other places near Hamilton.
*Eupatorium ageratoides*, L. Waterdown road. 27th August, 1859.
*Erigeron Canadense*, L. Fields. Common. August, 1860.
*Erigeron bellidifolium*, Muhl. Prince's Island. May, 1860.
*Erigeron Philadelphicum*, L. Fields. Common. August, 1860.
*Erigeron strigosum*, Muhl. Fields. Common. September, 1860.
*Erigeron annuum*, Persoon. Fields. Common. August, 1860.
*Solidago bicolor*, L. Fields about Hamilton. 25th August, 1860.
*Solidago latifolia*, L. Fields near Hamilton. 27th August, 1860.
*Solidago cæsia*, L. Fields, Hamilton. August, 1860.
*Solidago nemoralis*, Aiton. Fields, Hamilton. August, 1860.
*Solidago odora*, Aiton. Fields, Hamilton. August, 1860.
*Inula Helenium*, L. Road sides. Common. August, 1860.
*Ambrosia artemisiæfolia*, L. Road sides. July, 1860.
*Xanthium strumarium*, L. Road sides. Common. 8th September, 1860.
*Helianthus divaricatus*, L. Fields. 1859.
*Helianthus strumosus*, L. Fields. 1859.
*Bidens frondosa*, L. Wet places. 1859.
*Bidens cernua*, L. Wet places. 1859.
*Bidens chrysanthemoides*, Michx. Wet ground on the Mountain. 1860.
*Helenium autumnale*, L. August, 1860.
*Maruta Cotula*, DC. Common. 1860.
*Achillæa Millefolium*, L. Fields. August, 1859.
*Leucanthemum vulgare*, L. Road sides and fields, common. July, 1860.

*Tanacetum vulgare*, L. Road sides near dwellings. 1859.
*Gnaphalium decurrens*, Ives. September, 1860.
*Gnaphalium polycephalum*, Michx. Hill side near Sulphur Spring. Ancaster. 29th July, 1859.
*Antennaria margaritacea*, R. Brown. Dry fields, Burlington Heights. Aug., 1860.
*Antennaria plantaginifolia*, Hook. Road sides. Ancaster. 4th May, 1860.
*Senecio vulgaris*, L. Road sides. 1859.
*Cirsium lanceolatum*, Scop. Common. 1860.
*Cirsium muticum*, Michx. August, 1860.
*Cirsium arvense*, Scop. Common. August, 1860.
*Lappa major*, Gærtn. Common. 1860.
*Hieracium Canadense*, Michx. Hamilton. August, 1860.
*Hieracium Gronovii*, L. Ancaster. 1st October, 1860.
*Nabalus altissimus*, Hook. Prince's Island. 31st August, 1860.
*Nabalus albus*, Hook. Filman's lot. 27th August, 1860.
*Nabalus Fraserii*, DC. Prince's Island. 31st August, 1860.
*Taraxacum dens-leonis*, Desf. Common. May, 1860.
*Lactuca elongata*, Muhl. Common. Sept. 1860.
*Sonchus oleraceus*, L. Common. August, 1860.
*Aster Tradescantii*, L. Waterdown road. 3rd Sept., 1860.
*Aster Novæ angliæ*, L. End of Sept., 1860.
*Aster undulatus*, L. August, 1860.
*Aster cordifolius*, L. 1859.
*Aster macrophyllus*, L. 1860.
*Aster lævis*, L. Sept. 1860.
*Aster*. Several others not determined.

CAMPANULACEÆ.

*Campanula rotundifolia*, L. East Flamboro, near Mr. Carrol's. 1859.
*Campanula aparinoides*, Pursh. Marsh at Millgrove. 31st July, 1860.
*Campanula Americana*, L. Woods near Cline's Mill, west of city. 28th July, 1859.
*Specularia perfoliata*, DC. Field opposite to J. M. Williams' house. Aug., 1859.

ERICACEÆ.

*Chiogenes hispidula*, Torr and Gray. Marsh at Millgrove, in fruit. 31st July, 1860.
*Gaultheria procumbens*, L. Woods, common. 23rd July, 1859.
*Pyrola rotundifolia*, L. var. asarifolia. Lake Medad. 23rd June, 1860. Var. uliginosa. Lake Medad. 23rd June, 1860.
*Pyrola elliptica*, Nutt. Carrol's Point. 7th July, 1859.
*Pyrola secunda*, L. East Flamboro, near Carrol's. 4th July, 1859.
*Moneses uniflora*, Gray. Lake Medad. 23rd June, 1860.

*Chimaphila umbellata*, Nutt. Sulphur Spring, Ancaster. 23rd July, 1859.
*Andromeda polifolia*, L. Found by Miss Crooks at Westminster, in fruit. July, 1860.
*Ledum latifolium*, Aiton. Marsh at Millgrove and at Lake Medad. 23rd June, 1860.
*Pterospora Andromedea*, Nutt. Woods near Cline's Mill, west of city.
*Monotropa uniflora*, L. August, 1860.
*Monotropa Hypopitys*, L. Found by Miss Crooks. 1860.
*Vaccinium Pennsylvanicum*, Lamarck. Woods near Waterdown Road. May, 1860.
*Vaccinium sp.* Not determined with certainty, apparently *Vaccinium vacillans*, Kalm. Near Waterdown road. 1860.
*Vaccinium corymbosum*, L. Marsh at Millgrove, in fruit. 31st July, 1860.
*Cassandra calyculata*, Don. Millgrove Marsh. 23rd May, 1861.

LOBELIACEÆ.

*Lobelia cardinalis*, L. Wet ground near road side, Township of Beverly. Aug., 1859.
*Lobelia syphilitica*, L. Waterdown road, and in field east of city, near N. Merrit's house. 27th August, 1859.
*Lobelia inflata*, L. Road sides, common. 5th August, 1859.
*Lobelia spicata*, Lamarck. Prince's Island. 14th July, 1860.
*Lobelia Kalmii*, L. Collingwood, C. W. 16th August, 1860.

PLANTAGINACEÆ.

*Plantago major*, L. Common. 8th August, 1859.

PRIMULACEÆ.

*Trientalis Americana*, Pursh. Woods near Cline's Mill. 24th May, 1860.
*Lysimachia ciliata*, L. Woods near Cline's Mill. 28th July, 1859.
*Lysimachia quadrifolia*, L. East Flamboro, near Mr. Carrol's. 4th July, 1859.
*Lysimachia longifolia*, Pursh. Collingwood. 16th August, 1860.
*Naumburgia thyrsiflora*, DC. Swamp near Cumminsville. June, 1860.

LENTIBULACEÆ.

*Utricularia vulgaris*, L. Burlington Bay, near Mr. Carrol's. 4th July, 1859.
*Utricularia cornuta*, Michx. Found by Miss Crooks in a swamp at Westminster. 2nd August, 1860.

ÓROBANCHACEÆ.

*Epiphegus Virginiana*, Barton. Cline's Mill, and in Township of Glanford, common. 22nd August, 1860.
*Conopholis Americana*, Wallr. Woods behind Cline's Mill, Hamilton. 15th June, 1861.

SCROPHULARIACEÆ.

*Verbascum Thapsus*, L. Common, road sides and waste ground. August, 1860.

*Linaria vulgaris*, Miller. Road sides near dwellings. August, 1860.
*Chelone glabra*, L. Wet places, common. 15th August, 1859.
*Pentstemon pubescens*, L. Waterdown road, near Burlington Heights. 4th July, 1859.
*Mimulus ringens*, L. Wet places, common. August, 1859.
*Veronica Americana*, Schw. 24th June, 1861.
*Veronica serpyllifolia*, L. 22nd May, 1861.
*Veronica officinalis*, L. 15th June, 1861.
*Veronica triphyllos*, L. Cultivated ground, Hamilton, probably introduced. 20th May, 1861.
*Veronica officinalis*, L. Common. 9th June, 1859.
*Gerardia tenuifolia*, Vahl. Prince's Island. 31st August, 1860.
*Gerardia integrifolia*, Gray. Waterdown road. 27th August, 1859.
*Gerardia quercifolia*, Pursh. Prince's Island. 31st August, 1860.
*Gerardia flava*, L. Oaklands. Found by Miss Crooks. August, 1859.
*Gerardia pedicularia*, L. Waterdown road and other places, common. 27th Aug., 1859.
*Castilleja coccinea*, Spreng. Mountain beyond Mr. Brydge's house. 11th May, 1860.
*Pedicularis Canadensis*, L. Mountain side, near Mr. Brydge's. 6th June, 1859.
*Melampyrum Americanum*, Michx. Near Desjardins Canal. Burlington Heights. August, 1859.

VERBENACEÆ.

*Verbena hastata*, L. Road sides. August. 1860.
*Verbena urticifolia*, L. Road sides. August, 1860.
*Phryma Leptostachya*, L. Woods west of city. July, 1860.

LABIATÆ.

*Teucrium Canadense*, L. Burlington Heights, near Desjardins Canal. July, 1859.
*Collinsonia Canadensis*, L. Prince's Island. July, 1859.
*Monarda didyma*, L. Near Mount Forest. August, 1860.
*Monarda fistulosa*, L. Barton Church. 22nd July, 1859.
*Monarda punctata*, L. Bellhouse Farm, East Flamboro. 19th August, 1859.
*Nepeta Cataria*, L. Common. July, 1859.
*Brunella vulgaris*, L. Common. 21st July, 1859.
*Scutellaria laterifolia*, L. Wet places, common. 15th August, 1859.
*Scutellaria galericulata*, L. Near Desjardins Canal, Burlington Heights. July, 1859.
*Isanthus cœruleus*, Michx. Found at Westminster, C. W., by Miss Crooks. July, 1860.

BORAGINACEÆ.

*Echium vulgare*, L. Road side, London, C. W. Found by Miss Crooks. 10th July, 1860.

*Onosmodium hispidum*, Michx. Westminster, C. W. Found by Miss Crooks. July, 1860.

*Lithospermum arvense*, L. Road sides. May, 1859.

*Myosotis palustris*, With. Wet places, common. June, 1860.

*Cynoglossum officinale*, L. Road sides and fields, common. July, 1860.

*Cynoglossum Virginicum*, L. Galt. Found by Miss Crooks. 8th June, 1860.

*Cynoglossum Morisoni*, DC. Road sides, common. July, 1860.

HYDROPHYLLACEÆ.

*Hydrophyllum Virginicum*, L. Woods, mountain side beyond Mr. Brydge's house, abundant. June, 1859.

POLEMONIACEÆ.

*Phlox divaricata*, L. Common, in open woods west of city. 7th June, 1860.

CONVOLVULACEÆ.

*Calystegia sepium*, Brown. Waterdown road, near mouth of creek. July, 1859.

*Cuscuta Gronovii*, Willd. 25th Sept., 1859.

SOLANACEÆ.

*Physalis viscosa*, L. St. Thomas, C. W. Found by Miss Crooks. 30th Aug., 1860. (Also in list of Hamilton flora in Canadian Journal, vol. 2, p. 222.)

*Solanum Dulcamara*, L. Road side, near Barton Church. 5th Aug., 1859.

*Solanum nigrum*, L. Road side, near Dundas. 3rd Sept., 1860.

*Datura Stramonium*, L. Burlington Beach, common. 1st August, 1860.

*Nicandra physaloides*, Gærtn. St. Thomas. Found by Miss Crooks. Aug., 1860.

GENTIANACEÆ.

*Halenia deflexa*, Griseb. Collingwood. 16th August, 1860. (In list of Hamilton plants, Canadian Journal, vol. 2, p. 222.)

*Gentiana crinita*, Willd. Prince's Island. 31st August, 1860.

APOCYNACEÆ.

*Apocynum androsæmifolium*, L. Common, Carrol's Point. 4th July, 1859.

*Apocynum cannabinum*, L. Carrol's Point. 4th July, 1859.

ASCLEPIADACEÆ.

*Asclepias Cornuti*, Decaisne. Fields and road sides, common. July, 1859.

*Asclepias incarnata*, L. Low wet grounds, common. July, 1859. This species has a strong and valuable fibre, capable of being manufactured into cloth or paper.

*Asclepias variegata*, L. July, 1859.

*Asclepias tuberosa*, L. East Flamboro, near Mr. Carrol's. 4th July, 1859.

OLEACEÆ.

*Fraxinus Americana*, L. Not common. Field at east end of city. 21st May, 1861.

*Fraxinus sambucifolia*, Lamarck. Common in swamps, not observed in flower.

ARISTOLOCHIACEÆ.

*Asarum Canadense*, L. Mountain side, west of Hamilton, common. June, 1859.

NYCTAGINACEÆ.

*Phytolacca decandra*, L. Road side, near Stoney Creek. 26th Aug., 1859.

CHENOPODIACEÆ.

*Chenopodium album*, L. Common. August, 1859.

*Chenopodium hybridum*, L. About dwellings. Sept. 1859. (Doubtful if this species has become naturalized, as it is generally found in cultivated grounds.)

*Chenopodium Botrys*, L. Road sides, common. Sept. 1859.

*Chenopodium ambrosioides*, L. Road sides, common. Sept. 1859.

*Blitum capitatum*, L. Common in newly cleared lands. In fruit, August, 1860.

AMARANTACEÆ.

*Amarantus paniculatus*, L. Near dwellings in cultivated ground. 9th August, 1859.

*Amarantus retroflexus*, L. Near dwellings. 9th August, 1859.

POLYGONACEÆ.

*Polygonum Pennsylvanicum*, L. Field near Stoney Creek. August, 1859.

*Polygonum amphibium*, L. Marsh, mouth of Waterdown Creek. August, 1860.

*Polygonum Persicaria*, L. Common. July, 1859.

*Polygonum acre*, H. B. K. Wet places. September, 1860.

*Polygonum Hydropiper*, Michx. Wet places. September, 1859.

*Polygonum aviculare*, L. Common. July, 1859.

*Polygonum Convolvulus*, L. Common. July, 1859.

*Polygonum dumetorum*, L. Found by Miss Crooks at St. Thomas. August, 1860.

*Rumex Acetosella*, L. Common. June, 1860.

*Rumex crispus*, L. Common. July, 1859.

LAURACEÆ.

*Sassafras officinale*, Nees. Ancaster. May, 1860. This tree is common in the neighborhood of Ancaster, on Prince's Island, and in East Flamboro, between Waterdown and Burlington Bay.

*Benzoin odoriferum*, Nees. Found by Miss Crooks at Westminster, in July, 1860. Not in flower. Said to grow in Ancaster. (In list of Hamilton Plants in Canadian Journal, Vol. II, page 222.)

THYMELEACEÆ.

*Dirca palustris*, L. Sulphur Spring, Ancaster. 4th May, 1860.

SANTALACEÆ.

*Comandra umbellata*, Nutt. Mountain top near Mr. Brydge's house, and near the Albion Mills. June, 1859.

EUPHORBIACEÆ.

*Euphorbia obtusata*, (var. platyphylla, L.) Pursh. Shore of Lake Ontario, below Stoney Creek. July, 1860.

URTICACEÆ.

*Ulmus Americana*, L. Common. April, 1860.

*Ulmus fulva*, Michx. Woods, Mountain side near Ancaster. 10th May, 1861.

*Urtica gracilis*, Ait. Mountain side behind the city. Common. August, 1860.

*Laportea Canadensis*, Gaudich. Sulphur Spring, near Ancaster. July, 1859.

*Pilea pumila*, Gray. Hamilton. 5th August, 1859.

PLATANACEÆ.

*Platanus occidentalis*, L. Banks of several small streams at and near Stoney Creek and at Grimsby. Said to be the largest North American tree, excepting the Wellingtonia gigantea, Lindley, of California. None of those in the neighborhood of Hamilton, though large, are of extraordinary size. Not observed in flower.

JUGLANDACEÆ.

*Juglans cinerea*, L. Common along sides of Mountain and other places. May, 1860. In flower, 27th May, 1861.

*Juglans nigra*, L. Common. There are some very large trees still standing in the outskirts of the city and in the neighborhood, but most of the large trees have been cut. Small and medium sized trees are common. May, 1860; also in flower, 27th May, 1861.

*Carya alba*, Nutt. Common. 6th June, 1860.

CUPULIFERÆ.

*Quercus alba*, L. Common. May, 1860.

*Quercus macrocarpa*, Michx. East Flamboro, near Desjardins Canal. 4th June, 1861.

*Quercus rubra*, L. Woods, common. May, 1860, and 4th June, 1861.

*Castanea vesca*, L. Common, particularly in the valley between Ancaster and West Flamboro, does not extend to the north further than West Flamboro, in the direction of Toronto, much beyond Wellington Square, is found to the east in the direction of Niagara. 21st July, 1859.

*Fagus ferruginea*, Aiton. Woods, common. 4th June, 1861.

*Carpinus Americana*, Michx. Common, near Ancaster. In flower. 10th May, 1861.

*Ostrya Virginica*, Willd. Common. 9th May, 1861.

*Corylus rostrata*, Ait. Waterdown road. 6th May, 1861.

BETULACEÆ.

*Betula papyracea*, Ait. Woods near borders of Burlington Bay. June, 1859. Sterile flowers, 7th May, 1861.

*Betula lenta*, L. Wood near Dundas. Not observed in flower.

*Alnus incana*, Willd. Oaklands. 16th April, 1860.

SALICACEÆ.

*Salix nigra*, Marsh. 1st June, 1861.

CONIFERÆ.

*Pinus strobus*, L. Common. June, 1860.

*Abies Canadensis*, Michx. Mountain west of Hamilton. 24th May, 1861.

*Abies nigra*, Poir. Millgrove marsh. 23rd May, 1861.

*Abies alba*, Michx. Swampy ground near Brock road, not observed in flower.

*Juniperus Virginiana*, L. Near Mr. Carrol's house, on high bank of the Bay. 25th May, 1861.

*Larix Americana*, Michx. Marsh near Millgrove. 29th April, 1861.

*Thuja occidentalis*, L. Common in swamps. Northern parts of East and West Flamboro. 17th May, 1861.

*Taxus baccata*, L., var. Canadensis. Mountain side, beyond Mr. Brydge's house. 29th April, 1861.

ARACEÆ.

*Arum triphyllum*, L. Mountain side, west of city, common. 12th May, 1860.

*Calla palustris*, L. Lake Medad. June, 1860.

*Symplocarpus fœtidus*, Salisb. Oaklands. 16th April, 1860.

TYPHACEÆ.

*Sparganium ramosum*, Huron. Beach near Water Works. 9th July, 1859.

NAIADACEÆ.

*Potamogeton perfoliatus*, L. Burlington Bay, near the beach. July, 1859.

*Potamogeton pectinatus*, L. Burlington Bay. July, 1859.

*Potamogeton natans*, L. Burlington Bay, near beach. July, 1859.

ALISMACEÆ.

*Sagittaria variabilis*, Englemann. Burlington Bay near beach, common. Aug., 1860.

ORCHIDACEÆ.

*Orchis spectabilis*, L. 6th June, 1859.

*Gymnadenia tridentata*, Lindley. Millgrove, border of Marsh. 31st July, 1860.

*Platanthera flava*, Gray. Prince's Island. 14th July, 1860.

*Platanthera dilatata*, Lindley. Millgrove. 31st July, 1860.

*Platanthera leucophœa*, Nutt. Millgrove. 31st July, 1860.

*Platanthera psycodes*, Gray. Millgrove. 31st July, 1860.

*Platanthera bracteata*, Torrey. Mountain, near J. M. Williams' house. 6th June, 1860.

*Platanthera hyperborea*, Lindley. Sulphur Spring, Ancaster. 19th July, 1859.

*Platanthera orbiculata*, Lindley. Near Albion Mills. June, 1860.

*Platanthera Hookeri*, Lindley. Near Brock Road, west of Desjardins Canal. 31st July, 1860.

*Goodyera pubescens*, R. Brown. Sulphur Spring, near Ancaster. 5th August, 1859. Common. The leaves of this plant pounded and applied in the form of a poultice are said to be a cure for the bite of a rattlesnake.

*Corallorhiza innata*, R. Brown. Prince's Island. 23rd May, 1860.

*Corallorhiza multiflora*, Nutt. Woods near Lake Medad. 23rd June, 1860.

*Pogonia ophioglossoides*, Nutt. Bog at Millgrove. 31st July, 1860.

*Calypso borealis*, Salisbury. Shore of Lake Medad. 17th May, 1860.

*Cypripedium pubescens*, Willd. Prince's Island. 6th June, 1860.

*Cypripedium parviflorum*, Salisbury. Mountain beyond Mr. Brydge's house. June, 1859.

*Cypripedium spectabile*, Swartz. Lake Medad. 23rd June, 1860.

*Cypripedium acaule*, Aiton. 24th May, 1860.

AMARYLLIDACEÆ.

*Hypoxis erecta*, L. Prince's Island. 21st June, 1860.

IRIDACEÆ.

*Iris versicolor*, L. About shores of Burlington Bay. June, 1860.

*Sisyrinchium Bermudianum*, L. Prince's Island. 28th May, 1860.

SMILACEÆ.

*Smilax*. Not determined with certainty. Supposed to be *Smilax Pseudo-China* of Linnæus. Border of field west of city, in front of Mr. Williams' house. End of June, 1860.

*Trillium erectum*, L. Woods. Common. 4th May, 1860.

*Trillium pendulum*, Willd. Mountain side below Barton Lodge. 16th May, 1860.

*Trillium grandiflorum*, Salisb. Woods. May, 1860. (Miss C.)

*Medeola Virginica*, L. Woods near Lake Medad. 23rd June, 1860.

LILIACEÆ.

*Polygonatum biflorum*, Elliott. Woods. June, 1859.

*Smilacina racemosa*, Desf. Woods, side of Mountain, west of Hamilton. Common. 4th June, 1859.

*Smilacina stellata*, Desf. Prince's Island. 28th May, 1860.

*Smilacina trifolia*, Desf. Marsh at Millgrove. 19th June, 1861.

*Smilacina bifolia*, Ker. Common. May, 1859.

*Lilium Philadelphicum*, L. East Flamboro, near Mr. Carrol's. 4th July, 1859.

*Lilium Canadense*, L. Found by Miss Crooks, near Hamilton. July, 1860.

MELANTHACEÆ.

*Uvularia perfoliata*, L. Woods west of city. 12th May, 1860.
*Prosartes lanuginosa*, Don. Woods. June, 1859.
*Streptopus roseus*, Michx. Woods near Lake Medad. 17th May, 1860.
*Tofieldia glutinosa*, Willd. Shore of Georgian Bay at Collingwood. 16th Aug., 1860.

PONTEDERIACEÆ.

*Pontederia cordata*, L. Burlington Beach. 2nd August, 1860.*

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In order to make the List of the Flora of Hamilton as complete as possible, I have copied, from a List published in the Canadian Journal, vol. 2, page 222, the names of all the Phænogamous plants not included in the foregoing list, viz.—

*Ranunculus fascicularis*, Muhl. 24th June.
*Barbarea vulgaris*, R. Brown. 22nd July.
*Viola ovata*, Nutt. V. sagittata var. ovata, Torr and Gray. 4th May.
*Lechea minor*, Lamarck. 13th Sept.
*Hypericum corymbosum*, Muhl. 19th July.
*Saponaria officinalis*, L. 26th July.
*Silene noctiflora*, L. 31st June.
*Cerastium hirsutum*, Muhl. C. vulgatum, L. 4th June.
*Polygala fastigiata*, Nutt. 17th Aug.
*Lathyrus ochroleucus*, Hook. 7th June.
*Lathyrus maritimus*, Bigelow. 30th June.
*Desmodium cuspidatum*, Torr and Gray. 31st July.
*Desmodium nudiflorum*, DC. 31st July.
*Desmodium paniculatum*, DC. 4th Aug.
*Desmodium Dillenii*, Darlington. 4th Aug.
*Baptisia tinctoria*, R. Brown. 5th Aug.
*Phaca neglecta*, Torr and Gray. Astragalus Cooperi. 15th Aug.
*Phaseolus helvolus*, L. 20th Aug.
*Cerasus Pennsylvanicus*, L. 27th May.
*Cratægus coccinea*, L. 4th June.

* NOTE.—In the foregoing list I have omitted some of the natural orders of Phænogamous plants, such as Gramineæ, Cyperaceæ, Juncaceæ and Salicaceæ, and all the Cryptogamia for the reason that I have only had time to examine and determine a very limited number of Plants belonging to these orders. I hope at some future time to be able to furnish a supplementary list of these Plants, and also of such of the other Phænogamous plants to be found in this neighborhood, not hitherto observed by me.

A. L.

HAMILTON, MARCH, 1861.

*Rubus triflorus*, Richardson. 29th May.
*Geum Virginianum*, L. 30th June.
*Geum strictum*, Aiton. 30th June.
*Circœa Lutetiana*, L. 16th July.
*Epilobium palustre*, L. 5th Aug.
*Chrysosplenium Americanum*, Schw. 8th May.
*Cicuta bulbifera*, L. 26th July.
*Archangelica atropurpurea*, Hoffm. 30th June.
*Viburnum Lentago*, L. 12th June.
*Galium lanceolatum*, Torr. 31st June.
*Aster miser*, L. 31st July.
*Aster corymbosus*, Aiton. 31st July.
*Aster simplex*, Willd. 4th Aug.
*Aster multiflorus*, Aiton. 28th Aug.
*Aster longifolius*, Lamarck. 28th Aug.
*Aster puniceus*, L. 28th Aug.
*Aster acuminatus*, Michx. 28th Aug.
*Aster dumosus*, L. 13th Sept.
*Aster pre. anthoides*, Muhl. 13th Sept.
*Aster azureus*, Lindley. 13th Sept.
*Aster patens*, Aiton. 13th Sept.
*Diplopappus albus*, Hook. Aster ptarmicoides. 15th Aug.
*Helianthus tracheliifolius*, Willd. 16th July.
*Helianthus giganteus*, L. 15th Aug.
*Rudbeckia hirta* L. 12th July.
*Bidens connata*, Muhl. 26th July.
*Polymnia Canadensis*, L. 26th July.
*Solidago altissima*, L. 4th August.
*Solidago Canadensis*, L. 26th July.
*Solidago squarrosa*, Muhl. 18th August.
*Solidago puberula*, Nutt. 28th August.
*Solidago Muhlenbergii*, Torr. and Gr. 28th August.
*Circium discolor*, Spreng. 4th August.
*Hieracium paniculatum* L. 20th August.
*Hieracium longipilum*, Torr. 5th August.
*Artemisia Canadensis*, Michx. 20th August.
*Artemisia gnaphalioides*, (var. of A. Ludoviciana.) 20th August.
*Lobelia puberula*, Michx. 20th July.
*Chimaphila maculata*, Pursh. 31st July.
*Lysimachia stricta*, Aiton. 10th July.

*Aphyllon uniflorum*, Torr. and Gr. 19th June.
*Verbascum Blattaria*, L. 4th July.
*Scrophularia Marilandica*, L. 30th July.
*Veronica peregrina*, L. 30th May.
*Veronica Anagallis*, L. 31st July.
*Stachys aspera*, Michx. 31st July.
*Melissa Clinopodium*. 21st July.
*Leonurus cardiaca*, L. 30th July.
*Pycnanthemum incanum*, Michx. 18th August.
*Hedeoma pulegioides*, Persoon. 18th August.
*Scutellaria parvula*, Michx. 20th August.
*Hydrophyllum Canadense*, L. 3rd July.
*Frasera Caroliniensis*, Walt. 25th June.
*Gentiana quinqueflora*, Lamarck. 25th September.
*Gentiana Andrewsii*, Griseb. 28th August.
*Asclepias phytolaccoides*, Pursh. 2nd July.
*Asclepias debilis*. 30th June.
*Chenopodium urbicum*, L. 5th August.
*Polygonum arifolium*, L. 13th September.
*Polygonum sagittatum*, L. 13th September.
*Polygonum lapathifolium*. 13th September.
*Rumex Hydrolapathum*, Hudson. 15th August.
*Euphorbia polygonifolia*, L. 4th July.
*Euphorbia corollata*, L. 24th July.
*Acalypha Virginica*, L. 5th Aug.
*Spiranthes cernua*, Richardson. 28th Aug.
*Trillium cernuum*, L. 8th May
*Allium tricoccum*, Aiton. 3rd July.
*Lilium superbum*, L. 12th July.
*Tofieldia pubens*, Aiton. 17th Aug.

The following papers were also read:—

1. On the History, Properties and Cultivation of Cotton. By F. R. Stanton. Communicated by Dr Horatio Yates, Professor of Medicine.

2. List of Plants observed in the neighborhood of Prescott, C. W., chiefly in 1860. By B. Billings, Jr., F. B. S. C.

3. On the Sugar Maple, and the Preparation of Sugar and Saccharine Solutions from Maple Sap. By John May, A. M.

4. Notices of the destructive effects of Frost on Vegetation in Britain during the present winter, from Letters of Professor Balfour, Edinburgh, Dr. John Lowe, King's Lynn, and other correspondents. By Prof. Lawson.

*Sixth Meeting.*

## FRIDAY EVENING, 12th APRIL, 1861.

The Very Rev. Principal Leitch, D. D., President, in the Chair.

The following Candidates were balloted for, and duly elected Fellows of the Society, viz:—Hon. William Sheppard, D. C. L., of Fairymead, Drummondville, Lower Canada. J. Bruce, Nurseryman, Hamilton, Canada West.

The following gentlemen were elected Corresponding Members:—John Richardson, Geological Survey, Montreal. P. L. Simmonds, King's College, London, England. John Lowe, M. D., M. R. C. S., England, King's Lynn.

Letters were read from R. K. Greville, L L. D., Edinburgh, and John T. Syme, F. L. S., London, acknowledging their election as Honorary Members.

Professor Lawson exhibited a collection of native and cultivated Plants made in South Carolina by Mrs. Noel, Kingston, containing a number of interesting species, such as Cassia nictitans, Gossypium herbaceum, Rhus copallina, Nicandra physaloides, Spigelia Marilandica, Nicotiana Tabacum, Impatiens Balsamina, Vexillaria Virginiana, Phytolacca decandra, Œnothera biennis, Polygonum orientale, Convolvulus Batatas, Capsicum annuum, Salvia obovata, &c.

Dr. J. R. Dickson, Professor of Surgery, exhibited an interesting series of specimens collected by Dr. W. E. G. C. Dickson, many years ago, during the Excursions of the University Botanical Class around Edinburgh, and including specimens of Oxytropus campestris and other Clova plants from Prof. Balfour. Attention was directed to a frond of Polypodium vulgare, from Kinnordy, which was referable to the rather rare variety *auritum* of Moore.

The following donations to the Society's Library were announced, viz:—McGillivray's Lives of Eminent Zoologists, from Mr. Stanton. Prof. Lawson's pamphlet on Botrydium granulatum, from the Author. The Secretary announced the presentation to the Society by one of the Fellows, Mr. B. Billings, Jr., Prescott,

of a large and very valuable collection of plants, chiefly from the neighborhood of Prescott. The Society's thanks were specially voted to Mr. Billings for his valuable donation.

Mr. A. T. Drummond, B. A., exhibited a number of Dyes prepared from native Canadian Lichens. Mr. T. Sullivan presented a peculiar pilose Polyporus.

Blank Schedules for recording the leafing, flowering, and other periodical phenomena of plants, were distributed to the Members.

The following papers were read, viz:—

1. Remarks on the Silk obtained from Lettuce-fed Silk Worms. By Miss Gildersleeve.

2. Further observations on Silk Culture. By Mrs. Lawson.

3. Extracts from Letters relative to Silk and the native fibre-yielding Insects of Canada. By John Duff.

4. On Fungi, their relation to Disease. By John Lowe, M. D., M. R. C. S., Eng., F. B. S. E., Surgeon to the West Norfolk and Lynn Hospital. This paper has since been published in the British American Journal of Medical and Physical Science, for May, 1861, (vol. ii, p. 193).

5. On the Secretion of Saccharine Matter in the Floral Organs of Plants, and on the Economy of Bees; with the results of investigations on the Sexual Development of Bees. By the Very Rev. Principal Leitch, President.

*Seventh Meeting.*

FRIDAY EVENING, 14TH JUNE, 1861.

Rev. Professor Mowat, A. M., afterwards Rev. Prof. Williamson, L L. D., Vice-President, in the Chair.

The following were admitted as subscribers:—Miss Fisher, Newmarket; Rev. H. E. Plees, Carrying Place; Rev. Mr. Borthwick, A. M., Ottawa; John G. Giles, M. D., Farmersville; W. Carter Deans, M. D., Trenton; W. Weir, M. D.; H. D. Lord, Ladlowville, Tompkins Co., New York; Edward C. Fox, of Baliol College, Oxford, Trenton, C. W.; Samuel H. Fee, Kingston.

Donations of seeds were announced from Mr. Haage, Erfurt, and Mr. Bruce, Hamilton; donations of specimens of lichens from Mr. B. Billings, Jr., Brockville; and donations to the Library as follows:—Fragmenta Phytographiæ Australiæ, Vol. I., from the Author, F. Mueller, Ph. D., Botanist to the Colony of Victoria, Hon. M. B. S. C. From Principal Dawson, Montreal, Hon. M. B. S. C., his Memoir on the Pre-carboniferous Flora of New Brunswick, Maine and Eastern Canada.—From F. Stanton, of the 1st Royals, F. B. S. C., several interesting volumes on botanical subjects.

Printed notices of several projected publications were laid on the table, including Prospectus of a new Botanical Journal by John T. Syme, Hon. M. B. S. C., and of a new edition of the Entomological Writings of Harris, by W. Sharswood, M. B. S. C.

Professor Lawson exhibited, under the microscope, several species of Spirogyra in a beautiful state of conjugation, Chætophora elegans, and other Algæ, from the pond in Queen's College grounds.

The following papers were read :—

1. On the Geographical Distribution of the Coniferæ in Canada. By the Hon. William Sheppard, D. C. L., of Fairymead, Drummondville, Lower Canada, F. B. S. C. This paper has since been published in the Edinburgh New Philosophical Journal for October, 1861, (new series, No. 28, vol. xiv, p. 206).

2. Description of the Curculio, its mode of destroying Fruit, and the various means employed to check its progress. By Thomas Briggs, Jr., F. B. S. C.

3. Remarks on the species of Oak, their history, habits and uses. By Miss Crooks, Hamilton, C. W., Mem. B. S. C.

4. On the Lichens of the neighborhood of Prescott, C. W. By B. Billings, Jr., F. B. S. C. With specimens.

## REGULATIONS FOR THE EXCHANGE OF SPECIMENS.

The Laws of the Society provide for the formation of a public herbarium and the extension and improvement of private herbaria. In order to accomplish these important objects, arrangements have been made for receiving from members contributions of dried specimens of plants, and for supplying in return the desiderata of such members. The following Regulations have been framed for regulating the exchange of specimens.

1. The distribution of specimens shall be conducted by the Curators, and shall commence on the 15th November annually, before which time all contributions of specimens must be sent in by members who desire to participate in the distribution.

2. To entitle a Fellow or Subscriber to a share of the Society's duplicate specimens at any of the annual distributions, he shall have transmitted to the Society, before the 15th November, not less than 50 species of plants, with as many duplicate specimens of the rarer ones as possible.

3. All specimens contributed to the Society must be carefully prepared, by being pressed between sheets of paper in the usual manner, but not fastened down to paper in any way. Each specimen is to be accompanied by a label containing the name of the plant, together with the locality where collected, the date of collection, and the collector's name.

4. Universities and scientific societies forming herbaria and corresponding with the Botanical Society, will be permitted to take precedence of the members in the annual distributions. The Society's public herbarium will be invariably supplied with such specimens as may be required before any distributions take place.

5. Members are required to send, along with annual contributions of specimens, a list of those species which they desire to receive in return, or otherwise to specify, in sufficiently explicit terms, the nature of the plants wished for.

## DESCRIPTION OF THE CURCULIO, ITS MODE OF DESTROYING FRUIT, AND THE VARIOUS MEANS EMPLOYED TO CHECK ITS PROGRESS.

By Thomas Briggs, Jr., F. B. S. C.,
President of the Horticultural Society of Kingston.

*Read 14th June*, 1861.

The Curculio, or Plum Weevil, for the last few years has been very destructive to the fruit crop, more particularly the Plum, and as the season it makes its appearance is fast advancing, it may not be out of place at this meeting to give a brief description of the insect, its mode of destroying the fruit, and the various means which have been taken to check its progress. The Curculio is about one-fifth of an inch in length, very hard, of a dark brown color, varied with spots of lighter shades, behind its wings is a band of ochre yellow, thorax uneven and rough; it has a long curved throat with two fine pointed mandibles at the end of its snout with which it makes the crescent shaped ⌒ mark upon the plum or fruit, as shown by the accompanying drawing, it does not, however, confine itself to the Plum, but attacks the cherry, apple, pear and other fruits.

It makes its appearance in this locality in the latter part of May or early in June, and commences its work on the Plum about ten days after the blossoms have fallen or as soon as the fruit is set, and if allowed to continue its destruction in the fruit garden without interruption, will scarcely leave a Plum unmarked on any one tree: in the crescent shaped mark it deposits an egg, and in a few days after a worm or maggot appears therein, working its way into the core of the fruit; the effect caused by this worm or maggot in the Plum, is the dropping of the same before ripe, after which it passes into the ground, where it completes its transformation and is supposed by many to remain in the soil until the following Spring; others are of opinion that it brings forth two broods in one season, that is, the larva in the early fallen fruit soon becomes perfected, returns out of the soil and commences its destruction on apples, pears and other fruits. My own observations have satisfied me such is the case. During the early part of last summer I placed a Plum and a Curculio

under a glass; the second day the Curculio was allowed to pass out, first having marked the Plum in its usual way, the Plum was preserved under the glass: and in a few weeks a perfect Curculio made its appearance; the short period required from the time the egg is deposited in the fruit to the insect making its appearance in a proper state, affords ample time to produce two broods during the summer.

By cutting open some of the early fallen Plums in June or July, the larva of the Curculio will be found therein, in others it will have already passed from the fruit into the ground, where it completes its transformation in about three weeks. It is advisable, indeed, I may say necessary, in order to check the increase, and assist as far as possible the entire destruction of the insect, to cause all the fallen fruit to be picked up and destroyed by burning or some other sure mode of destruction, for such precautions, tend to lessen their appearance the following season, and might in time so far diminish their numbers as to prevent them from doing any material injury. If the fruit is allowed to remain on the ground the insect passes therefrom and continues to increase.

Various and numerous are the measures which have been tried to check the ravages of this fruit destroyer, some of which I may mention, as, by placing coops of chickens under or near the trees, so that they may eat the worms or grubs as they pass from the fruit, syringing the trees with tobacco water, soap suds, copperas water, lye, lime water, dusting the trees at the time they are in bloom, and when the fruit is forming, with ashes, lime, plaster, salt, sulphur, &c., &c.; paving under the trees with brick or stone, turning pigs into the enclosure to eat the fruit which drops from the trees, tying cotton coated with tar round the trunk of the trees so as to prevent the Curculio from passing up.

Many persons are of opinion it does not fly but crawls up the tree, this, however, is a mistaken idea. There is no doubt it flies, but not so readily as many other winged insects; about four years ago I tried the last mentioned means by having strips of cloth tied round all my Plum trees about one foot from the ground, a thick coat of tar put thereon, so as to prevent the Curculio or any other insect from passing over it; in addition to this, the trees were dusted with air slacked lime during the time they were in bloom, and repeated after every shower of rain until the fruit was set; this, however, did not prevent the Curculio from making its usual destruction; as it could not possibly pass the tarred cloth, I became convinced it was quite capable of using its wings; from this and other observations, I believe the Curculio is both migratory and gregarious.

I have tried all the foregoing means, except that of turning pigs into my premises, which are not adapted for such a trial. There is no doubt where pigs and poultry can be allowed to run the fruit garden, it would have a tendency to check the increase of the Curculio, in consequence of their eating all the fallen fruit containing the larva of the insect.

After my trial with the tar bands, without success, I visited the extensive nurseries of Messrs. Ellwanger & Barry, at Rochester, N. Y., where I witnessed their Plum trees heavily laden with fruit. Mr. Barry informed me they could only succeed in checking the ravages of the Curculio, and secure a sure crop of fruit, by jarring the trees daily, sweeping up and destroying all the Curculio and punctured fruit that might fall upon the ground.

The following season I adopted the same plan, the result was in securing a full crop of Plums. From two of my trees twenty-five bushels of ripe Plums were gathered, and all the others were equally full. I have since continued the same course yearly, with success, and believe it to be the only satisfactory remedy yet discovered; all others prove of little or no effect.

The proper time to commence jarring the trees is so soon as the blossoms have fallen and the fruit set, or there is evidence of the Curculio being at work by the crescent shape mark being visible upon the fruit; the plan is to spread sheets beneath the trees as far as the branches extend, take a slat about two feet long and four inches wide, wind round one end a few thicknesses of carpet or coarse cloth, so as to avoid injuring the bark, hold this against the body of the tree or a stump from which a limb has been cut, and strike it sharply with a heavy wooden mallet two or three times, which will cause the Curculio to drop upon the sheet, when it may be discovered; this requires to be done every morning for about two weeks, or until no Curculio's are to be found. Merely shaking the tree with the hand will not answer, it requires a quick sudden jar with the mallet to cause it to drop.

There are many things relative to the habits of this insect I have necessarily excluded, as I fear I have already trespassed upon your valuable time.

Kingston, C. W., April, 1861.

## LIST OF PLANTS OBSERVED GROWING PRINCIPALLY WITHIN FOUR MILES OF PRESCOTT, C. W., AND FOR THE MOST PART IN 1860.

By B. Billings, Jr., F. B. S. C.

*Read 28th March*, 1861.

The particular localities of rare plants and those not found within the limits indicated, are given below, but this was considered unnecessary with those represented as common. The list contains nearly all the species to be found here, from Ranunculaceæ to Lycopodiaceæ inclusive, but to enumerate the species of the remaining families, both time and attention will be required.

RANUNCULACEÆ.

*Clematis Virginiana*, L. Two miles from Prescott, near Ottawa and Prescott Railway. Abundant and rare in thickets northward to Chelsea.

*Anemone Virginiana*, L. Rocky wood-lands, near Brockville; thickets on Stewar property. Prescott, northward to Ottawa, rather rare.

*Anemone Pennsylvanica*, L. Common over the country.

*Hepatica triloba*, Chaix. Rocky wood-lands West of Brockville, not rare. Ottawa, Lot O., rare.

*Hepatica acutiloba*, DC. Common in woods.

*Thalictrum dioicum*, L. Common.

*Thalictrum Cornuti*, L. Common.

*Ranunculus aquatilis*, L., var. divaricatus. Conway's Creek, a mile West of Prescott and Railway Bay. Common.

*Ranunculus Purshii*, Richards. Conway's Creek.

*Ranunculus Flammula*, L., var. reptans. Dried up ponds near Fort Wellington, Prescott. Banks of St. Lawrence, west of Brockville, rare.

*Ranunculus abortivus*, L. Common.

*Ranunculus recurvatus*, Poir. Woods. Common.

*Ranunculus Pennsylvanicus*, L. Wastes. Common.

*Ranunculus repens*, L. Conway's Creek.

*Ranunculus acris*, L. Common.

*Caltha palustris*, L. Common.

*Coptis trifolia*, Salisb. Common.

*Aquilegia Canadensis*, L. Common.

*Delphinium Consolida*, L. Banks of the St. Lawrence, west of Prescott.

*Hydrastis Canadensis*, L. Mirivin's Woods, a mile west of Prescott; rare.

*Actæa spicata*, *Linn. var. rubra* as well as *alba* is very common in thickets.

MENISPERMACEÆ.

*Menispermum Canadense*, L. Common in woods; abundant near Ottawa.

BERBERIDACEÆ.

*Caulophyllum thalictroides*, Michx. Common in woods.

*Podophyllum peltatum*, L. Mirivin's Woods; rather rare.

NYMPHÆACEÆ.

*Nymphœa odorata*, Ait. Conway's Creek; common in rivers, &c., inland.

*Nuphar advena*, Ait. Conway's Creek, and with the last; common.

*Nuphar Kalmiana*, Pursh. Nation River, at the crossing of the Ottawa and Prescott Railway, nine miles from Prescott.

SARRACENIACEÆ.

*Sarracenia purpurea*, L. Marsh near Ottawa and Prescott Railway, four miles from Prescott. Heck's Mills, Augusta and northward; common.

PAPAVERACEÆ.

*Chelidonium majus*, L. DeSett's Woods, near Prescott.

*Sanguinaria Canadensis*, Rich Woods and northward ; common.

FUMARIACEÆ.

*Dicentra Cucullaria*, DC. Mirivin's Woods and northward to Ottawa ; common.

*Dicentra Canadensis*, DC. Mirivin's Woods, &c., and evidently more abundant than the last.

*Corydalis glauca*, Pursh. Exposed rocks, Brockville. Chelsea, C. E.

CRUCIFERÆ.

*Nasturtium palustre*, DC., var. hispidum. Common in moist places.

*Dentaria diphylla*, L. Rich woods ; abundant.

*Cardamine pratensis*, L. Near Ottawa and Prescott Railway, two miles from Prescott Station ; Dow's Swamp, three miles South of Ottawa.

*Cardamine hirsuta*, L. Very common in swamps.

*Turritis stricta*, Graham. Grand Trunk Railway Track near Prescott ; rare.

*Erysimum cheiranthoides*, L. Near Prescott Junction ; rare.

*Sisymbrium officinale*, Scop. Road sides common.

*Sisymbrium Sophia*, L. East Street, Prescott ; rare.

*Sinapis arvensis*, L. Extremely abundant in cultivated fields.

*Camelina sativa*, Crantz. Grank Trunk Railway Track.

*Lepidium Virginicum*, L. Wastes ; common.

*Capsella Bursa-pastoris*, Mœnch. Everywhere ; common.

*Thlaspi arvense*, L. West end of Dibble Street, in a field ; rare.

VIOLACEÆ.

*Viola blanda*, Willd. Very common.

*Viola cucullata*, Ait. Very common.

*Viola rostrata*, Pursh. Rather rare.

*Viola Muhlenbergii*, Torr. Common.

*Viola Canadensis*, L. Common.

*Viola pubescens*. Common.

CISTACEÆ.

*Lechea minor*, Lam. Rocky woodlands west of Brockville.

DROSERACEÆ.

*Drosera rotundifolia*, L. Marshes near Prescott Junction ; rare.

HYPERICACEÆ.

*Hypericum perforatum*, L. Very common.

*Hypericum corymbosum*, Muhl. Common.

*Hypericum mutilum*, L. Common.

*Hypericum Canadense*, L. Common.

*Elodea Virginica*, Nutt. Common in Swamps.

CARYOPHYLLACEÆ.

*Silene inflata*, Smith. Sandy field two miles west of Prescott ; rare.
*Silene antirrhina*, L. Grand Trunk Railway, two miles west of Prescott ; rare.
*Silene noctiflora*, L. Very common.
*Agrostemma Githago*, L. Common in grain fields throughout.
*Arenaria serpyllifolia*, L. Woods, fields and gardens ; common. (Ottawa).
*Stellaria media*, Smith. Very common.
*Stellaria longifolia*, Muhl. About Prescott Junction ; somewhat rare. Common towards Ottawa.
*Cerastium viscosum*, L. Everywhere common.

PORTULACCACEÆ.

*Claytonia Caroliniana*, L. Mirivin's Road and elsewhere ; common.

MALVACEÆ.

*Malva rotundifolia*, L. Road sides and waste places in abundance.
*Malva sylvestris*, L. Road sides ; rare.

TILIACEÆ.

*Tilia Americana*, L. Common.

LINACEÆ.

*Linum usitatissimum*, L. Grand Trunk Railway Track ; rare.

OXALIDACEÆ.

*Oxalis stricta*, L. Common.

GERANIACEÆ.

*Geranium maculatum*, L. Thickets about the Junction ; rather common.
*Geranium Robertianum*, L. Bank of Conway's Creek, a mile from Prescott.
*Geranium Carolinianum*, L.

BALSAMINACEÆ.

*Impatiens fulva*, Nutt. Common.

RUTACEÆ.

*Zanthoxylum, Americanum*, Mill. Near Maitland, rare ; Ottawa, common.

ANACARDIACEÆ.

*Rhus typhina*, L. Common.
*Rhus Toxicodendron*, L. Common.

VITACEÆ.

*Vitis cordifolia*, Michx. Common.
*Ampelopsis quinquefolia*, Michx. Common.

RHAMNACEÆ.

*Rhamnus alnifolius*, L'Her. Common in Swamps near Prescott Junction and northward.
*Ceanothus Americanus*, L. Extremely abundant in thickets near Grand Trunk Gravel Pit, three miles west of Prescott.

CELASTRACEÆ.

*Celastrus scandens*, L. Banks of Conway's Creek and in thickets ; common.

SAPINDACEÆ.

*Staphylea trifolia*, L. Thicket near Grand Trunk Gravel Pit, west of Prescott.

*Acer Pennsylvanicum*, L. Common.

*Acer spicatum*, Lam. Common.

*Acer saccharinum*, Wang. Common. A few trees of var. *nigrum*, are growing in Mirivin's Woods.

*Acer rubrum*, L. Common.

LEGUMINOSÆ.

*Trifolium arvense*, L. West slope of Conway's Creek, near Brockville Road.

*Trifolium pratense*, L. In cultivation and elsewhere ; common.

*Trifolium repens*, L. Common everywhere.

*Trifolium procumbens*, L. Waste places ; common.

*Melilotus alba*, Lam. Bank of the St. Lawrence, two miles from Prescott.

*Astragalus Canadensis*, L. Bank of the St. Lawrence, a mile west from Prescott. (Brockville in thickets westward.)

*Desmodium nudiflorum*, DC. Rare.

*Desmodium acuminatum*, DC. Common.

*Desmodium pauciflorum*, DC. Rare.

These three species grow in Mirivin's Woods.

*Desmodium Canadense*, DC. Rocky woodlands near Brockville ; common.

*Lespedeza hirta*, Ell.

*Lespedeza capitata*, Michx. With the last, near Grand Trunk Gravel Pit, west of Prescott, and westward along the banks of the St. Lawrence.

*Vicia sativa*, L. Clay banks east of Prescott.

*Vicia Cracca*, L. Fields and wastes ; common.

*Lathyrus palustris*, L. Common in marshes.

*Apios tuberosa*, Mœnch. Marsh near Blue Church, west of Prescott.

*Amphicarpœa monoica*, Nutt. Woods and thickets ; very common.

ROSACEÆ.

*Prunus Americana*, Marsh. In thickets ; everywhere, common.

*Prunus Pennsylvanica*, L. Common.

*Prunus Virginiana*, L. Common.

*Prunus serotina*, Ehrhart. Common.

*Spiræa salicifolia*, L. Common.

*Spiræa tomentosa*, L. Common.

*Agrimonia Eupatoria*, L. Common.

*Geum album*, Gmelin. Common.

*Geum strictum*, Ait. Common.

*Geum rivale*, L. Dr. Jessup's Swamp ; abundant, but not often met with.
*Waldsteinia fragarioides*, Tratt. Common.
*Potentilla Norvegica*, L. Fields and road sides. Common.
*Potentilla Canadensis*, L. Banks of Conway's Creek, near Grand Trunk Railway.
*Potentilla anserina*, L. Everywhere common.
*Potentilla palustris*, L. Marshes north of Junction.
*Fragaria Virginiana*, Ehrhart. Common.
*Fragaria vesca*, L. Mirivin's Woods. Common.
*Rubus odoratus*, L. Common.
*Rubus triflorus*, Richardson. Common.
*Rubus strigosus*, Michx. Common.
*Rubus occidentalis*, L. Common.
*Rubus villosus*, Ait. Common.
*Rubus hispidus*, L. Woods north of Prescott Junction ; rare.
*Rosa lucida*, Ehrhart. Thicket south of Junction.
*Rosa blanda*, Ait. Very common.
*Cratægus Oxycantha*, L. Near the bank of the St. Lawrence, two miles west of Brockville.
*Cratægus coccinea*, L.
*Cratægus tomentosa*, L. Growing with the last near the Pine Grove N. of Prescott.
*Pyrus arbutifolia*, L. By the side of Grand Trunk Railway near Junction Switch.
*Pyrus Americana*, DC. In a swamp four miles north of Prescott near Ottawa and Prescott Railway. (Near Heck's Mills, Augusta). (Blue Swamp Nepeon), &c.
*Amelanchier Canadensis*, Torr. and Gr. Very common, northward to Ottawa.

LYTHRACEÆ.

*Nesæa verticillata*, H. B. K. In a marshy little bay on the banks of the St. Lawrence, a mile west of Brockville. Banks of the Rideau, near Ottawa.

ONAGRACEÆ.

*Epilobium angustifolium*, L. Common in moist grounds.
*Epilobium palustre*, L. var. lineare. In swamps about Prescott and northward ; common.
*Epilobium coloratum*, Muhl. Common.
*Œnothera biennis*, L.
*Ludwigia palustris*, Ell. Conway's Creek, abundant, and elsewhere in Swamps, common.
*Circæa Lutetiana*, L. Mirivin's Woods ; common.
*Circæa alpina*, L. Moist woods and fields ; extremely abundant.
*Proserpinaca palustris*, L. Marshy bank of the Nation River at the crossing of the Ottawa and Prescott Railway.

*Myriophyllum spicatum*, L. St. Lawrence River; common.
*Hippuris vulgaris*, L. Marshy Bank of the St. Lawrence, three miles east of Prescott; abundant.

GROSSULACEÆ.

*Ribes Cynosbati*, L. Common.
*Ribes rotundifolium*, Michx. Common.
*Ribes lacustre*, Poir. Common.
*Ribes prostratum*, L'Her. Rocks west of Brockville. (Chelsea, C. E).
*Ribes floridum*, L. Common.

CRASSULACEÆ.

*Sedum acre*, L. Rocks near First Toll Gate west of Prescott; and abundant upon rocks a mile west of Brockville, near the River.
*Penthorum sedoides*, L. Common.

SAXIFRAGACEÆ.

*Saxifraga Virginiensis*, Michx. Wind Mill Point west of Prescott; and abundant in rocky wood-lands near Brockville.
*Mitella diphylla*, L. Common in woods.
*Mitella nuda*, L. Rather rare in moist woods, and occasionally met with in open situations.
*Tiarella cordifolia*, L. Woods; common.
*Chrysosplenium Americanum*, Schwein. Bottoms of wood-land rills and wet places in swamps.

HAMAMELACEÆ.

*Hamamelis Virginica*, L. Thickets around Prescott Junction.

UMBELLIFERÆ.

*Hydrocotyle Americana*, L. Moist woods; common.
*Sanicula Marylandica*, L. Woods and thickets; common.
*Daucus Carota*, L. Wastes around Grand Trunk Gravel Pit.
*Heracleum lanatum*, Michx. A mile west of Brockville, on the Bank of the St. Lawrence.
*Pastinaca sativa*, L. Road sides and along fences; common.
*Thaspium aureum*, Nutt. Banks of Conway's Creek; rare.
*Zizia integerrima*, DC. East Bank of Conway's Creek, a mile from Prescott.
*Cicuta maculata*, L. Swamps; common.
*Cicuta bulbifera*, L. Swamps; common.
*Sium lineare*, Michx. Swamps; common.
*Cryptotœnia Canadensis*, DC. Mirivin's Wood; not rare.
*Osmorrhiza longistylis*, L. Fence-row, Wind Mill Point.
*Osmorrhiza brevistylis*, DC. Common in woods.

ARALIACEÆ.

*Aralia racemosa*, L. Common in rich woods.
*Aralia hispida*, Michx. Sand-banks north-west of Prescott.
*Aralia nudicaulis*, L. Very common in rich woods.
*Aralia quinquefolia*. Mirwin's woods; rare.
*Aralia trifolia*. Woods and thickets; very common.

CORNACEÆ.

*Cornus Canadensis*, L. Very common.
*Cornus circinata*, L'Her. Thickets around Grand Trunk Gravel Pit.
*Cornus stolonifera*, Michx. Conway's Creek, banks of streams inland and swamps; very common.
*Cornus paniculata*, Michx. Thickets near Grand Trunk Gravel Pit; not rare.
*Cornus alternifolia*, L. Thickets near the Junction; not common.

CAPRIFOLIACEÆ.

*Linnæa borealis*, Gronov. Swamps; very common.
*Symphoricarpus racemosus*, Michx. Abundant in thickets near Grand Trunk Gravel Pit.
*Lonicera parviflora*, Lam. Hedgerows; rare.
*Lonicera ciliata*, Muhl. Woods; common.
*Lonicera oblongifolia*, Muhl. Bay near Heck's Mills.
*Diervilla trifida*, Mœnch. Thickets around Grand Trunk Railway Gravel Pit; abundant. Ottawa. Chelsea, C. E.
*Triosteum perfoliatum*, L. Thickets two miles west of Prescott. Chelsea, C. E.
*Sambucus Canadensis*, L. Common and abundant northward.
*Sambucus pubens*, Michx. Everywhere common.
*Viburnum nudum*, L. Thickets around Prescott Junction and moist woods; not common.
*Viburnum Lentago*, L. Thickets near the Junction. Banks of streams inland and northward; common.
*Viburnum dentatum*, L. Woods north of Junction; rather rare.
*Viburnum pubescens*, Pursh. Thickets, Grand Trunk Railway Gravel Pit.
*Viburnum acerifolium*, L. Mirwin's woods; common.
*Viburnum Opulus*, L. Banks of streams; common.
*Viburnum lantanoides*, Michx. Thickets and woods near Prescott Junction.

RUBIACEÆ.

*Galium asprellum*, Michx. Thickets north of Junction; not common.
*Galium trifidum*, L. Very common in swamps.
*Galium triflorum*, Michx. Mirwin's woods.
*Galium circæzans*, Michx. Mirwin's woods.
*Galium lanceolatum*, Torr. Mirwin's woods.

*Galium boreale*, L. Rocky wood-lands near Brockville; rare.
*Cephalanthus occidentalis*, L. Marsh south of Prescott Junction, northward to Ottawa, in swamps.
*Mitchella repens*, L. Common.

DIPSACEÆ.

*Scabiosa atropurpurea*, L. Grassy bank of Railroad, bay east of Prescott.

COMPOSITÆ.

*Eupatorium purpureum*, L. Marshy wet places around the Junction and northward, very common.
*Eupatorium perfoliatum*, L. Swamps; common.
*Eupatorium ageratoides*, L. Woods; common.
*Aster macrophyllus*, L. Abundant in thickets.
*Aster cordifolius*, L. Abundant in thickets.
*Aster miser*, L. Everywhere; common.
*Aster tenuifolius*, L. Swamps; common.
*Aster puniceus*, L. Swamps; common.
*Aster Novæ-Angliæ*, L. Thickets around Prescott Junction; rare.
*Aster acuminatus*, Michx. Woods and thickets west of Junction; rather rare.
*Erigeron Canadense*, L. Borders of woods; common.
*Erigeron Philadelphicum*, L. Swamps and moist grounds; common.
*Erigeron annuum*, Pers. Fields; very common.
*Erigeron strigosum*, Muhl. Fields; very common.
*Diplopappus umbellatus*, Torr & Gr. Thickets west of Brockville a mile.
*Solidago squarrosa*, Muhl. Rocky wood-lands near Brockville.
*Solidago bicolor*, L. Thickets east and west of Prescott.
*Solidago latifolia*, L. Rich woods two miles west of Prescott; abundant.
*Solidago cæsia*, L. Mirwin's woods; abundant.
*Solidago arguta*, Ait. Marsh four miles north of Prescott, near Ottawa and Prescott Railway? Oswegatchie, near Ogdensburgh! and Chelsea, C. E.!
*Solidago altissima*, L. Very common.
*Solidago nemoralis*, Ait. Field near Fort Wellington.
*Solidago Canadensis*, L. Very common.
*Solidago serotina*, Ait. Rather rare.
*Solidago lanceolata*, L. Common in moist places along the Grand Trunk Railway.
*Inula Helenium*, L. Dr. Jessup's swamp, northward; common. At Heck's corners, Township of Mountain, covering several acres of ground.
*Ambrosia artemisiæfolia*, L. South end of East Street, not seen elsewhere.
*Xanthium Strumarium*, L. Mirwin's side road, a mile from toll gate.
*Rudbeckia laciniata*, L. Wet ground near Blue Church, and thickets west of Brockville; rare.

*Helianthus divaricatus*, L. Thickets near Grand Trunk Railway Gravel Pit, and northward to Chelsea, C. E.

*Helianthus decapetalus*, L. Grows with the last, and both common.

*Bidens frondosa*, L. Waste places; common.

*Bidens connata*, Muhl. Wet grounds; common.

*Bidens cernua*, L. Wet grounds; common.

*Bidens Beckii*, Torr. Railway Bay near Prescott. Doxey's Bay, Rideau River, 4 miles from Ottawa, abundant.

*Maruta Cotula*, DC. Waste places, very common.

*Achillea Millefolium*, L. Everywhere, common.

*Tanacetum vulgare*, L. Roadsides; common.

*Artemisia vulgaris*, L. Grand Trunk Station, Prescott. Gilmour's Mills near Chelsea, C. E.

*Gnaphalium decurrens*, Ives. Common.

*Gnaphalium uliginosum*, L. Common.

*Antennaria margaritacea*, R. Brown. Very common.

*Antennaria plantaginifolia*, Hook. Common.

*Erechthites hieracifolia*, Raf. Common.

*Centaurea cyanus*, L. Cultivated grounds and roadsides; common.

*Cirsium lanceolatum*, Scop. Common.

*Cirsium discolor*, Spreng. Bank of the St. Lawrence River, three miles west of Prescott.

*Cirsium arvense*, Scop. Very common.

*Lappa major*, Gærtn. Common.

*Hieracium Canadense*, Michx.

*Hieracium scabrum*, Michx. Both species in thickets around Prescott.

*Nabalus albus*, Hook. Banks of Conway's Creek and wastes around Grand Trunk Railway Gravel Pit, west of Prescott.

*Nabalus altissimus*, Hook. Moist woods; common.

*Taraxacum Dens-leonis*, Desf. Very common.

*Lactuca elongata*, Muhl. Common.

*Sonchus oleraceus*, L. Common.

*Sonchus asper*, Vill. Common.

LOBELIACEÆ.

*Lobelia cardinalis*, L. Conway's Creek; northward to Ottawa.

*Lobelia syphilitica*, L. Moist grounds east of Prescott, and abundant a mile west of Brockville, on the bank of the St. Lawrence.

*Lobelia inflata*, L. Very common.

*Lobelia Kalmii*, L. Moist grounds on the sides of the road to Brockville, two miles from Prescott.

CAMPANULACEÆ.

*Campanula aparinoides*, Pursh. Common in swamps.

ERICACEÆ.

*Gaylussacia resinosa*, Torr & Gr. Rocky wood-lands west of Brockville, upon an out-crop of Potsdam sandstone, township of Oxford and northward.

*Vaccinium macrocarpum*, Ait. Marsh near Prescott Station, and common in bogs over the country.

*Vaccinium Pennsylvanicum*, Lam. Common in woods and thickets.

*Vaccinium Canadense*, Kalm. Moist thickets near the Junction; rather rare.

*Vaccinium corymbosum*, L. Swamps; common.

*Chiogenes hispidula*, Torr & Gr. In bogs; common.

*Arctostaphylos Uva-ursi*, Spreng. Rocky banks of the St. Lawrence west of Brockville; rare.

*Gaultheria procumbens*, L. Common.

*Cassandra calyculata*, Don. Swamp near Heck's Mills, Augusta.

*Kalmia glauca*, Ait. Same locality as last.

*Kalmia angustifolia*, L. West Augusta. (Collected by Mr. P. Byrne.)

*Ledum latifolium*, Ait. Swamp near Junction, and common in bogs towards Ottawa.

*Pyrola rotundifolia*, L. In woods; rather rare.

*Pyrola elliptica*, Nutt. Woods; common.

*Pyrola chlorantha*, Swartz. Woods; rare.

*Pyrola secunda*, L. Woods; common.

*Moneses uniflora*, Woods; not common. Mirwin's woods, and Pine Grove near the Junction.

*Chimaphila umbellata*, Nutt. Hemlock woods around Prescott; common.

*Monotropa uniflora*, L. Mirwin's woods, &c.; common.

AQUIFOLIACEÆ.

*Ilex verticillata*, Gray. Moist thickets near Prescott Junction, and in swamps; common.

*Nemopanthes Canadensis*, DC. Moist grounds near the Junction; rare.

PLANTAGINACEÆ.

*Plantago major*, L. Common.

*Plantago lanceolata*, L. Rare.

PRIMULACEÆ.

*Trientalis Americana*, Pursh. Woods and thickets; common.

*Lysimachia stricta*, Ait. Swampy places; common.

*Lysimachia ciliata*, L. Swampy places; common.

*Naumburgia thyrsiflora*, Reichenb. Moist grounds near the Junction.

LENTIBULACEÆ.

*Utricularia vulgaris*, L. Conway's Creek.

OROBANCHACEÆ.

*Epiphegus Virginiana*, Bart. Mirwin's woods; common.

*Conopholis Americana*, Wallroth. Thicket north of Grand Trunk Gravel Pit; rare.

SCROPHULARIACEÆ.

*Verbascum Thapsus*, L. Common.

*Verbascum Lychnites*, L. West Augusta. (Mr. P. Byrne.)

*Linaria vulgaris*, Mill; road-sides; common.

*Chelone glabra*, L. Swamps; common.

*Mimulus ringens*, L. Wet places; common.

*Ilysanthes gratioloides*, Benth. Marsh near the Junction. Ottawa.

*Veronica Anagallis*, L. Wet places; common.

*Veronica Americana*, Sweinitz. Wet places; common.

*Veronica scutellata*, L. Wet places; common.

*Veronica serpyllifolia*, L. Everywhere common.

*Veronica peregrina*, L. Sides of ditches on Grand Trunk Railway a mile west of Prescott; rare.

*Veronica arvensis*, L. Mirwin's wood; rare.

*Pedicularis Canadensis*, L. Extremely abundant in wood-lands north of Grand Trunk Railway.

*Melampyrum Americanum*, Michx. Same locality as last, common.

*Scrophularia nodosa*, L. Common.

VERBENACEÆ.

*Verbena hastata*, L. Common.

*Verbena urticæfolia*, L. Less common than the last.

*Phryma Leptostachya*, L. Mirwin's woods; common.

LABIATÆ.

*Teucrium Canadense*, L. Conway's creek at the crossing of the Brockville road.

*Mentha Canadensis*, L. Abundant along Conway's Creek, and common elsewhere; the var. glabrata of this species is most frequent.

*Lycopus Europœus*, L. Moist thickets; common.

*Hedeoma pulegioides*, Pers. Road-side two miles from Mirwin's, north-west.

*Monarda fistulosa*, L. Bank of the St. Lawrence River half a mile west from Prescott, and over the country; rather rare.

*Nepeta Cataria*, L. Common.

*Prunella vulgaris*, L. Everywhere common.

*Scutellaria galericulata*, L. Swampy places; common.

*Scutellaria lateriflora*, L. Swampy places; common.

*Galeopsis Tetrahit*, L. Everywhere common.

*Stachys palustris*, L. Banks of Conway's creek, and adjoining fields; somewhat rare.

*Leonurus Cardiaca*, L. Common.

*Lamium amplexicaule*, L. Shelving clay banks of the St. Lawrence, a mile west of Prescott.

BORAGINACEÆ.

*Echium vulgare*, L. Road-sides; common and abundant upon sandbanks a few miles north-west from Prescott.

*Lithospermum arvense*, L. Cultivated fields; rare.

*Lithospermum officinale*, L. Waste places; common.

*Echinospermum Lappula*, L. Common.

*Cynoglossum officinale*, L. Common.

*Cynoglossum Morisonii*, DC. Mirwin's woods, and in thickets; rather rare.

HYDROPHYLLACEÆ.

*Hydrophyllum Virginicum*, L. Mirwin's woods; not common.

POLEMONIACEÆ.

*Phlox divaricata*, L. Rocky wood-lands west of Brockville; abundant.

CONVOLVULACEÆ.

*Convolvulus arvensis*, L. Bank of the St. Lawrence a mile west of Prescott.

*Calystegia sepium*, R. Br. Clay bank near Prescott, Ottawa and Prescott Railway Depot. Bank of Rideau River three miles from Ottawa.

*Calystegia spithamæa*, Pursh. Grand Trunk Gravel Pit west of Prescott.

SOLANACEÆ.

*Solanum Dulcamara*, L. Road-sides; rare, northward to Ottawa.

*Solanum nigrum*, L. Common.

*Nicandra physaloides*, Gærtn. Occasionally met with in cultivated grounds.

*Hyoscyamus niger*, L. Road-sides; common.

*Datura Stramonium*, L. Road-sides; common.

GENTIANACEÆ.

*Gentiana Andrewsii*, Griseb. Low banks of the Nation River at the crossing of the Railway. Banks of the Rideau near Kemptville.

*Menyanthes trifoliata*, L. Bay west of the Junction and northward; common.

APOCYNACEÆ.

*Apocynum androsæmifolium*, L. Common.

*Apocynum cannabinum*, L.

ASCLEPIADACEÆ.

*Asclepias Cornuti*, Decaisne. Common.

*Asclepias phytolaccoides*, Pursh. Rather rare.

*Asclepias incarnata*, L. Conway's Creek; common.

OLEACEÆ.

*Fraxinus Americana*, L. Woods; not common.

*Fraxinus pubescens*, Lam. Woods; not common.

*Fraxinus sambucifolia*, Lam. Common upon low land.

ARISTOLOCHIACEÆ.

*Asarum Canadense*, L. Common in rich woods.

PHYTOLACCACEÆ.

*Phytolacca decandra*, L. Hulbert's lot west of Prescott, (Dr. Easton). Brockville; rare.

CHENOPODIACEÆ.

*Chenopodium hybridum*, L. Common.

*Chenopodium album*, L. Everywhere common.

*Chenopodium Botrys*, L. Grand Trunk Station, Prescott.

*Blitum capitatum*, L. Waste places; common.

AMARANTACEÆ.

*Amarantus hybridus*, L. Very common.

*Amarantus albus*, L. Road-sides; rather rare.

POLYGONACEÆ.

*Polygonum amphibium*, L., var. terrestre. Moist grounds north of Junction freight house, and var. aquaticum, abundant in the Nation River at the Railway crossing.

*Polygonum nodosum*, Pers. var. incarnatum. Waste places; common.

*Polygonum Pennsylvanicum*, L. Common.

*Polygonum Persicaria*, L. Common.

*Polygonum Hydropiper*, L. Very common.

*Polygonum acre*, H. B. K. Abundant along Conway's Creek.

*Polygonum hydropiperoides*, Michx. Marshy banks of the Nation at Railway crossing.

*Polygonum aviculare*, L. Everywhere; common.

*Polygonum tenue*, Michx. Rocky bank of the St. Lawrence two miles west of Brockville.

*Polygonum sagittatum*, L. Woods east of Junction freight house. Low grounds west of Brockville; rare.

*Polygonum Convolvulus*, L. Very common.

*Polygonum cilinode*, Michx. Pine grove south of Junction. Abundant climbing among rocks, west of Brockville; common northward.

*Fayopyrum esculentum*, Mœnch. Borders of woods, thickets, &c.; common.

*Rumex verticillatus*, L. Along the banks of streams inland and northward; Common.

*Rumex Hydrolapathum*, Hudson, var. ? *Americanum*. Conway's Creek, and wet places; rare.

*Rumex crispus*, L. Everywhere common.

*Rumex Acetosella*, L. Very common.

THYMELEACEÆ.

*Dirca palustris*, L. Woods and thickets; common.

ELÆAGNACEÆ.

*Shepherdia Canadensis*, Nutt. Rocky banks of the St. Lawrence, west of Brockville.

SANTALACEÆ.

*Comandra umbellata*, Nutt. Pine Grove south of Junction, and abundant in thickets around Grand Trunk Gravel Pit.

CERATOPHYLLACEÆ.

*Ceratophyllum demersum*, L. St. Lawrence; common.

CALLITRICHACEÆ.

*Callitriche verna*, L. Conway's Creek; common.

*Callitriche autumnalis*, L.? Railroad Bay.

EUPHORBIACEÆ.

*Euphorbia maculata*, L. Hard soil; common.

*Euphorbia Helioscopia*, L. Road-sides; common.

*Euphorbia obtusata*, Pursh. Road-sides; common.

*Acalypha Virginica*, L. Road-sides; rare.

URTICACEÆ.

*Ulmus fulva*, Michx. Woods and thickets; common.

*Ulmus Americana*, L. Very common.

*Ulmus racemosa*, L. Woods; somewhat rare.

*Celtis occidentalis*, L. Occurs northward upon the tributaries of the Ottawa, but not seen here.

*Urtica gracilis*, Ait. Common.

*Laportea Canadensis*, Gaudich. Common.

*Pilea pumila*. Common.

*Bœhmeria cylindrica*, Willd. Common.

*Cannabis sativa*, L. Common.

JUGLANDACEÆ.

*Juglans cinerea*, L. Everywhere common.

*Carya alba*, Nutt. Common, but not inland.

*Carya amara*, Nutt. Common over the country.

CUPULIFERÆ.

*Quercus macrocarpa*, Michx. Common.

*Quercus alba*, L. Less common than the last.

*Quercus rubra*, L. Common.

*Fagus ferruginea*, Ait. Very common.

*Corylus rostrata*, Ait. Common.

*Carpinus Americana*, Michx. Common.

*Ostrya Virginica*, Willd. Common.

MYRICACEÆ.

*Myrica Gale*, L. Banks of the St. Lawrence west of Brockville. Banks of the Gatineau near Chelsea, C. E.

*Comptonia asplenifolia*, Ait. Thickets around Grand Trunk Gravel Pit.

BETULACEÆ.

*Betula papyracea*, Ait. Common.

*Betula excelsa*, Ait. Common.

*Betula pumila*, L. Swamp near Heck's Mills, Augusta.

*Alnus incana*, Willd. Common.

SALICACEÆ.

*Salix candida*, Willd. Marsh near the Junction.

*Salix discolor*, Muhl. Very common.

*Salix petiolaris*, Smith? Very common.

*Salix cordata*, Muhl. Banks of streams inland; rather rare.

*Salix rostrata*, Richardson. Common.

*Salix nigra*, Marshall. Common.

*Salix lucida*, Muhl. Common.

*Salix pedicellaris*, Pursh. Marsh near Prescott Junction.

*Populus tremuloides*, Michx. Common.

*Populus grandidentata*, Michx. Common.

*Populus balsamifera*, L. Common.

CONIFERÆ.

*Pinus resinosa*, Ait. Rocky banks of the St. Lawrence west of Brockville.

*Pinus Strobus*, L. Everywhere common.

*Abies balsamea*, Marshall. Common.

*Abies Canadensis*, Michx. Common.

*Abies alba*, Michx. Rather rare, but more common towards the Ottawa.

*Larix Americana*, Michx. Very common.

*Thuja occidentalis*, L. Very common.

*Juniperus communis*, L. Extremely abundant, growing upon rocks west of Brockville, and northward sparingly.

*Taxus baccata*, L., var Canadensis. Common.

ARACEÆ.

*Arisæma triphyllum*, Torr. Very common.

*Calla palustris*, L. Very common.

*Acorus Calamus*, L. Conway's Creek, and margin of St. Lawrence River; common.

TYPHACEÆ.

*Typha latifolia*, L. Very common.

*Sparganium ramosum*, Hudson. Moist grounds near the Junction; common elsewhere.

*Sparganium simplex*, Hudson. Conway's creek, &c.; common.

LEMNACEÆ.

*Lemna trisulca*, L. Conway's creek, &c.; common.
*Lemna minor*, L. Conway's creek, &c.; common.
*Lemna polyrrhiza*, L. Conway's creek, &c.; common.

NAIADACEÆ.

*Potamogeton pectinatus*, L. St. Lawrence River, Conway's creek, &c.; common in streams inland.
*Potamogeton pusillus*, L. Conway's creek, &c.; common in streams inland.
*Potamogeton compressus*, L. St. Lawrence River, &c.; common.
*Potamogeton lucens*, L. St. Lawrence; common.
*Potamogeton natans*, L. Railroad Bay.
*Potamogeton heterophyllus*, Schreber. Nation River.

ALISMACEÆ.

*Scheuchzeria palustris*, L. Marsh near the Junction; rare.
*Alisma Plantago*, L., var. Americanum. Common.
*Sagittaria variabilis*, Engelm. Very common.

HYDROCHARIDACEÆ.

*Anacharis Canadensis*, Planchon. St. Lawrence, and everywhere common in streams inland and northward.
*Vallisneria spiralis*, L. Same localities as last, but less common.

ORCHIDACEÆ.

*Orchis spectabilis*, L. Mirwin's woods and elsewhere; common.
*Platanthera Hookeri*, Lindl. Moist thickets west of Prescott Junction; rare.
*Platanthera bracteata*, Torr. Same locality; rare.
*Platanthera hyperborea*, Lindl. Same locality; rare.
*Platanthera psycodes*, Gray. Common.
*Goodyeria pubescens*, R. Brown. Woods north of Prescott Junction; rare.
*Spiranthes gracilis*, Bigelow. Rocky wood-lands west of Brockville; rare.
*Spiranthes cernua*, Richard. Moist grounds west of Prescott; common.
*Calopogon pulchellus*, R. Brown. Bay west of the Junction; rare.
*Corallorhiza innata*, R. Brown. Woods east of Junction; rare.
*Corallorhiza multiflora*, Nutt. Woods; common.
*Aplectrum hyemale*, Nutt. Mirwin's woods.
*Cypripedium parviflorum*, Salisb. Cedar swamp north-west of Prescott; rare.
*Cypripedium spectabile*, Swartz. Swamp near Heck's Mills, Augusta, and common in bogs northward.
*Cypripedium acaule*, Ait. Swamp near Heck's Mills.

IRIDACEÆ.

*Iris versicolor*, L. Very common.

*Sisyrinchium Bermudiana*, L. Moist grassy places; common.

SMILACEÆ.

*Smilax herbacea*, L. Thickets around Prescott and northward; common.
*Trillium erectum*, L. Common.
*Trillium grandiflorum*, Salisb. Very common.
*Trillium erythrocarpum*, Michx. Somewhat rare.
*Medeola Virginica*, L. Woods; common.

LILIACEÆ.

*Polygonatum biflorum*, Ell. Common.
*Smilacina racemosa*, Desf. Common.
*Smilacina stellata*, Desf. Rare.
*Smilacina bifolia*, Ker. Common.
*Smilacina trifolia*, Desf. Swamp north of Prescott.
*Clintonia borealis*, Raf. Somewhat common.
*Allium tricoccum*, Ait. Common.
*Lilium Philadelphicum*, L. Thickets near Grand Trunk Gravel Pit.
*Erythronium Americanum*, Smith. Common.

MELANTHACEÆ.

*Uvularia perfoliata*, L. Mirwin's woods, and elsewhere; common.
*Uvularia sessilifolia*, L. Mirwin's woods.
*Streptopus roseus*, Michx. Common.

JUNCACEÆ.

*Luzula pilosa*, Willd. Thicket a mile west of Prescott.
*Luzula campestris*, DC. Same place.
*Juncus effusus*, L. Very common.
*Juncus Balticus*, Willd. Rare.
*Juncus articulatus*, L. Common.
*Juncus nodosus*, L. Common.
*Juncus tenuis*, Willd. Very common.
*Juncus bufonius*, L. Very common.

PONTEDERIACEÆ.

*Pontederia cordata*, L. In streams inland and northward; very common.

CYPERACEÆ.

*Cyperus diandrus*, Torr. Common.
*Cyperus strigosus*, L. In a little marsh on the banks of the St. Lawrence, a mile west of Brockville.
*Dulichium spathaceum*, Pers. Common in swampy grounds.
*Eleocharis obtusa* Schultes. Common.
*Eleocharis palustris*, R. Brown. Common.
*Eleocharis compressa*, Sullivant. Barren fields north of Fort Wellington.

*Eleocharis acicularis*, R. Brown. Common.
*Scirpus pungens*, Vahl. Bank of St. Lawrence three miles west of Prescott. Banks of Rideau River near Ottawa.
*Scirpus lacustris*, L. Common.
*Scirpus sylvaticus*, L. Common.
*Scirpus Eriophorum*, Michx. Common.
*Eriophorum Virginicum*, L. Marsh west of Prescott Junction, &c.
*Eriophorum polystachon*, L. Dr. Jessup's swamp, and common northward.
*Eriophorum gracile*, L. Grows with the last.
*Carex polytrichoides*, Muhl. Low grounds ; common.
" *Backii*, Boott. Mirwin's woods ; rare.
" *bromoides*, Schk. Common in swamps.
" *siccata*, Dew. Grand Trunk Gravel Pit. Rocky wood-lands west of Brockville.
" *teretiuscula*, Good. Common.
" *vulpinoidea*, Michx. Common.
" *stipata*, Muhl. Common.
" *sparganioides*, Muhl. Mirwin's woods, and in fields ; not common.
" *rosea*, Schk. Common.
" *trisperma*, Dew. Common.
" *chordorhiza*, Ehrh. Marsh near the Junction.
" *canescens*, L. Common.
" *Deweyana*, Schw. Common.
" *stellulata*, Good. Very common.
" *sychnocephala*, Carey. Near freight house, Prescott Junction.
" *scoparia*, Schk. Common.
" *lagopodioides*, Schk. Common.
" *festucacea*, Schk., var. mirabilis ; common.
" *stricta*, Lam. Common.
" *crinita*, Lam. Common.
" *irrigua*, Smith. Swamp near Heck's Mills.
" *aurea*, Nutt. Field near Fort Wellington.
" *Crawei*, Dew. Field near Fort Wellington.
" *granularis*, Muhl. Everywhere common.
" *gracillima*, Schw. Common.
" *plantaginea*, Lam. Mirwin's woods, &c. ; common.
" *laxiflora*, Lam. Common.
" *pedunculata*, Muhl. Mirwin's woods.
" *Novæ-Angliæ*, Schw. Rocky wood-lands west of Brockville.
" *Pennsylvanica*, Lam. Common.

*Carex varia*, Muhl. Common.
" *pubescens*, Muhl. Rather rare.
" *Œderi*, Ehrh. Near Fort Wellington.
" *filiformis*, L. Marsh west of Junction.
" *lanuginosa*, Michx. Wet grounds near Junction.
" *aristata*, R. Brown. Wet grounds near the Ottawa and Prescott Railway, north of Junction.
" *comosa*, Boott. Wet grounds; common.
" *Pseudo-Cyperus*, L. Wet grounds around the Junction.
" *hystricina*, Willd. Very common.
" *intumescens*, Rudge. Woods; common.
" *lupulina*, Muhl. Very common.
" *retrorsa*, Schw. Very common.
" *ampullacea*, Good. Conway's creek; abundant.
" *cylindrica*, Schw. Wet grounds; not rare.

GRAMINEÆ.

*Leersia oryzoides*, Swartz. Conway's creek, &c.; common.
*Alopecurus geniculatus*, L. Common.
*Phleum pratense*, L. Everywhere common.
*Agrostis scabra*, Willd. Common.
*Agrostis alba*, L. Common.
*Ginna arundinacea*, L. Banks of Nation River, near Railway crossing, and northward; rare.
*Muhlenbergia glomerata*, Trin. Marsh near the Junction. Chelsea, C. E.
*Muhlenbergia Mexicana*, Trin. Near Prescott Junction, also near Ottawa.
*Brachyelytrum aristatum*, Beauv. Woods west of Prescott. Chelsea, C. E.
*Calamagrostis Canadensis*, Beauv. Swamps north-west of Prescott Junction; rare.
*Oryzopsis melanocarpa*, Muhl. Mirwin's woods, &c.; common.
*Oryzopsis asperifolia*, Michx. Mirwin's woods, &c.; common.
*Oryzopsis Canadensis*, Torr. Rocky wood-lands west of Brockville; rare.
*Eatonia Pennsylvanica*. Wastes near Grand Trunk Gravel Pit; rare.
*Glyceria Canadensis*, Trin. Wet grounds near Prescott Junction. Chelsea, C. E.
*Glyceria nervata*, Trin. Common.
*Glyceria aquatica*, Smith. Ravine near Fort Wellington; not frequent.
*Glyceria fluitans*, R. Brown. Wet grounds around Prescott Junction; common.
*Poa annua*, L. Common.
*Poa debilis*, Torr. Mirwin's woods; rare.
*Poa serotina*, Ehrhart. Common.
*Poa pratensis*, L. Everywhere common.
*Poa compressa*, L. Common.

*Festuca nutans*, Willd. Mirwin's woods; rare.
*Bromus secalinus*, L. Common.
*Bromus Kalmii.* Rocky wood-lands west of Brockville.
*Bromus ciliatus*, L. Bank of St. Lawrence a mile west of Brockville; rare.
*Phragmites communis*, Trin. On the side of Ottawa and Prescott Railway, four miles from Prescott. Railway bridge, Ottawa.
*Triticum repens*, L. Common.
*Gymnostichum Hystrix*, Schreb. Common.
*Aira flexuosa*, L. Pine grove two miles west of Prescott.
*Danthonia spicata*, Beauv. With the last and elsewhere; common.
*Avena striata*, Michx. Mirwin's woods; rather rare.
*Phalaris arundinacea*, L. Swamps; common.
*Phalaris Canariensis*, L. Waste places near the town; rare.
*Milium effusum*, L. Woods; common.
*Panicum glabrum*, Gaudin. Bed of Railway track two miles west of Prescott, and sandy fields; rare.
*Panicum capillare*, L. Common.
*Panicum latifolium*, L. Wastes around Grand Trunk Gravel Pit, abundant, and elsewhere, not frequent.
*Panicum xanthophysum*, Gray. Grows with the last; not common.
*Panicum dichotomum*, L. Thickets; not common.
*Panicum depauperatum*, Muhl. Common in waste places around Grand Trunk Gravel Pit.
*Panicum Crus-galli*, L. Very common.
*Setaria glauca*, Beauv. Very common.
*Setaria viridis*, Beauv. Very common.
*Andropogon furcatus*, Muhl. Rocky wood-lands west of Brockville.
*Sorghum nutans.* Same locality as last.

EQUISETACEÆ.

*Equisetum arvense*, L. Common.
*Equisetum sylvaticum*, L. Common.
*Equisetum limosum*, L. Conway's creek, &c.; rather rare.
*Equisetum hyemale*, L. Mirwin's woods, &c.; common.
*Equisetum scirpoides*, Michx. Common.

FILICES.

*Polypodium vulgare*, L. Rocks west of Brockville. Out-crop of Potsdam sandstone, Oxford. Hull Mountains near Chelsea, C. E.
*Polypodium Phegopteris*, L. Damp woods; not common. Osgoode Station, Ottawa and Prescott Railway. Gloucester. Chelsea.
*Polypodium hexagonopterum*, Michx. Mirwin's woods; rare.

*Polypodium Dryopteris*, L. Common.
*Struthipteris Germanica*, Willd. Common; abundant around Ottawa.
*Pteris aquilina*, L. Common.
*Adiantum pedatum*, L. Common.
*Woodwardia Virginica*, Willd. Swamp near Heck's Mills, Augusta.
*Camptosorus rhizophyllus*, Link. Rocky woods a mile north-west of Oxford Station, Ottawa and Prescott Railway, and not properly coming within the limits of this neighborhood.
*Asplenium Trichomanes*, L. Rocky wood-lands west of Brockville; rare.
*Asplenium thelypteroides*, Michx. Mirwin's woods, &c.; not common.
*Asplenium Filix-femina*, R. Brown. Very common.
*Dicksonia punctilobula*, Hook. Dr. Jessup's moist pasture land.
*Woodsia Ilvensis*, R. Brown. Rocks west of Brockville, and Chelsea, C. E.
*Cystopteris bulbifera*, Bernh. Mirwin's woods; common.
*Cystopteris fragilis*, Bernh. Mirwin's woods; common.
*Aspidium Thelypteris*, Swartz. Common.
*Aspidium Noveboracense*, Willd. Common.
*Aspidium spinulosum*, Swartz. Very common.
*Aspidium cristatum*, Swartz. Common.
*Aspidium marginale*, Swartz. Common.
*Aspidium acrostichoides*, Swartz. Common.
*Onoclea sensibilis*, L. Common.
*Osmunda regalis*, L. Common.
*Osmunda Claytoniana*, L. Common.
*Osmunda cinnamomea*, L. Common.
*Botrychium lunarioides*, Swartz. Waste places near Prescott Junction; rare.
*Botrychium Virginicum*, Swartz. Woods; common.

LYCOPODIACEÆ.

*Lycopodium lucidulum*, Michx. Common.
*Lycopodium annotinum*, L. Common.
*Lycopodium dendroideum*, Michx. Common.
*Lycopodium clavatum*, L. Common.
*Lycopodium complanatum*, L. Pine grove near Blue Church Cemetery, and wood-lands west of Brockville; not common.
*Selaginella rupestris*, Spreng. Rocks in pine grove two miles west of Prescott, near the river, and rocks west of Brockville; not common.

MUSCI.

*Sphagnum cymbifolium*, Dill. Common in bogs.
*Sphagnum acutifolium*, Ehrh. Common in wet grounds.
*Leucobryum glaucum*, Hampe. Rocks west of Brockville.

*Dicranum varium*, Hedw. Common.
*Dicranum heteromallum*, Hedw. Common.
*Dicranum longifolium*, Hedw. Boulders in woods west of Prescott; rare.
*Dicranum Scoparium*, L. Common.
*Dicranum undulatum*, Turner. Oak wood-land north of Grand Trunk Gravel Pit; rare.
*Campylopus leucotrichus*, Sulliv. & Lesq. On metamorphic rocks, bank of St. Lawrence, west of Brockville.
*Ceratodon purpureus*, Brid. Very common.
*Fissidens polypodioides*, Hedw. Rocks in Mirwin's woods; rare.
*Barbula unguiculata*, Hedw. Common.
*Tetraphis pellucida*, Hedw. Common.
*Orthotrichum strangulatum*, Beauv. Common.
*Orthotrichum affine*, Schrad. Common.
*Orthotrichum Ludwigii*, Schwægr. Trees and decaying wood; not common.
*Orthotrichum Huchinsiæ*, Smith. Gneiss rocks west of Brockville, near the St. Lawrence; rare.
*Orthotrichum crispum*, Hedw. Very common.
*Schistidium apocarpum*, Br. & Sch. Common.
*Hedwigia ciliata*, Ehrh. Common.
*Buxbaumia aphylla*, Haller. Thickets near Grand Trunk Gravel Pit on the ground; rare.
*Atrichum angustatum*, Beauv. Common.
*Polytrichum commune*, L. Common.
*Polytrichum juniperinum*, Hedw. Common.
*Timmia megapolitana*, Hedw. Common.
*Bryum pyriforme*, Hedw. Common.
*Bryum argenteum*, Linn. Common.
*Mnium affine*, Bland. Common.
*Mnium stellare*, Hedw. Woods, Prescott; common.
*Mnium cuspidatum*, Hedw. Common.
*Mnium punctatum*, Hedw. Woods, Prescott; common.
*Funaria hygrometrica*, Hedw. Very common.
*Bartramia pomiformis*, Hedw. Wood-lands west of Brockville.
*Leptodon trichomitrion*, Mohr. Trees on low land at the crossing of the Ottawa and Prescott Railway, Nation River; rare.
*Anomodon obtusifolius*, Br. & Sch. Trees; common.
*Anomodon attenuatus*, Hub. Common.
*Leskea rostrata*, Hedw. Common.
*Thelia hirtella*, Hedw., Sulliv. Mirwin's woods; rare.

*Pylaisæa intricata*, Bryol. Europ. Very common.
*Neckera pennata*, Hedw. Very common.
*Climacium dendroides*, Web & Mohr. Common.
*Hypnum tamariscinum*, Hedw. Common.
" *scitum*, Beauv. Common.
" *triquetrum*, L. Common.
" *splendens*, Hedw. Somewhat rare.
" *strigosum*, Hoffm. Common.
" *deplanatum*, W. P. Sch. Rare.
" *recurvans*, Schwægr. Common.
" *albulum*, C. Mull.? Common.
" *eugyrium*, Bryol. Europ. Common.
" *Schreberi*, Willd. Very common.
" *cordifolium*, Hedw. Very common.
" *uncinatum*, Hedw.? Common.
" *fluitans*, L. Common.
" *aduncum*, Hedw. Common.
" *Crista-Castrensis*, L. Common.
" *imponens*, Hedw. Very common.
" *curvifolium*, Hedw. Rare.
" *salebrosum*, Hoffm. Common.

HEPATICÆ.

*Marchantia polymorpha*, L. Very common.
*Fegatella conica*, Corda. Common.
*Sphagnœcetis communis*, Nees. Common.
*Scapania nemorosa*, Nees. Common.
*Frullania Grayana*, Montagne. Swamp near Doyle's station.
*Frullania Virginica*, Lehm. Very common.
*Madotheca platyphylla*, Dumort. Very common.
*Radula complanata*, Dumortier. Somewhat rare.
*Ptilidium ciliare*, Nees. Common.
*Trichocolea Tomentella*, Nees. Woods and thickets west of the Junction; rare.
*Mastigobryum trilobatum*, Nees. Same locality as last, and somewhat common.

LICHENES.

The following is a Catalogue of Lichens lately collected (except No. 19) near Prescott, and among the Laurentian rocks west of Brockville. The habitats and numbers which appear below, refer to the specimens forwarded to the Society.

1. *Usnea barbata*, Fr. From a cedar.
2. *Usnea angulata*, Ach. Tamerack.
3. *Evernia jubata*, Fr. Cedar rail.

4. *Evernia furfuracea*, Mann. Perhaps a form of Ramalina calicaris, but the apothecia are colored.
5, 6, 7, 8. *Ramalina calicaris*, Fr. Several varieties from Balsam Fir, cedar rail, &c.
9. *Cetraria ciliaris*, Ach. Branch of Pinus Strobus.
10. " *lacunosa*, Ach. Dead branch of Tamerack.
11. " *lacunosa*, Ach. Gneiss rock.
12. " *aurescens*, Tuckerm. Branch of Tamerack.
13. *Nephroma resupinatum*, Ach. Gneiss rock in woods.
14. " *Helveticum*, Ach. Gneiss rock in woods.
15. " *Helveticum*, Ach. Br. of Balsam Fir.
16. *Peltigera apthosa*, Hoffm. On the earth.
17. *Peltigera canina*, Hoffm. Mossy rock.
18. *Peltigera polydactyla*, Hoffm., var. Rock.
19. *Sticta crocata*, Ach. Perpendicular face of Gneiss rocks. Chelsea.
20. " *glomerulifera*, Delis.
21. " *pulmonaria*, Ach.
22. *Parmelia perlata*, Ach. Gneiss rock.
22 a. & 22 b. *Parmelia perlata*. Dead branches.
23. *Parmelia saxatilis*, Ach. White pine.
24. " *aleurites*, Ach. Branch of cedar.
25. " *lævigata*, Ach. White pine.
26. " *terebrata*, Mart. Balsam Fir.
27. " *physodes*, Ach. Dead branch of Tamerack.
28. " *colpodes*, Ach. Bark of Rock Maple.
29. " *olivacea*, Ach. Trunk of white pine.
30. " *caperata*, Ach.
31. " *conspersa*, Ach.
32. " *parietina*, Fr.
33. " *ciliaris*, Ach. Trunk of Balsam Fir.
34. " *ciliaris*, Ach? From a rock.
35. " *detonsa* Fr. Branch of Balsam Fir.
36. " *detonsa*, Fr. Gneiss rocks.
37. " *pulverulenta*, Fr. Bark of white elm.
38. " *hypoleuca*, Muhl. Bark of white elm.
39. " *speciosa*, Ach. Dead branch of Balsam Fir.
40. " *speciosa*, Ach. Bark of white elm.
41. " *stellaris*, Wallr.
42. " *obscura*, Fr. Two specimens, sp. and var.
43. " *sorediata*, Tuckerm.? Bark of *Pinus Strobus*.

44. *Parmelia rubiginosa*, Ach. Dead branch of Balsam Fir.
44 A. " *triptophylla*, Tr. Gneiss rock in woods.
45, 46, 47, 48, 49. *Parmelia pallescens*, Fr.
50, 51, 52. *Parmelia subfusca*, Fr.
53. *Parmelia sophodis*, Ach.
54. " *varia*, Fr.
94. " *scruposa*, Sommerf.?
93. " *sp.* Appears to be a form of P. speciosa. Common on cedars, &c., in swamps.
55. *Stereocaulon tomentosum*, Fr. Rocks.
56. *Stereocaulon denudatum*, Flœrk. Exposed rocks west of Brockville, on the ground.
57. *Cladonia pyxidata*, Fr. On the ground.
58. " *gracilis*, Fr., var. verticillata. On the ground.
59. " " " cervicornis. No. 69 appears also to be a variety of this species.
60. " *degenerans*, Floerk ?
61. " *parasitica*, Schær.
62, 63. " *furcata*, Floerk.
64. " *rangiferina*, Hoffm.
65. " *cornucopioides*, Fr. Rocks west of Brockville.
66. " *Floerkiana*, Fr.
67. " *macilenta*, Hoffm.
68. " *deformis*, Hoffm.

70. *Lecidea parasema*, Fr.
71. " *enteroleuca*, Fr.
72. " *melancheima*, Tuckerman.
73. *Umbilicaria pustulata*, Hoffm. Laurentian rocks west of Brockville.
74. " *Muhlenbergii*, Ach. Laurentian rocks west of Brockville.
75. " *Dillenii*, var. Laurentian rocks west of Brockville.
76. " *hirsuta*. Laurentian rocks west of Brockville.
77. " *polyphylla*, Hoffm., var. deusta. Laurentian rocks west of Brockville.
78. *Endocarpon miniatum*, Ach. Calciferous sand rock.
79. *Opegrapha atra*, Pers. Duf.
80. *Opegrapha scripta*, Ach. Schær.
81. *Calicium trachelinum*, Ach. Decaying Hemlock.
82. *Pertusaria pertusa*, Ach.
83. *Verrucaria nitida*, Schrad.

84. *Verrucaria alba*, Schrad.
85. *Collema palmatum*, Ach.
86. *Collema nigrescens*, Ach.?
87. *Leptogium tremelloides*, Fr.
88. *Parmelia cerina.*
D. " *pallescens.*
E. " *elegans*, Tuck.
F. " *parietina.* Apparently an abnormal state.

CHARACEÆ.

*Chara vulgaris*, L. St. Lawrence River, and streams inland; very common.

## ON FUNGI, THEIR RELATION TO DISEASE.

By John Lowe, M.D., M.R.C.S., Eng., Fel. Bot. Soc., Edin., Cor. Mem. Bot. Soc. Ca., Surgeon to the West Norfolk and Lynn Hospital.

*Read* 12*th April*, 1861.

It is now more than twenty years since it was first discovered that vegetable growths could exist upon the human body. From the earliest age diseases of the skin were known and described: the symptoms and appearances they presented were matters of ordinary observation, and rules of an empirical character were laid down for their treatment.

During all this time, it is probable, nay almost certain, that in some forms of the disease fungi were constantly present, but it was not until the year 1839 that this fact was demonstrated. To M. Schœnlein, of Berlin, we are indebted for this most important discovery, which, but for the rapid advance that has been made in scientific knowledge during the present century, and above all in the proper use of the microscope, would, like many other wondrous things, be still one of nature's own secrets. Even now, strange to say, there are those who regard the growth described by Schœnlein as an abnormal production of the body, anddeny its vegetable origin; but a vast amount of accumulated evidence leaves no room for doubt upon this point, to any one who is at all conversant with the character, structure and behaviour of the humblest individuals of the plant world, the Fungi.

Regarding it then, as an established fact, with botanists and the medical profession generally, that a fungous growth is really present in the majority of skin diseases, I shall abstain from entering on the discussion of the reasons for upholding this opinion and leave the facts, to be presently mentioned, to speak for themselves,—suffice it to say here, that men of the greatest eminence as botanists and physiologists entertain no doubt on the subject.

We have, however, another and a larger class of observers, who, while they admit the presence of the fungus, disclaim for it any title to be considered as an originator of disease, but regard it rather, as a foreign and accidental visitor, engendered and fostered by the products of a pre-existing malady. Upon this more important dogma, which has, in this country, been the subject of much argument, I propose to speak at greater length, inasmuch as it is a question of considerable interest, in a medical and hygienic point of view.

Before doing so, however, let me point out some of the various forms of fungi which have been noted, as occurring upon animal organisms, in order that I may put before you the salient points which are worthy of interest and attention. The whole of these lower fungi are ascribed by botanists to a subdivision of the family, which has received the name of *Hypomycetous*. They are minute microscopic plants, consisting in their perfect state of a mycelium, that is, a net-work of fine capillary tubes or filaments, from which springs an upright, hair-like stalk bearing at its extremity a collection of spores or sporules—the seeds of the plant. These have a diameter of about $\frac{1}{3000}$ of an inch, and from their extreme lightness are capable of floating about in the atmosphere and are wafted by the air to every quarter in incalculable myriads.

Whenever they alight upon objects favorable to their growth, as upon decomposing organic matter of any description, they readily germinate, provided there be sufficiency of warmth and moisture, both of which are essential to their well-doing.

Let us follow one of these spores, thus located, and watch its development; we shall then have the key to the behaviour of the rest. When first given off from the fruitstalk it is a spherical cell, consisting of a cell-wall filled with homogeneous molecular plasma, but without a nucleus ; on the application of warmth and moisture the cell assumes, in the first instance, an oval form ; the cell-contents become granular, the granules ultimately coalescing to form one or more nuclei. In its next stage, it becomes elongated, until its length exceeds its breadth by two or three times, and now we observe small eminences arise from its extremities ; these are buds, which in their turn, become elongated cells and then give off other buds or shoots, each in succession acquiring additional length, until finally, we find them as filaments or thread-like cells, crossing each other in all directions, and forming a network which is termed the mycelium.

At a more advanced stage, these filaments are seen to contain numerous nuclei and granules, and now, several slender threads are pushed perpendicularly upwards ; these are the fruit-stalks, the terminal cell of which undergoes budding or segmentation, until a large number of spores is formed into a capitulum or head. These like the original cells we started with are spherical, and their arrangement varies in different genera, for example being collected into a round head or glomerulus

as in *Mucor ;* or into a brush-like one as in *Aspergillus*, so named from a fancied resemblance to the brush used for sprinkling holy-water in Roman Catholic Churches.

Such is, briefly, the mode of development of these minute plants under favorable conditions. But there are occasional deviations to be met with, which are deserving of attention as throwing a clearer light upon certain forms which are to be mentioned presently. This will be manifest when I state that from the results of numerous experiments I have made, the plant may be caused to remain in any one of its different stages of growth by supplying it with food suitable for that purpose. The bearing of this statement will be seen in the subsequent remarks upon the identity of the parasitic fungi. A familiar illustration of the power above mentioned is to be observed in common yeast, which presents itself as a collection of spherical cells containing nuclei and capable of endless multiplication in two ways, viz:—by the formation of buds, or by the bursting of the cells and the liberation of nuclei which become cells. Yeast is derived from the aerial spores of one or more common species of mould. This I have proved by experiment; and I have recently obtained additional proof of the correctness of this view from the examination of spontaneous yeast of the tan-pits kindly forwarded to me from Kingston, Canada, by Professor Lawson. This in no way differs from brewers' yeast which has been long kept. The favorite food of the yeast-cell is sugar, upon which it acts in such a manner as to disturb the feeble combination of its chemical elements. This process, which is termed *catalysis* by chemists, causes decomposition of the sugar and a new arrangement of its particles, giving rise to carbonic acid and alcohol. Sugar is essential to the maintenance of yeast in its integrity. As soon as its requirements in this respect fail to be supplied, the plant turns for its prey upon the new element it has evoked, the alcohol, which is at once converted, by a similar process, into vinegar. Here the cell becomes changed in form. It is now oval, and this condition, which has received the name of *Torula*, it may be made to retain indefinitely; but under ordinary circumstances, it proceeds to convert the acid into other compounds, and its development goes on rapidly until it has assumed the form of a filamentous mycelium. In this stage, again, it can be retained at will, as the vinegar plant, or as it is popularly termed the "*mother*" of vinegar, which possesses the power of at once converting saccharine matter into acid apparently without the intermediate alcoholic fermentation. If now exposed to the air it completes its growth by producing spores which in their turn go through the same cycle.

With this slight sketch of the natural history of one of these minute beings, we will now notice some of the more important effects which they are reputed to produce. And, first, let us glance at their influence on the higher forms of vegetables.

It appears certain that before any great damage can be done by these para-

sites there must pre-exist in the objects of their attack an unhealthy condition of structure, resulting partly from being deprived of some chemical element essential to healthy growth, and partly to atmospheric changes which tend to foster a too rapid formation of cellular tissue, at the same time that they favor the rapid development of the parasite. The result of these changes in the plant is a lowered vitality, rendering it prone to the attacks of the fungus, which, once having found a habitat, spreads with prodigious rapidity, and by setting in motion chemical changes similar to those already spoken of, soon involves the whole plant in decay. Examples of this will be familiar to you, as in the case of the potato disease, which not many years ago brought England to the verge of famine, and in Ireland, which depends almost solely on this crop, was the cause of untold misery and destitution.

The failure of the vine crops in Spain and Portugal was owing to the ravages of another species, the *Oidium Tuckeri;* and in some seasons the wheat crops in this country are to a great extent damaged or destroyed by another of these minute pests, which, under the name of mildew, often in the course of a single night, converts whole fields of waving corn into black useless rubbish. Dry-rot in timber is another example of the destructive power of this group. Nor are these the only commercial interests which thus suffer. The production of silk is often a complete failure, owing to the silkworm being infested by a minute fungus, the *Botrytis Bassiana*, which, entering, probably by the spiracles or breathing apertures, insinuates itself into the blood-vessels and destroys the insect. Damp and want of cleanliness are found to be the causes of the attack. Other species again have been found in flies, beetles, eggs, in the air sacs of birds, on fishes, reptiles, and animals, the mention of which would encroach too much upon your time. A great part of those which have received distinct names, as well as nearly the whole of those from the human subject, I have proved to be mere initial or imperfect forms of one or two common species of mould which occur everywhere upon decaying organic matter, as cheese, apples, oranges, &c. The number of plants thus degraded from the rank of species is about thirty-four, and I doubt not that many others might be placed in the same category.

The first discovery of a vegetable parasite on man was, as I have said, made by M. Schœnlein, of Berlin, while examining the crusts from the head of a person affected with favus (Porrigo lupinosa or scald head). The plant has been since known under the name of *Oidium Schœnleinii.* Another parasite was subsequently discovered in the hairs of persons affected with the disease termed *plica polonica*—also a similar one in ulcer was found by Mr. Robin.

Others have been found in Tinea, Porrigo, Pityriasis, Lichen and Sycosis, &c., &c. Others again in the lungs and on the mucous surfaces of the body. Now the whole of these are referable to a common origin; the characters which have caused them to be raised to the rank of species being due to the plant having been *retained*

in a state of immaturity. So singular is this power of being so retained, that we might almost reduce it to a formula. Giving a certain quantity of sustenance we might predicate the form which the parasite would exhibit, and thus we find no difficulty in accounting for the great variety which is met with on the human subject alone; difference in density and chemical constitution of textures, in degrees of warmth and moisture, in greater or less facility of access to external air, will readily account for these differences in form, and will render it no matter for surprise that microscopists should have given distinct specific names to upwards of thirty plants which are in truth referable to one or two.

There remains one very peculiar variety to be mentioned. This consists of minute square-shaped cells arranged in fours. It was discovered by Professor Goodsir, in a disease of the stomach, and was named by him *Sarcina ventriculi*. A similar one has been observed by Dr. Gardner and others, from the kidney. There is now good reason to believe that both these are merely varieties of the common fungi of which we have been speaking, Penicillium and Aspergillus, for identical growths have been found by Mr. Stephens, on bones from South America; by Dr. Fox on the human subject, in a case of skin disease; and by myself in a phial containing crystals of cholesterine.

Let us now enquire into the power which fungi have of generating disease. Their influence upon plants has never been doubted—Firstly, because their ravages are too well known, and too serious, to admit of dispute; and secondly, because their malific agency upon structures of a low organization, allows of more easy demonstration, than when highly organized and sensitive tissues are the seat of their operation, and when more various forces and conditions are to be considered.

It is no difficult matter to show that dry-rot as it is termed, would be a comparatively slow process, were it not that the fungus is present, to insinuate itself amongst the fibres of the wood, to give admission to air, and to yield oxygen, which hastens the already commenced decomposition; while at the same time the living cells abstract chemical elements from the woody fibre, and fan into activity the eremacausis or slow combustion of the decaying tissue. Equally obvious is the fact that without yeast, wort would undergo but little fermentation, and that if all vegetable organisms were excluded, no proper fermentation would result; for even in the case of wine which is conducted without the artificial aid of yeast, I have found that this is really the source of the fermentation.

We may assume then, as a fact, which few will deny, that a living vegetable parasite upon other vegetable cells, must excite in them a chemical action, equivalent to fermentation, for it cannot grow without so doing; and that even supposing the cells themselves were able to resist this action, the juices of the plant, not possessed of the same vital resistance, must succumb to its influence. Whether this alone be the real secret of its power, affects not the question. If the juices are de-

composed the cells must suffer, and the morbific agency is at once apparent. But there is another point in which their action is not unimportant, viz., the power which fungi have of inserting themselves amongst the cells and tissues. Physiologists, and especially medical writers, overlook this fact, that a cell confined in a limited space, and at the same time undergoing development, must expand in some direction, and the force thus generated is almost incredible. Many of you have no doubt seen a strong wall pushed down by the growth of a tree; that is, by the expansion of soft and otherwise yielding cells. But perhaps a more impressive fact is, that simple cellular fungi, growing under large stones, have raised them from their beds to the height of some inches, even when the stones were several hundred pounds in weight; and yet so soft is the structure of the plant that it might be crushed between the finger and thumb. Here is a power not to be ignored when discussing the influence of parasites. Let us see how it applies to the production of disease in animal tissues. Each individual cell, it must be borne in mind, possesses the same motor power; it is only their combined action which yields great results such as the above. Suppose then a single tube inserted into the skin and impinging upon a nerve filament, would you not expect that nerve to resent the intrusion? Would it not do so if any other foreign body of the same size were introduced? How much more then, if in addition to mere mechanical irritation, the cell proceeds to abstract or decompose the fluids. That it does this, which is indeed the essential function as a scavenger, we see in favus and ringworm, where, especially in the former, the odour produced by it is intolerably fetid and irritating. It is clear that what with the actual pressure of the outspreading fungus, and the irritating products which it engenders, there are strong *prima facie* grounds for believing that the fungus does actually produce disease.

Then again if proof were wanting, observe the peculiar character of *lichen annulatus*, fairy-rings in miniature, presenting all the characters that fairy-rings do, and showing clearly enough that the fungus and rings of inflammation proceed *pari passu.*

The form of the disease will be determined by several minor conditions affecting the growth of the parasite; these we have before mentioned as warmth and moisture, suitability of food and density of tissue, all of which influence the development of the plant; thus we find in *Lichen*, one form; in *Pityriasis*, another; in *Favus*, a third, and so on; the spread of the disease being co-equal with that of the plant, and the degree of passive resistance which the tissues offer to its inroads.

It must be admitted here, as in the case of plants, that an unhealthy condition of the structures and fluids is necessary to the development of a parasite, for without these it would be incapable of establishing itself. The first attack would in a healthy body be at once resented, and the intruder repelled.

I would remark before concluding, that those diseases which are probably

considered as of a parasitic origin, have recently been shown by clinical observation to be identical, and capable of merging one into another by imperceptible gradations ; thus establishing the fact which I had asserted from experimental enquiry and the development of the parasites.

In conclusion, a word or two as to the treatment of this class of diseases may not be out of place.

The primary consideration will at once suggest itself, that since the fungi can only attack an enfeebled system, it is essential for the cure of the disease that the general health be restored by treatment appropriate for that purpose ; for we cannot expect a successful result while this important cause is still in operation.

The remedies which have attained celebrity as specifics, have little claim to be so considered, since if we except arsenic, which by the way is only useful when it is pushed to a dangerous extreme, they are all of but little value.

Of the topical applications I may observe, that my own experience of them is, that they are either inefficient or dirty, or both. The one to which I trust almost solely, has this to recommend it, that it is neither.

Its action is founded on what ought to be our guiding principle in the treatment of these cases, viz., the destruction of the parasite ; and this, from extended observation, I believe to be effected by the Tincture of Iodine, far better than by any mineral or other agent we can employ, at the same time its application is unattended by any inconvenience.

It is simply an alcoholic solution of Iodine, thus: Take of Iodine, 1 drachm ; Iodide of Potassium, half a drachm ; Alcohol, one ounce ; solve. Paint the diseased parts every day or on alternate days ; omitting it for a day or two if the skin becomes sore, then resume it, and continue the application until the disease has disappeared.

As yet I have met with no case which has resisted steady treatment of this kind, neither do I believe that I am likely to do so.

King's Lynn, Norfolk, England, Feb 1861.

## ON THE SEXUAL DEVELOPMENT AND ECONOMY OF BEES,

### And on the Saccharine Matter of Plants, viewed in relation thereto.

By the Very Rev. Principal Leitch, President.

*Read 8th March*, 1861.

My experiments were chiefly directed to the determination of some unsolved problems in bee life. Huber had done much to remove the doubts that existed in

reference to the development of queens; but he left others still unsolved. The subject has recently acquired new importance from the discoveries as to parthenogenesis and alternate generation. It appeared not improbable, that the unexplained facts in the development of the honey bee might throw light on these subjects, and in turn receive elucidation. In the course of investigation, new difficulties presented themselves, and it was several years before I arrived at any definite results. During all this time a Silesian clergyman, Pastor Dziersen, was engaged in similar investigation, and met with the same difficulties. At the last meeting of the British Association at Glasgow, I gave the results of my observations up to that time. They were, however, incomplete, and there were still some points that required confirmation before the theory I was disposed to adopt could be established. I had the benefit of the discussion and hints of some of the most distinguished physiologists, and, among the rest, Professor Kolliker, whose profound histological researches enabled him to give suggestions of great value in prosecuting the enquiry. The points were to be determined by nice microscopic observations on the ova of the bee; but the ova of this family of insects present peculiar difficulties, difficulties so great indeed, that Leuckart was baffled in all his attempts to determine the character of the micropylar apparatus. The opaque nature of the integuments presents great difficulty in investigating the contents, and marking the embryological development. While engaged in these enquiries, the book of Siebold, professor of physiology at Munich, appeared. In this work there is an account of the reasearches of Pastor Dziersen, who was arrested in his researches by the want of microscopic apparatus of sufficient power to determine the points of difficulty that presented themselves to him. Siebold had heard of his observations, and paid him a visit with a view of solving the difficulties by means of his microscope. He saw that the determination of the points in question would throw a flood of light on more general physiological problems. After making a few observations he came to the very startling conclusions which have been pretty generally accepted. In these conclusions I do not concur, and I have subsequently directed my researches to such crucial experiments as might finally settle the question.

One of the most startling facts in the history of the honey bee, is, that when the queen dies there is the power of converting a neuter bee into a queen. The neuter must be taken while yet a worm, and by proper care and nursuig, the plebeian offspring becomes a portly queen. When this fact was first discovered by Shirach, it was received with incredulity by the greatest physologists of the time. It was held that such a power would be miraculous, and could not, therefore, for a moment be entertained. Many competent observers refused to look at the fact, and it was therefore long before it was received into science as an undoubted truth. Huber has the merit of putting it beyond all doubt.

This power, however, was considered an abnormal one, and rarely brought

into action. It was thought that a regular queen had always a royal descent from the very commencement. The old queen or mother was supposed to lay three different kinds of eggs in three different kinds of cells. On opening a hive, it will be observed that the great mass of cells are of the same size. In these, the eggs are laid which produce common working bees. In looking more narrowly, it will be seen that there are a few hundred cells of a larger size, but of exactly the same shape. In these the drones, or males, are brought up; and lastly, there will be observed three or four cells altogether different, of a pear shape, and with the small open end looking towards the bottom of the hive. In these the young queens are nursed and brought to maturity. Now, it was thought that the normal plan was for the queen to lay a royal egg in a royal cell, and that from this, as a rule, the future queen sprung. In the exceptional plan, the method was supposed to be quite different. When a queen perishes, and another must be provided, the worm of a common cell is taken, a royal cell is built at the mouth of the former, and the fortunate larva is launched into this more capacious room to enjoy royal luxuries and attention.

My first enquiry was to determine this point: was it really the case that there were two distinct methods by which a queen was produced? There were two facts by which my enquiries were directed. The first was that one method seemed quite adequate for the social economy of the hive; and the second, that the interval between the first and second swarms of a hive corresponded to the time required to bring forth a queen in the supposed abnormal way. But to see the point of this it is necessary to advert to the various stages of bee existence. The egg is hatched three days after being layed. The worm that issues from the egg continues five days in its grub state. It is then covered up in its cell, and continues in this state for other eleven days, when it comes forth as a perfect bee; the whole time from the laying of the egg being nineteen days. This, however, applies only to the worker bee. In the case of the queen, the whole time is fifteen days, and that of the drone twenty-five days. When a queen is required to be developed in the abnormal way, the community select a common worker worm, three days old from its emergence from the egg, and, by proper treatment, a perfect queen is hatched in nine days, so that the swarm wants a head only for this short time. It appeared to me a coincidence, which ought not to be overlooked, that the interval between the first and second swarm was ordinarily nine days, corresponding with the above period. This at once led to the suspicion that when a queen left a hive with the swarm, the desertion was equivalent to the death of a sovereign, and that the same method was adopted to supply her place. The usual belief was that before the old queen left the hive with a swarm, she saw her successor fairly in possession of the throne, or at least ready to be crowned. This on examination, was found not to be the case. On opening the hive immediately after the queen has left, it will be found that

there is no young queen in the hive. But, immediately on her departure, steps are taken to supply her place. Sometimes queen's cells are found with ova deposited in them, but, more frequently, this is not the case. When there is no such cell, a neuter larva, three days old, receives the proper treatment; and in nine days it comes forth a perfect queen, and may at once lead off a second swarm. The bees, however, are not satisfied with one queen. They generally make three or four, with one or two days interval between them. This is obviously to secure the succession, and give leaders to more swarms than one, should the year be propitious. If the supernumerary queens are not required, they are slain. It was thus proved by numerous observations that there is probably only one method of producing queens; that they all spring from plebeian worms, and are made queens by special treatment. Still it is certain, that in some cases ova are deposited in queen's cells before the first swarm leaves, and the circumstances that determine this departure from the general rule, are yet open to enquiry.

The marvel of this metamorphosis was greatly removed by the minute dissections of Miss Jurine, who proved that the workers, or neuters, are really undeveloped females or queens. The production of the queen is thus only the carrying out of the process of evolution a step further.

Another point of enquiry in connection with this subject was the nature of the treatment by which a neuter was transformed into a queen. Huber thought all depended on the food, and that there was a royal jelly, quite different from the food supplied to neuter bees. The only test of the quality of the food was its taste. He thought it more pungent than the ordinary food of bees. This, however, is a deceptive criterion, as the taste of the syrup or jelly depends on the age of the worm. I applied chemical and microscopic tests, but could find no difference in the food. The composition of it is, however, not well understood. The bees disgorge it from their stomachs into the cell, at the bottom of which the worm is coiled up. It is, no doubt, a compound of honey and pollen, but seems to have undergone a digestive process, for the taste of the honey is gone, and all trace of the pollen cells is lost. Finding no clue to the development of the queens in the kind of food supplied, I next enquired if heat could have anything to do with it. This was suggested by the position of the royal cell. The queen-worm, as we have seen, is removed from its original cell and placed in a new one, in an isolated position; or, rather, the worm gradually slides into the new receptacle constructed at the mouth of the former. If food is the secret of the development, there is no obvious reason why the worm should not be fed in its original cell; but if temperature is one of the agents, then the isolation of the cell has an unmistakeable meaning. In its isolated position, a special heat may be communicated, different from that of the other cells, as the bees can cluster all round it and hatch on every side. In the original position, there could be no differential hatching, as only the end of the

cell would be exposed to the special heat. The heat is kept up by the respiration of the bees, and they have a wonderful power of raising the temperature when required. They can thus localize the heat, and apply a special temperature. To put this to the test, I applied a delicate thermometer to the queen's cell, while others for comparison were placed in different parts of the hive. This at once revealed the fact, that an elevated temperature was constantly employed in hatching the queen. While the experiment is not decisive as to temperature being the sole cause, it at least indicates it as one of the efficient causes, if there be more than one. This furnishes one of the most striking illustrations of calculation and adaptation in the whole range of natural science.*

It is plain that queens may be produced, at pleasure, simply by removing the reigning monarch. In a few hours her loss is detected, and three or four queen-cells are seen to be in the process of construction. By repeating the experiment, I found that not only were queens produced from neuter worms, but that a few drones were also developed. The drones, hatched and developed in the small cells of neuters, were much smaller than ordinary drones, being only about half the size of the latter. This was a far more startling fact than the production of queens from neuters. In the latter case the sex is the same, and the question is one merely of degree of development. In the case of the development of the drone from the neuter, there is a transformation of sex. On repeating the experiment, the results were invariable. When a hive was supplied only with neuter larvæ, both males and females, or drones and queens, were developed.

The next experiment was to determine whether a queen might be developed from a drone larvæ. To test this, the reigning queen was removed, and also all the neuter brood, so that nothing was left but drone brood. To my great satisfaction I saw the commencement of a queen's cell, and the process went on as far as the chrysalis state; but I was not fortunate enough to bring out a perfect queen. In such experiments there is great danger of failing, unless the hive be very strong; and, generally, every such experiment implies the loss of the hive, so that only small hives of little value are usually employed. But when the numbers are not kept up by a fertile queen, the population rapidly dwindles, and the hatching power is lost. The larva, when the hatching process ceased, was not old enough to have its sex distinguished; but the great probability is that the instinct of the bees could not have so far failed them as to lead them to go on with the development of a

*It appears from the report of the Entomological Society of England, held 4th Nov., 1861, that the observations of Mr. Tegetmeier, have confirmed the above conclusions. "Mr. Tegetmeier called attention to a statement regarding the development of queen bees lately published by Professor Leitch, who asserts that the production of the perfect queen is due, not as has been supposed, to the larva being fed on a peculiar food, but to increased temperature, and that the isolated position of the royal cell enables the worker bees to cluster around, and by their rapid and increased respiration to produce the degree of heat necessary. Mr. Tegetmeier considered his own observations fully supported this theory."

grub in the queen's cell which was not ultimately to become a queen. Supposing the experiment quite decisive, what would be the necessary deduction? It would be this: that eggs, as laid by the queen, had the elements of both sexes, and that it depended on future treatment which of the two sexes should predominate.

On *a priori* grounds it is obvious that the production of drones from neuter larvæ, is a corollary to the similar production of the queen. The object of this remarkable power is the continuance of the vitality of the hive; but the object is not gained, merely by the production of the queen, for she cannot be fertilized without the existence of males. It is only during a small part of the year that drones are found in the hive, so that if the queen should die at any other time, there would be no object served by the production of a new queen, unless drones were produced at the same time.

Unless we accept the above bisexual hypothesis, there is no alternative but to adopt another, which gives the queen the power of determining at pleasure the sex of the egg which she is about to lay. When you look into a glass single-comb hive in the breeding season, you see the queen constantly depositing eggs in cells. All the eggs she deposits in small cells become neuters; all deposited in large cells become drones. Huber thought that the ova of the different sexes were disposed in regular order in the ovaries of the queen, so that the order of deposition in the cells must follow the pre-arranged order in the ovaries. According to this idea, the queen laid neuter eggs for months together, and when drone eggs came, she deposited them in continuous order in the larger cells. This, however, is not the case. In watching the movements of the queen across the comb, you see her depositing an egg in a neuter cell, and when she comes to a drone cell, she deposits one there also, and the product is always a male or a female, according as the cell is a large or small one. Take a queen from a compartment of a hive, when she is laying only neuter eggs, and place her where there are only drone cells, and she will immediately deposit eggs which will become drones. We are, therefore, shut up to one of two hypotheses; the first is that there is no difference of sex in the eggs as laid, and that the subsequent sexual difference is due to size of cell, temperature, &c.; or that the queen has the power of determining the sex at the moment of laying. The latter is the hypothesis of Siebold; the former is the one to which my experiments would lead. Siebold's hyyothesis is that the queen when depositing an egg in a small cell, at the same time, by an act of volition, inserts into it one or more spermatozoa; when depositing an egg in a large cell, she omits this process and a spermatozoon is not inserted. The former egg becomes a neuter; the latter a drone. Leuckart, the greatest authority on the ova of insects, tried in vain to detect the spermatozoa in the eggs of bees. In the insect ova there is an aperture, or series of apertures, at one extremity, called the micropyle, through which the spermatozoa penetrate and fertilize the egg; and frequently, after deposition,

these bodies may be detected finding their way into the interior of the egg. When the membranes of the egg are very transparent they may be detected in the interior. Leuckart, however, failed in all his attempts to discover them in the eggs of bees. Siebold next applied himself to the task. He found the state of things to be such as exactly to suit his theory. He found spermatozoa in neuter's eggs, but none in drone's eggs; and were the observations completely established, they would be decisive of the question. The egg of the bee is confessedly one of the most difficult microscopic objects, and the observations would require the confirmation of other observers, especially as Siebold had only once an opportunity of examining new laid eggs, when on a visit to Pastor Dzierzien in Silesia. I have examined hundreds of eggs, many of them submitted to the microscope the moment after deposition, but have never detected the filaments in question, though adopting the precise method suggested by Siebold. Objects exceedingly like spermatozoa were detected, but they were easily shown to be folds of the enveloping membrane. The optical power employed seemed to be superior to that of Siebold, as I could clearly make out the micropylar apparatus which baffled all his attempts.

It has also been attempted to settle the matter by a cross between our own and the Italian bee, which has very distinct characters. If Siebold's theory be correct, all the neuters might show the character of the males, but the drones should have only the character of the queen. The result was against this theory, as some drones were found with the character of the parent drone, and a single case would be sufficient to overthrow the theory.

An obvious plan of determining whether the ova of the bee are sexually distinct from the moment of their being deposited, is to interchange them—that is, to put an ovum, deposited in a drone's cell, into a neuter cell, and vice versa. If no interchange was made, all the ova in the drone cells would become drones, and those in the neuter cells would become neuter bees. Should it be found, however, that this held even when the ova were interchanged, the necessary conclusion would be, that the ova are not *ab initio* distinct, and that the differentiation of sex depends on the treatment they receive after being deposited. The experiment of interchanging was made with all care. By means of a camel's hair pencil the ovum was removed from one cell and deposited in another. But in all cases, and hundreds of trials were made, the ova were removed as foreign matter and destroyed, the bees greedily devouring the ova. In the above cases, the ovum was laid loose in the cell instead of being attached at one end, so as to stand perpendicularly, as in the case when deposited by the queen. Thinking that this might possibly be the cause of the failure, I imitated nature as closely as possible, and with gum got the ova to stand erect. This experiment also failed; the ova were all removed and destroyed. I made still another attempt to get the ova hatched in other than their appropriate cells. This was to cut out the bottom of the cell, so as not to disturb

the attachment of the ovum, and to insert this piece of wax in the other cell. Still, all was of no avail ; the ova were invariably expelled.

Being now baffled in all my attempts with the ova, I next tried the worms or larvæ. I carefully interchanged them when very young—putting the drone into the cradle of the neuter, and the neuter into the cradle of the drone. But the bee at once discovered the changelings and expelled them. Very numerous trials were made to obviate accidental causes. The question now arose—Do these experiments conclusively prove that the ova are originally different, and is this the true cause of the expulsion ? There was still a crucial experiment by which it might be determined whether the expulsion was due to the essential difference in the ova and larvæ. The experiment was simply to interchange neuter and drone eggs, not with one another, but among themselves—that is, to remove the ova in small cells to other small cells, and to treat the ova of drones in the same way. On trying this experiment, I found that the same result followed: that the removed ova were always expelled. This proved decisively that the ejection of the ova was simply on the ground of the removal, and that the experiment told neither for nor against the theory of the identity of the ova. This left the question entirely open, and I was obliged to resort to some other means. The next experiment was to remove the queen from the hive, and also all the neuter brood, leaving only drone brood. The object of this experiment was to ascertain whether a queen could be developed from the larva of a drone—that is, whether a perfect female could be developed from a larva, which, by ordinary treatment, would certainly become a male. The bees were forced either to make no attempt to replace the queen or to develope one from the larva of a drone. To my great satisfaction, I found that the usual plan was adopted for replacing the queen. The cell was elongated and isolated from the other cells. It was in due time closed, and the hatching went on as usual. Unfortunately, however, the cell was broken by the incautious opening of the window of the hive, and the hatching was suspended. The chrysalis was not sufficiently matured to determine the sex. The experiment was again repeated, and the construction of queen's cells for drone brood was proceeded with, but I have not yet succeeded in obtaining a perfect queen. The cause of failure seemed to be the want of hatching power. In such experiments, the loss of the hive is usually involved, and there is an unwillingness to sacrifice a valuable hive. But unless the hive be strong, the number of bees is apt to dwindle down so much that they cannot keep up the requisite temperature for hatching. Although this experiment be not absolutely conclusive, still there is the presumption that the instinct of the bees would not so far err as to lead them to attempt to develope a queen from a drone larva, if this, in the nature of things, was not possible. The point can be fully determined only by further experiment.

The above experiments were not made with the view of establishing a conver-

sion of sex. The theory to which they lead is either that the ova, when deposited, are sexless, and that it is the subsequent treatment that determines the sex, or that each ovum is bisexual, and that the subsequent treatment merely determines which sex is to predominate. This latter is the more probable view, as it is countenanced by the phenomena of hermaphroditism. The facts are such as to compel us to resort to some such theory. If you scattered a handful of ova at random over the empty cells of a comb, and if you found that all that fell into large cells became drones, and all that fell into small became neuters, you would naturally conclude that the cells had something to do with the differentiation of sex. Now, it is quite ascertained that the queen deposits her ova in this apparently random method. If removed from drone cells, when she is busy laying, to neuter cells, she will continue her laying, and the cells will produce their appropriate sexes.

The only other hypothesis by which the failures are attempted to be explained, is that of Siebold, who holds that all the ova are originally male, but that, at the moment of deposition, the queen can, at will, convert the male ovum into a female one. This is supposed to be done by the action of voluntary muscles, which inject spermatozoa into the ovum through the micropyle The queen is provided with a spermatheca, and she can, at will, fertilize or not the ova as they pass. When depositing an ovum in a large cell, she does not fertilize, and the ovum produces a drone. When depositing in small cells, she fertilizes, and the result is female or neuter bees. This theory implies the conversion of sex, for according to it, all ova are originally male, and the conversion is effected by the presence of spermatozoa. Siebold thinks that his microscopic observations have established this theory. He says that he clearly detected spermatozoa in the neuter ova, while none could be discovered in those of the drone. We have repeated his experiments in many hundred cases, but could find no corroboration. We have found what appeared to be spermatozoa ; but, on more careful examination, we discovered that they were merely folds in the membrane of the ova, and these folds are very like the threadlike spermatozoa of insects. In the case of all the ova we have examined, they were taken immediately after being deposited by the queen. This is essential, for if the interval was great, there would be little hope of finding them, even though visible at an earlier stage. We do not by any means think that the problem is solved by the few imperfect observations of Siebold. Evidence has still to be accumulated, and a most interesting field is still open for the investigations of the naturalist.

# ON THE HISTORY, PROPERTIES, AND CULTIVATION OF COTTON.

By Lieut. F. R. Stanton, F. B S. C.

*Read by Prof. H. Yates, M.D., 28th March*, 1861.

From the great benefits which the human family derive from the cotton plant, it is held in the very highest estimation, and consequently, to treat it either as a botanical, or as an historical subject, must surely prove interesting to all readers. Its cultivation is a source of great national wealth to one nation, while its manufacture enriches another. Its medical virtues are much in vogue, and its history is extremely ancient.

In order that we may be more clearly understood, the subject will be divided into the following heads,—under the first, I will treat of the cotton plant in a botanical point of view—under the second, as regards its medical properties—under the third, in an historical aspect—and under the fourth and last head, attempt to describe its cultivation. In all its lights the subject is alike pleasing, and I trust may be found both novel and instructive.

## Description of the Cotton Plant in a Botanical point of view.

The cotton plants belong to the genus *Gossypium*, of which there are many species all growing in warm climates. They belong to the *Malvaceæ*, or mallow order, which contains—" herbs, shrubs, and trees, with alternate stipulate, " palmately divided leaves, often stellate hairs, and showy involucrate flowers on " axillary peduncles, sepals five, rarely three or four, united at the base, valvate, " often having an epicalyx. Petals of the same number as the sepals, twisted. " Stamens ∞, monadelphous, united to the claws of the petals ; anthers one-celled, " reniform, introrse, opening transversely ; pollen hispid. Ovary many-celled, with " placentas in the axis; or several ovaries, separate or separable when ripe; styles " equal in number to the carpels, distinct or united. Fruit composed of several " monospermal or polyspermal carpels, either combined or separate. Seeds with " little albumen; embryo curved with folded cotyledons. The plants abound in " tropical regions, and in the hotter parts of the temperate zone. The properties " of the mallow-worts are mucilaginous and demulcent, they supply various kinds " of fibres. *Althœa officinalis*, marsh mallow, is used medicinally to supply mucil- " age. Various species of *Gossypium* furnish cotton, which consists of the hairs " attached to the seeds. The inner bark of *Hibiscus cannabinus*, furnishes a kind of " sun-hemp in India."

Botanists have ever experienced the greatest difficulty in determining which are to be held merely as varieties, and which as abstract species, owing to the constant changes produced in the plants of this genus by means of cultivation. DeCandolle describes thirteen species in his Prodromus, and mentions six others, but all of them he considers uncertain. Royle described eight; but according to Swartz, they are all referable to one original species.

From Linnæus and DeCandolle, we learn that the *Gossypium herbaceum*, or common herbaceous cotton plant, which is the species most generally cultivated, is a biennial or triennial plant, with a branching stem from two to six feet high, and palmate, hoary leaves, the lobes of which are somewhat lanceolate and acute, the flowers are pretty with yellow petals, and near the claw have a purple spot. The leaves of the involucel or outer calyx are serrate. The capsule opens when ripe, and displays a loose white tuft of long slender filaments, which surround the seeds and adhere firmly to the outer coating. This species is a native of Persia, and is the same which is grown so largely in the Southern States of America, in Sicily, and in Malta. There is another species of herbaceous cotton, which forms a shrub of from four to six feet high.

The *Gossypium arboreum*, or tree cotton, is of a much larger growth. If left to luxuriate to its full height it has sometimes attained to fifteen or twenty feet. The leaves grow upon long hairy foot-stalks, and are divided into five deep spear-shaped lobes. The tree cotton grows in India, Arabia, Egypt, China, the western coast of Africa, and in some parts of America. According to Humboldt this species of the cotton plant requires a mean annual temperature of 68 ° Fahrenheit; but the shrubby kind may be cultivated with success under a mean temperature of 60 ° to 64 °.

Another species is distinguished by the name of *Gossypium religiosum*. Linnæus gives no reason for having bestowed upon it so singular a name. It is called in the Northern provinces of China, the "mie-wha," and is chiefly cultivated in a part of the Great Plain around Shanghae, where it is the staple summer crop. Nankeen, called after the city of Nankin, is produced from the material furnished by this plant. It is also cultivated in the Mauritius. There are two varieties of this species; in the one, the cotton is extremely white, in the other it is of a yellowish brown.

From the varieties which are familiar to the Southern States of America, an article for commerce is produced, that is divided into the technicalities, "short staple" and "long staple," which terms refer to the length of the fibres produced by the different plants. If ever any real difference in species existed between the plants producing these several staples, the speciality has been lost through constant assimilation.

The "short staple," or upland cotton, also called *bowed Georgia cotton*, from

an olden method of cleaning it, familiar to us in shirtings and sheetings, was procured originally from the West Indies, and is now cultivated with advantage in Florida, Alabama, Mississippi, Louisiana, Tennessee, Georgia, South Carolina, North Carolina, Arkansas and Texas.

The "long staple," or Sea-Island cotton, the finest in the world, is supposed to be a native of Persia. It commands in England double the price of any other imported cotton, and is of so silky a texture that the Cotton Manufacturers in Europe frequently combine sea-island cotton with silk, and so fine is the material, that it is rarely discovered. It is even and strong, and has a yellowish tinge, which in cotton, when natural, is a mark of extreme fineness. Its seeds are black, while most of the cotton of the Southern States is raised from the green seed variety. Having been found to thrive well on the low sandy islands lying along the coast between Charleston and Savannah, it thence derived its name of sea-island cotton.

The quantity as well as the quality of cotton which each plant yields, is variable. The average produce per English acre is reckoned as varying from one hundred and fifty to two hundred and seventy pounds of *picked* cotton.

The plant is propagated by seed.

The cotton shrub in general lasts, in the Islands of the West Indies, about two or three years; in India, Egypt and some other countries, from six to ten years. In the hottest countries it is perennial, and furnishes two crops a year; in cool climates it is annual. The shrub itself very much resembles a currant bush in appearance, and has one feature in common with the orange, namely, that of exhibiting on one stalk every possible stage of growth; so that it is a common sight to see the "blossoming," "forming" and "bolling," going forward at one and the same time.

## Medical Properties of Cotton.

Eventually cotton wool will, it is supposed, supersede many, if not all, of the common remedies in the treatment of recent burns and scalds. It was first used with this intention in America. It relieves the pain, diminishes the inflammation, prevents vesication, and greatly hastens the cure. The part affected is reduced to an equable temperature, its effused liquids absorbed, and protection from the atmosphere afforded by the application of thin and successive layers of cotton wool, and also, when the skin is not too much inflamed, by a bandage. But it is found often to do much harm by becoming consolidated over a visicated surface, thus mischievously acting as a mechanical irritant. However, such a result may be prevented by first dressing, with a piece of fine linen spread with simple ointment, the part inflamed.

In erysipelas it is recommended, and also as a dressing for blisters. Applied

in a large batch, it has been found useful in rheumatism, more especially in that most crippling form—lumbago.

The root of the cotton plant has been employed by Dr. Bouchelle, of Mississippi, who considers it to be an excellent emmenagogue, having also similar specific physiological properties to the *secale cornutum* in its action upon the metra,—rivalling the ergot in promoting uterine contraction. He further observes, that the slaves of the Southern States use it habitually and effectually for producing ectrosis; and he considers that it acts in this way without serious injury to the general health.

It has also been asserted, that in parts of the Southern States, cotton seeds have been employed with great success in the treatment of intermittents; but this remains to be proved.

A fixed oil of the drying kind is yielded by the seeds by expression, and the cake produced in the process has been employed in feeding cattle, like linseed cake. Of late years this cake has given rise to accidents, the husks of the cotton seed forming large coherent indigestible masses in the stomachs of the animals. The root also has been supposed to possess medical properties, but it has not as yet been introduced into any officinal preparation.

Cotton is without taste or smell, insoluble in water, alcohol, ether, the oils, and vegetable acids; soluble in strong alkaline solutions, and decomposed by the concentrated mineral acids. In chemical character, it bears a close analogy to lignin. Gun cotton is produced by the operation of nitric acid on it. Collodion is an officinal preparation; and in the form of old rags, cotton is used in the manufacture of paper.

In India, and indeed in all warm countries, both Europeans and natives have found that after a profuse perspiration, linen cloth became damp and cold, first by absorption, and then by evaporation; when cotton cloth remedied these evils, as was soon discovered, its adoption became universal.

It is worthy of note, that gun cotton, or explosive cotton, was first made in America, by the late Professor Ellet, of the University of South Carolina, by the operation of nitre and sulphuric acid on cotton; but with characteristic modesty and ingenuousness, he disclaimed the idea as original, from having experimented upon the fact which had been communicated to him, that a German chemist had succeeded in making cotton explosive. He also yielded the idea of nitre as an agent in causing substances to explode, to Dumas, from whom a memoir had then recently appeared, which gave an account of the method of rendering bibulous paper explosive. However, Ellet's product being readily dissolved in ether—while other processes furnish a product which sometimes dissolves only partially—has displaced all other preparations in the making of collodion, which has itself

constituted not a little to the marvellous perfection now attained in the art of photography.

## History of Cotton in the East.

Varieties of the cotton plant are produced in Africa, in the Levant, Egypt, the East Indies, North and South America, including of course the West Indies, thus showing that no plant has so wide a field adapted to its cultivation. Some assert, that by far the finest cotton grows in the Presidency of Bengal, and the Coromandel coast, East Indies, but owing to careless cultivation, the produce is greatly inferior to the American sample. In Africa and Asia more than sixty different varieties have been, it is said, discovered growing spontaneously. But though cotton seems to have been universally known from the earliest periods, yet it is only within the memory of man, that it has obtained its present important place in the commercial world.

Cotton was both cultivated and manufactured in India in the remotest antiquity. Herodotus, who wrote about B. C. 445, makes mention of the manufacture among the Indians, as if it were a well known branch of national industry. Nearchus, the Admiral to whom Alexander the Great intrusted (B. C. 327) the survey of the River Indus, confirmed all that Herodotus had observed. Arrian, an Egyptian Greek, living in the first or second century, also notices the export of cotton from India. And some authorities state, that even now at the present day, India produces annually more of the raw material than the Southern States of America. Cotton indeed seems to have been generally known and used by all the nations of the East, as far back as history informs the inquirer. Strabo states that cotton grew and cotton cloths were manufactured in Susiana, at the head of the Persian Gulf, in his day—about A. D. 20. Pliny, about fifty years later, described the plant (*Gossypium* or *Xylon*) and its products. And yet still we do not find that it occupied in ancient times a place of any real importance among the varied wants of man.

Hindoos, Arabs and Persians, therefore, have without doubt, from time immemorial, formed their clothing of cotton; but it is also certain that the making was confined to household hands, and excited no manufacture beyond the local demand. This custom of home production indeed still holds in the countries of the above mentioned nations, more particularly in India, where, even at the present day, almost every Hindoo—or rather Ryot—family, has an enclosure for cotton planting, from which is taken sufficient for the family's annual consumption; the surplus being allowed to go to decay, nourishing the exhausted land.

In China the cotton plant began to be cultivated for the first time, for general use, after the Tartar conquest. Great opposition was experienced from the wool

and silk fabricators, but at length it was overcome, and it is supposed that about the year 1368, the cultivation became general throughout the empire. Marco Polo makes frequent mention of both the cultivation and manufacture of cotton, in his account of his travels in China, Persia and Armenia. From Benin, on the Guinea coast, in 1590, cotton cloth of African manufacture, was brought to London. The cotton tree grows indeed plentifully on the borders of the Senegal, Gambia, and Niger Rivers, at Timbuctoo, Sierra Leone, in the Cape de Verde Islands, on the coast of Guinea, in Abyssinia, and throughout the interior of Africa.

Neither in the Bible, nor among any Hebrew writers, do we find one single instance wherein cotton is mentioned. The ancient Egyptians, although they were no doubt familiar with its uses from the commercial intercourse which they held with the surrounding nations, seem to have religiously proscribed it as an article of dress or of domestic use, for upon Egyptian tombs, particularly those of Thebes, where we find sculptured the active employments of the long embalmed dead, flax is common from which was obtained the linen spoken of in Scripture, but the cotton plant has never yet been found represented, among the monuments of this ancient people. In support of this theory, it may be pointed out, that the embalming of the dead has not only preserved the bodies of the ancient Egyptians, but also that millions of yards of cloth, such as was used daily by them in their households, have been exposed to the gaze of the curious and learned of modern times, for the cerements of the mummies in part are composed, so it has been ascertained, of the napkins and sheets that by contact with the dead body were polluted, and yet only the stuffs formed from the raw material furnished by the flax plant have been found.

About a century ago, a learned Frenchman asserted that cotton—or as the French call it *coton en laine Anglice*, cotton wool—formed the coverings of the mummies. Everything conspired to force him to this conclusion, for the fabric resembled cotton, and as he said, in no way did it differ from that material. But while the dispute raged, some men more practical than theoretical, applied the microscope to the several fibres of cotton and flax: the former they found was composed of transparent flat ribbon-like fibres, with thickened edges, and very much twisted; the latter was in the form of straight cylindrical tubes. The magnifying glass thus finally confirmed tradition and history in the opinion held conjointly, that the Egyptians used linen cloth alone, for the straight cylindrical tubes only were discovered. When the nationality of the ancient Egyptians was destroyed by foreign conquest, corruption as a sequence became prevalent, or we might with greater truth say, the fitness of things became more apparent, and knowledge overcame superstition, paving the way, and ere long cotton cloth was introduced into Egypt.

Although there are but few notices among either Greek or Latin writers, still

we know that cotton was used more or less generally throughout the whole Roman Empire, and therefore was not unknown to the then civilized world. By the ancients it was called "the wool of trees," from its great resemblance to sheep's wool.

During many succeeding centuries the use of cotton is seldom spoken of, although stuffs of woolen, linen and silk are often mentioned. But when Mohammed commenced agitating the East with his religious ambition, then cotton seems to have attracted much attention. The fierce followers of the Prophet were wearers of cotton, and some writers hold that there was a certain feeling of religion associated with the wearing of cotton apparel. Hence it became for the first time an important article of commerce. For as these Eastern warriors spread over Asia and a portion of Southern Europe, they speedily caused the necessity of a requisite supply.

## In Spain.

At the period when the Moors, Saracens, or Arabs—as they were variously denominated—occupied Andalusia, or the Region of the West, as Spain was called by these children of the Desert, they were known as manufacturers of cotton cloths; and, wearing it themselves, it became almost a mark of the Moorish usurpers, which, without doubt, caused a species of religious prejudice that operated strongly against its more rapid introduction into the European world.

The Arabs of Spain made paper out of cotton long before native Europeans were acquainted with that most useful article. Spain has therefore the credit of having introduced the cotton manufacture into Europe about the tenth century. The plant itself flourished on the fertile plains of Valencia, where now it grows wild.

At the beginning of the fourteenth century, the manufacture of cotton was commenced at Venice, and afterwards at Milan. Syria and Asia Minor it is supposed supplied the cotton yarn, for in later years both Italy and France imported all that they required from those countries.

## In America.

The great navigator and discoverer, Christopher Columbus, found, on his arrival in the New World, in 1492, cotton growing spontaneously upon many of the islands of the West Indies; and also, on the Continent of South America. Clavigero tells us that in Mexico and Peru, the natives, the aborigines of the country, universally made and wore cotton cloths, and formed also fishing nets of the same material. Fernando Cortez sent home to Spain, to his Sovereign, Charles the Fifth, after he

had completed the conquest (we had almost written the desolation) of Mexico, robes and mantles of native manufacture, which from having been really manufactured, made by the hand, were extremely fine and delicate; for it is a singular fact that the most perfect piece of machinery of the present day, cannot equal the workmanship of unaided semi-barbarous hands. For although some contend that cloth produced from a mill can be as perfect as that prepared by the hand, yet he must surely forget that the dust, oil and impure atmosphere of the milling process, are all escaped by the creation of the hand, which thus retains its natural gloss. This skill in weaving cotton into cloth, is still possessed by the otherwise degenerate descendants of the ancient Mexicans.

North America, it is said, really possesses greater native varieties of the cotton plant than any other portion of the world. The cotton of the Pinos of Texas is extraordinarily fine and long; while the Navajos living in the country bordering on New Mexico, have abundant cotton fields, and when their produce is examined in the manufactured piece of goods, the staple is found to possess both strength and fineness.

## In Great Britain.

The cotton manufacture is supposed to have been introduced into England in the early part of the seventeenth century, some writers give 1641 as the date. Mr. Baines suggests that the art was brought from Flanders, when the Duke of Parma, in 1585, captured and ruined the City of Antwerp, and thus caused the Protestant artisans and workmen to fly to England, and there introduce their art.

England, at that period, obtained her trifling supply wholly from Smyrna and Cyprus, in the Levant. It appears, however, that on an average of the five years ending 1705, the quantity annually imported amounted only to 1,170,881 lbs. At the accession of George III., (1760), the entire value of all the cotton goods manufactured in Great Britain was estimated to amount to only £200,000 a year; and it was not till after the invention of the spinning-jenny by Hargreaves, in 1767, and the subsequent discoveries of the spinning-frame of Sir Richard Arkwright, in 1769, the mule-jenny of Mr. Crompton in 1779, and the power-loom of the Reverend Mr. Cartwright, that the manufacture began to advance with any degree of rapidity. But the imports of cotton wool, which in 1781 were 5,198,778, had increased in 1791 to 28,706,675 lbs.; in 1801, they were 56,004,305 lbs; in 1811, 91,576,635 lbs.; in 1821, 126,420,000 lbs.; and in 1830, 259,856,000 lbs. It is remarkable, that at present more than one-half of our cotton wool comes from the United States, whereas previously to 1790, North America did not supply us with a single pound weight of raw cotton. In fact, at the time (1784) when Egypt, and other portions of Africa, with Hindostan, failed to supply to England her increasing demand of

the staple, eight bags of cotton were seized at Liverpool on board of an American vessel, because it was supposed by the custom house officers that such an amount could not have been raised in North America.

Out of 19,900,000 lbs. of cotton wool imported in 1786, 5,800,000 lbs. came from the British West Indies, 5,500,000 lbs. from the French and Spanish Colonies, 1,600,000 lbs. from the Dutch Colonies, 2,000,000 lbs. from the Portuguese Colonies, and 5,000,000 lbs. from Smyrna and Turkey; whilst out of 227,760,000 lbs., being the import of 1828, 151,652,000 lbs. were from the United States, 29,143,000 lbs. from Brazil, 32,187,000 lbs. from the East Indies, 6,454,000 lbs. from Egypt, 5,893,000 lbs. from the British West Indies, 726,000 lbs. from Columbia, and 471,000 lbs. from Turkey and Greece.

It is supposed that about two millions of persons are engaged directly, and about two millions more indirectly, in the manufacture of the raw material into cotton cloth in Great Britain alone.

### Introduction into the United States.

In the Southern States, many of the planters, and other gentlemen residents, had for a long time been accustomed to small fields of cotton, but it had never become an export, and none conceived the important part which the cotton plant was about to play in the commercial prosperity of the Southern States—for its cultivation can only be carried on advantageously as far as Virginia, as it requires a certain duration of warm weather to perfect its seeds, and consequently any further tending to the northward ends in failure.

As the machinery for the proper manufacture of the raw material into cotton cloth became more improved, so did the demand for the production become greater, and the impulse having been once given, the small fields soon became plantations. But still, it was, although a rapidly increasing, yet by no means a considerable, article of commerce.

At length, however, Hargreaves, Arkwright, Crompton, Cartwright, and many others arose, and, aided by the steam-engine of Watt, so vastly improved the machinery for the production of cotton cloth, that the consumption far exceeded the supply. It was found then, that not without immense expense could the fibre be separated from the seed to which it was attached. But the necessity produced the man—the bane its antidote—a New Englander from Massachusetts on reaching Georgia, where he had determined to settle, at once perceived the difficulty, and his genius soon supplied the want, by the invention (1793) of the *saw-gin*, commonly called the *cotton-gin*—and that so perfectly, that Eli Whitney's invention has held to the present day without material improvement.

## Cultivation of the Cotton Plant, more particularly in the Southern States of America.

The cotton plant flourishes in a dry sandy soil, and grows well where the land is too poor to produce any other valuable crop. The vicinity of the sea is favorable for its cultivation, as the salt clay mud acts as a manure, and the saline breezes as a stimulant. Wet seasons are found to be fatal to the plant. The preparations for planting cotton begin in January. The first care of the planter is to clear the fields, which are covered with the dry stalks of the crop of the preceding year. The field hands are accordingly called into requisition, and by breaking down the cotton stalks with heavy clubs, and pulling them up by the roots, the land is soon rendered arable. The stalks are then collected and burned.

About the middle of March, or the beginning of April, the plough begins its work. The "water furrows" about five or six feet apart, are made by a heavy plough, which brings the surface of the ground into ridges, in the centre of which is next run a light plough, making "the drill," as it is called, that is, the depository of the seed. Next comes the sower, who profusely scatters the cotton seed into the newly made "drill." And the harrow succeeding, finishes temporarily the various labors of planting.

From two to three bushels of seed are sufficient to plant an acre of ground—this is but a slight expense, as the quantity of seeds collected at the gin-house is enormous.

At the end of from six to ten days, if the weather prove favorable, the young plant makes its appearance, and what is termed "the scraping" of the crop, now begins. A light plough is first employed, which *throws the earth away from the plant.* The field hands then come with hoes and cut away weeds and superabundant shoots, and leave single plants on little hills at about two feet apart. "Scraping" the crop is an extremely delicate and difficult operation, when rightly performed.

Often many rows have to be re-planted from the operations of the "cut-worm," or *Agrotis xylina*, and other causes, many of which are unknown; but if all goes well in two weeks after "the scraping," the plough is again introduced, which *throws the furrow on to the roots* of the now rapidly growing plant, and the hoe perfects the field work, until the month of June, when the "water furrows" are deepened, and the plough and hoe are used for the last time.

In the month of July the sun makes the "cotton bloom" appear. This "bloom" is of a beautiful light, but warm cream colour. It is considered that the magnificent fabrics which astonished even the polished and powerful Court of Spain, retained much of the natural brilliance and fine gloss which cotton pure from the fields always exhibits.

The *cotton blossom* is born in the night, glows in the morn, but decays at the meridian. The day following its appearance, it has changed to a deep red, and, ere the sun goes down, its petals have fallen to the ground, leaving enclosed in the capacious calyx a scarcely perceptible *germ.* In its incipient and early stages, this germ is called "a form," and in its advanced and perfect state of existence "a boll."

The growing cotton is liable to many accidents, and "rust," "rot," "the blight," generally caused by a species of borer or pith worm, the *Ægeria carbasina*, a species of gangrene, and wet seasons, often cause great injury. The "boll," more especially of the Upland cotton, is subject to the depredations of the *Heliothes Americana* or *boll-worm.* The *Phalena Gossypion* is the *boll-worm* usually found among the Sea Island Cotton.

The season of cotton picking, always performed in fine weather, after the morning dew has disappeared, commences in the latter part of July, and continues uninterruptedly to December. The work is not heavy, each field hand has a basket and a bag; the basket is left at the head of the "cotton rows", the bag is suspended from the "picker's" neck by a strap, and is used to hold the cotton as it is taken from the "boll." The usual method is to take away the seeds and cotton, leaving the empty husks. In the East the whole pod is gathered, but the husk being apt to break and mix with the cotton, this is found to be disadvantageous. When the bag is full it is emptied into the basket. Some negroes are able to exceed three hundred pounds of "seed cotton" a-day, but they are extraordinary. The "pickers" have to go over the same fields often, as the cotton does not all ripen at the same time. The cotton is carried from the field direct to the "packing-house" provided the weather is favorable, but generally, or at least very frequently, the cotton is spread out on scaffolds where it is left to dry, and all extraneous matter picked out when perceived.

The "packing-room" is immediately over the "gin-stand" in the loft of the "gin-house"; by this arrangement the cotton is conveniently moved down a causeway into the "gin-hopper."

Much of the comparative value of cotton depends upon the excellence of the "cotton-gin," for if the seeds be left in the wool it becomes oily and mouldy, and thus deteriorates in value. Some "gins" separate the staple from the seed far better than others, while all are dependent, more or less, for their excellence, upon the judicious manner in which they are used.

A "gin-stand" worked by the steam-engine has been brought into requisition upon large plantations, and found eminently serviceable, but if worked by four mules with constant attention from the persons in charge, it will make up four bales of four hundred and fifty pounds each a-day, but the average amount does not equal this.

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The "baling" of the cotton, which is accomplished generally by a single but powerful screw, ends the labor of its production on the plantation. The "baling" once completed, the cotton is ready for exportation.

One thousand pounds of "seed-cotton" to the acre, which makes two-thirds of a bale of "ginned-cotton" of four hundred and fifty pounds, is considered a very large yield, but it is but seldom that any land remunerates so well the labor of the planter.

In the greater part of India, the use of machinery for the purpose of separating the cotton from the seeds, is unknown; and all the cotton is picked by hand. A man can scarcely by this method, separate more than one pound of cotton in a day. By this we see the great service which the "cotton gin" performs, for by its aid about three hundred weight of cotton may be cleaned in a day, not partially, but entirely, and although it injures to a certain extent the fibre of cotton, still all the cotton grown in the Southern States (the sea-island alone excepted), is cleaned by its means.

We have seen, in the foregoing pages, that the productions of the cotton plant have not acquired their present high standing without a long and an arduous struggle,—before history was the cotton plant flowered, and yet it was but very recently that cotton cloth became so necessary to human comfort, or even was known as an article of commerce.

How finely it illustrates the vast resources of the Divine power, which from an apparently useless shrub, gives employment to millions of beings, and sustains even nations by its cultivation and its produce.

In that portion of the subject which relates more especially to Great Britain, and in which is pointed out the rise and rapid progress of the manufacture into cloth of the raw material produced from the cotton plant, we have indulged in a few statistics in order that we might prove at once the rapidity with which the demand for the produce arose in England, and the equal progress of the cultivation of the plant in the Southern States of America. In one year Great Britain received no cotton wool at all from that source, but a few years elapsed and her chief reliance was on the South.

There are many who hold the opinion that the East Indies will yet be enabled to furnish the manufacturers of Great Britain with a sufficiency of the raw material, but ideas are often delusive, and the opinion, although gaining ground, remains to be proved.

In Africa also, the cultivation of the cotton plant is receiving more attention; and in far-off New South Wales, it is hoped that the plant may flourish, and become a great export and source of wealth to the Colony.

F. R. STANTON, *Queen's College.*

# SECOND SESSION.

*Eighth Meeting.*

FRIDAY EVENING, 15TH NOVEMBER, 1861.

The Rev. Professor Williamson, LL. D., Vice-President, in the chair.

The chairman opened the proceedings by a short introductory address, in which he alluded to the recent origin of the Society, notwithstanding which, it had already struck its roots deeply into the soil, passed the period of youth, and grown up into a goodly tree, whose branches were spread far and wide. Already, he said, contributions and applications for membership were almost daily being received not only from various parts of Upper and Lower Canada and the adjoining States, but also from Britain, and France, and Italy, and Germany, and even our Australian colonies. And not only so. The Society, young as it was, had already acquired the maturity requisite to enable it to bring forth abundant fruit. Its contributions to science, recorded in the "Annals" of the Society, and in numerous scientific journals of Canada and Britain, were already well known. A Botanic Garden had also been established in Kingston, the first of the kind in Canada, and one that might be expected ere long not only to add to the range of scientific knowledge, but also to yield valuable economic results from the experiments that would be undertaken as to the plants suited to our climate. A public Herbarium was also in course of formation, to which, as in other countries, the student might repair to resolve his doubts in the determination of obscure species. At this season of the year, the plants which form the objects of the botanists study go to rest, so also the botanist himself withdraws from his pleasant and healthful researches in the fields and woods; but, as there is no real rest in the case of the plant, as the tissues go on developing, and the juices are being elaborated even beneath the snows of winter, so the botanist also does not now pass into a state of inactivity. Our winter meetings begin, the members come together, and an opportunity is afforded of elaborating and making known the results of the summer's work. The chairman concluded by alluding to the valuable aid that had been derived from Prof. Gray and Sir Wm. Logan in forwarding the objects of the Society, and expressed

a hope that our Provincial Government would view the labours of this Society in the same favorable light in which they were viewed by scientific men, and give to the Society that countenance and aid which the Governments of other countries did not fail to bestow upon similar institutions.

The following names were added to the list of subscribers:—Mrs. Macauley, King street; Rev. H. Mulkins, Portsmouth; Rev. John H. McKerras, M.A., Bowmanville; Alexander Bell, Perth; David Smart, President of the Horticultural Society, Port Hope.

The following were proposed and duly elected Corresponding Members:—Mrs. Traill, Westove, near Peterboro'; T. Sterry Hunt, F.R.S., Montreal; W. Mitton, A.L.S., Hurstpierpoint; Prof. Caspary, Konisberg; T. Caruel, Florence; Rene Lenormand, Vire; Aug. Todaro, Palermo; Dr. Fitch, Salem; W. Wilson, Warrington; Prof. Wood, Brooklyn; W. S. M. D'Urban, 14 Suthernhay, Exeter, Devonshire.

Extensive donations to the Botanic Garden were announced from Prof. Asa Gray, Harvard University; Mrs. Ferguson, Bellevue Terrace; Rev. Dr. Machar, Andrew Drummond, Esq., G. B. Kirkpatrick, Esq., Hugh Fraser, Esq., Miss Mason, George Baxter, Esq., Mr. Yeomans, M Flanagan, Esq., Prof. Litchfield, Judge Logie, Hamilton; Prof. Williamson, Prof. Weir, Mr. A. T. Drummond, and others.

Donations of dried specimens of Canadian Plants were announced from Mr Billings, Prescott, Mr. Macoun, Belleville, Dr. McGillivray, Chelsea, C. E., Mr. T. F. Chamberlain, Farmersville.

Prof. Lawson read a letter from Sir William Logan, F. R. S., Director of the Geological Survey of Canada, announcing the presentation to the Society of the large collections of plants made by the officers of the Geological Survey on the following explorations, viz:—

From the Rouge country of Argenteuil and neighborhood, by W. S. M. D'Urban.

From Gaspe, Lake Superior and Lake Huron, by Robert Bell.

From Eastern Townships, Labrador and Newfoundland, by James Richardson.

Mr. R. V. Rogers, the Librarian, presented the following list of contributions made to the Society's Library since last meeting:—

From Edward Tuckerman, Professor of Botany in Amherst College, the following works by the donor:—Lichenes Americæ Septentrionalis Exsiccati Fascic. III & IV, V & VI, 2 vols; Lichenes from the Botany of Wilkes' Exploring Expedition; Observations on North American and other Lichenes; Synopsis of the Lichenes of New England, other Northern States and British North America; Enumeratio Methodica Caricum quarundam; New England's Rarities, discovered by John Josselyn, Gent., with introduction and notes by E. Tuckerman, M. A.

From Asa Fitch, M. D.—His First and Second Reports on the noxious, beneficial and other insects of the State of New York.

Proceedings of the American Philosophical Society—No. 65—from the Society.

Proceedings of the American Association for the Advancement of Science—14th meeting—from the Association.

From the Wilmington Institute—Catalogue of the Phænogamous and Filicoid Plants of Newcastle County, Delaware, by Edward Tatnall. Five copies.

From K. McIver, M. B. S. C.—Report upon the present condition and future prospects of tea cultivation in the N. W. provinces of India, with MS. notes.

From Dr. Balfour, Prof. of Medicine and Botany, University of Edinburgh, Hon. M. B. S C., the following paper by the donor:—Observations on Temperature in connection with Vegetation.

From Dr. Lauder Lindsay, F. R. S. E, &c., Hon. M. B. S. C., his paper on the Flora of Iceland.

From Prof. Lawson, Sec. B. S. C.—Bonplandia, a Botanical periodical published in Hanover, 15th May, 1861, containing an article on the B. S. of C.

From Prof. Cleghorn, Madras—Official Reports on the new Gutta Plants of India.

Also numerous Flower and Seed Lists from Vilmorin, Andrieux & Co., Paris; from Handasyde, McMillan & Co., Melbourne, and from Prince & Co., Long Island, N. Y.

Dr. Dickson, Prof. of Surgery, moved a vote of thanks to the various donors. He alluded to the valuable character of some of the donations, such as those of Professor Tuckerman, and especially of Sir William Logan and Professor Asa Gray of Harvard Sir William had sent to the Society the various collections of plants that had been made at different times by the officers of the Geological Survey of Canada.—Many of these were from localities inaccessible to ordinary collectors, and were of great interest. Independent, however, of the intrinsic value of these very large collections, we must regard the compliment paid to us by Sir Wm. Logan in making us the custodiers, as an indication of his confidence in the ability of our Society to sustain the character of botanical science in the country. Professor Gray's invaluable donation from the Cambridge Garden could scarcely be overestimated, for it, along with the donations of our local horticulturists, had enabled us in a short time to form a Botanic Garden, and the force of our example in this respect was already beneficially felt by other cities in Canada. Coming at such a time, when the country is distracted by civil war, we must appreciate Professor Gray's donation as a special mark of favor, and accord our thanks with more than ordinary fervour.

Professor Lavell seconded the motion, and alluded particularly to the donations of trees, shrubs and plants that had been made by our local horticulturists. Thanks were cordially voted to all the donors.

Very large specimens of tobacco-leaf grown in Pittsburgh, were exhibited by Mr. E. G. Ferguson.

Large plants, in flower, of Richardia Æthiopica and Ricinus communis, were placed on the table by Mrs. Lawson and Dr. Fowler.

A head of Indian corn, infected with smut, was exhibited from the farm of Mr. Lucas.

Specimens of Anacharis Canadensis were exhibited from Judge Logie, Hamilton, who stated, in a note accompanying them, that the plant was abundant.

Professor Lawson, the Secretary, read communications from the following botanists, chiefly in reference to donations, the exchange of specimens, &c. :—Mrs. Traill, Lakefield; Dr. Muller, Melbourne; Dr. Auguste Le Jolis, Cherbourg; Mr. Rene Lenormand, Vire, (France); Prof. Kutzing, Nordhausen; Prof Tuckerman, Amherst; Prof. Asa Gray, Harvard; Dr. Fitch, Salem; Prof. Thurber, Lansing, Michigan; Asst.-Prof. Caruel, Florence; Mr. Todaro, Director of the Botanic Garden, Palermo; Sir William Logan, Director of the Geological Survey of Canada; Principal Dawson, Montreal; Rev. A. F. Kemp, Montreal.

A letter was read from J. Phayer, Jr., Esq., Secretary of the Montreal Agricultural and Horticultural Society, stating that the members of that Society were desirous of establishing a Botanic Garden in Montreal, and requesting any reports, documents and suggestions. The Secretary was authorised to send the "Annals," and other publications, to the Montreal Society, as published, and to afford any additional information that might be required.

The following papers were read:—

1. Report on the injurious effects of Insects and parasitic Fungi on the field crops in Canada during the past season. By Prof. Lawson, with specimens.

2. Remarks on a species of Acarus infesting the Concord Grape. By Octavius Yates, M. D. Specimens were exhibited, and a microscopical drawing of the Acarus.

3. Remarks on the Medicinal Plants of Harrowsmith, &c. By Thomas R. Dupuis, M. D., Odessa, with specimens.

4. On a new culinary vegetable, Chærophyllum bulbosum. By Mrs. Prof. Weir.

5. Returns of the periodical phenomena of vegetation during the season 1861. By John Macoun, Belleville; B. Billings, Prescott; A. T. Drummond, B. A., Kingston; T. Dupuis, M. D., Odessa; Judge Logie, and Miss Crooks, Hamilton.

*Eighth Meeting.*

## THURSDAY EVENING, 19TH DECEMBER, 1861.

Very Rev. Principal Leitch, President, in the Chair.

The following candidates were balloted for and duly elected Fellows;—Dr. George Thurber, Professor in the State Agricultural College, Lansing, Michigan; E. J. Fox, Bath; Dr. McGillivray, M. D., Chelsea, C. E.; John K. McMorine, Almonte.

The following names were added to the List of Lady Members and Subscribers:—Mrs Prof. Dickson, Johnson Street; Mrs Prof. Mowat, Johnson Street; J. Phayer, Jr., Secretary of the Montreal Agricultural and Horticultural Society; Mr Murray, King Street; Josiah J. Bell, Carleton Place, C. W.

The following were elected Corresponding Members:—Archibald Hall, M.D., L. R. C. S. E., Professor of Obstetrics, University of McGill College, Montreal; Rev. A. F. Kemp, Montreal.

The Librarian presented the following contributions to the Society's Library:
Class Book of Botany. By Alphonse Wood, M. A. From the author.
Seed Lists from Vilmorin, Andrieux & Co., Paris, &c.

The President opened the proceedings by a short address, in which he alluded to the successful progress made by the Society, the standing which it had already assumed, and the interest with which its proceedings were regarded by scientific men in European countries.

The following papers were read:—

1. Account of a skiff expedition up the Gananoque River during the month of May, 1861. By John V. Noel.

2. A Summer Ramble in the Woods. By John May, A. M. Read by Prof. Litchfield, M. D.

3. On the Aquarium. By Prof. Litchfield, M. D. In illustration of this paper, a very interesting fresh water Aquarium, furnished with numerous living plants and animals, was exhibited.

4. On the Ferns of the Gatineau District. By D. McGillivray, M. D. Communicated by James C. Smith.

5. Letter from J. D. Trousdale, M. D., with particulars of a case of poisoning with Cicuta maculata. Read by Prof. Lawson.

At this and the preceding meeting numerous letters were read from members and others, desirous of entering into correspondence with the Society. The following is a selection from the correspondence:—

Palermo, li 11 Luglio, 1861.

Chiarissimo Signore,

Per mezzo del Bullettino della Societa Botanica della Græcia, sono venuto in conoscenza, che una Societa Botanica vi e stabilita al Canada, di cui ella ne e il Secretario. Io amerci di entrare nelle relazioni le pin intime e le piu frequenti colla conspicua Societa che vi e costituita, offrendole dal mio canto il cambio delle piante secche che nascono spontanee in Sicilia, non che i semi che il Giardino Botanico da me diretto mette in ogni anno in commercio. Per le piante secche io non le divizzo in Catalogo, potendo tanto la Societa, che i suoi membri avoalersi sia della Synopsis Floræ Siculæ del Gussone, sia delle Flore Italiane di Bertolone e Parlatore, posse dendo nell 'erbario, in una buona quantita di doppie, tutte quasi le piante sinora ritrovate in Sicilia. Per i semi le invio il catalogo dell 'anno corrente, sul quale suo Ella fare la sua scelta. In ricambio io accetterei qualsivoglia pianta dell' America anco la piu volgare, e semi e bulbi delle piante le pin ovvie nel Canada o di qualsivoglia ultra contrada. Per la rimessa dei semi, e delle piante secche che potrebbero rispettivamente farsi la cosa pin interezzante o'e di' stabilire i mezzi di communicazione. L'Orto Botanico di Palermo possiede agenti spedizionieri in tutti i porti principali del Mediterraneo, come in Marsiglia, Malta, Genova, Livorno, Napoli, e se abbisognasse si potrebbe anco interessare il Governo del Re d'Italia; quindi dovrebbe ella farmi conoscere in qual punto di Europa, ed a preferenza dei' Mediterranee le riesce pin facile di far pervenire gli oggetti che potrebbe inviarmi, e quale e la via pin facile per rimetterle cio che desidera di Sicilia.

Rilevera Ella di quale utile potrebbero essere le nostre relazione nell' utile della Scienza, e son sicuro che fera buon vizo alla mia offerta.

Riceva intanto gli attestati della mia divozione et mi creda

Suo div. e obl. serv.,

AGOSTINO TODARO,

*Direttore del orto Botanico di Palermo.*

Al Chiarissimo Signore Mr. Prof. Lawson,

*Secretario della Societa Botanica del Canada, Kingston.*

[*Translation, by Professor Williamson.*]

Palermo, 11th July, 1861.

By means of the Bulletin of the Botanical Society of Greece, I have learnt that a Botanical Society has been established in Canada, of which you are the Secretary. I should like to enter into the most intimate and frequent communications with the eminent Society which has been formed there, offering to it on my part the exchange of the dried plants which are indigenous to Sicily, as well as the seeds which the Botanical Garden under my direction brings every year into the market. As to the dried plants, I do not arrange them in a Catalogue, the Society, as well as its members, having it in their power to avail themselves either of the *Synopsis Floræ Siculæ* of Gussone or of the *Flore Italiane* of Bertolone and Parlatore, having in the herbarium a large number of duplicates of almost all the plants hitherto found in Sicily. As to the seeds, I send the Catalogue of the current year, out of which you may make your choice. In exchange I would accept any American plants you please, even the most ordinary, and seeds and bulbs of the plants which are most common in Canada, or of any other country. As to the transmission of the seeds and dried plants, which I shall be able to send you in return, the most important thing is to establish the means of communication. The Botanical Garden of Palermo possesses expeditionary agents in all the principal ports of the Mediterranean, as in Marseilles, Malta, Genoa, Leghorn, Naples, and if it were necessary could also interest the Government of the King of Italy. You will therefore have to let me know to what point of Europe, and especially of the Mediterranean, it would be most convenient for you to transmit the articles you may be able to send me, and what is the most easy way of remitting to you what you want from Sicily.

Consider of how great utility our correspondence will be to the interests of the science, and I am sure you will look favorably on my offer.

Meanwhile receive the assurances of my devotion, and believe, &c.,

AGOSTINO TODARO,

*Director of the Botanical Garden of Palermo.*

CHERBOURG, 15TH AUGUST, 1861.

SIR,

I beg to acknowledge the receipt of Vol. I., Part I., of "Annals of the Botanical Society of Canada," in perusing which I got the information (p. 19) that I had been selected as a Corresponding Member of that learned Company. I request you will be so kind as to present to the Council and Fellows of the Canadian Society my warmest thanks for that honour, so unexpected, and assure them I shall be happy if I may be useful to the Society in contributing some plants for their herbarium. I shall be glad to know if such contributions might be acceptable, and in what manner or way I can forward them. If any of the learned Fellows of the Society were specially studying marine algæ, I should be glad to exchange the species of our coasts against a numerous set of samples of Canadian species.

I beg you will inform me whether the number of the "Annals" was intended for the Library of our Society of Cherbourg, or for my own library. In the latter case, I should solicit a second set of those publications for the Society, who shall send you in exchange their Memoirs.

I have the honor to inform you that the Society Imperial of Natural Sciences of Cherbourg, at their meeting of 9th inst., have, after my proposition, elected you their Corresponding Member.

I am, very respectfully, Sir, your very obedient servant,

AUGUSTE LE JOLIS, *Dr. Philos.*

DR. GEORGE LAWSON, Professor, &c., Kingston.

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VEREHRTER HERR UND COLLEGE!

Yhr werthes Schreiben vom 29 August a. c. habe ich am 13 September a. c. erhaltenund ich danke Yhnen, so wie den geehrten Mitgliedern der Botanical Society of Canada, dass Sie mich als auswartiges Ehren Mitglied in Yhren Kreis aufgenommen haben.

Gegenwartig beschaftigt mit der Herausgabe des XII. Bandes meiner, Tabulæ Phycologicæ wird es mir erst, im nachsten Yahre moglich sein, Yhnen eine Anzahl Algen der niedern Ordnung aus meiner Sammlung auszusuchen und zu ubersenden. Wollen Sie mir inzwischen Suss Wasser Algen aus Yhrem Lande ubersenden, so werde ich gern die Untersuchung und Bestimmung derselben uber nehmen. Ich bitte dann aus die einzelnen Exemplare mit *nummern* zu bezeichnen.

Indem ich Ihnen und sammtlichen geerhrten Mitgliedern der Botanical Society of Canada meinen herzlichen Gruss darbringe zeichne ich mit vorzuglicher.

Hochachtung, Euer Hochwohlgeboren, gehorsamster,

DR. KUTZING, *Prof.*

AN HERRN PROFESSOR LAWSON, Kingston, Canada.

Nordhausen, d. 20 September, 1861.

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FLORENCE, 10TH JULY, 1861.

SIR,

I have been informed that a Botanical Society, of which you are the Secretary, has been founded in your town with a view to further the interests of science, and that one of the means intended to be employed by the Society will be exchanges of plants. Although it is not stated expressly, I suppose foreign botanists will be admitted to partake of the advantages of these exchanges; and if such were really the case, I should beg leave to offer to the Canadian Society collections of Italian and especially Tuscan plants, for which I would thankfully take in return American plants, especially *Ranunculaceæ*, of which I intend working up a monograph. Perhaps the fact of my being the author of a Flora of Tuscany may give some additional value to my plants.

I should be very much obliged if you would favor me with an answer; begging you to believe me,

Yours sincerely,

T. CARUEL.

PROF. LAWSON, Secretary of the Botanical Society, at Kingston, Canada.

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PARIS, 21ST NOV.

SIR,

In a number of the "Phytologist" I have lately read a very interesting advertisement, by which you make known that the Botanical Society of Kingston wishes to exchange plants with foreign botanists. Having myself long since the same intentions and purposes, and being very well connected for making such exchanges with several European and Algerine botanists, notwithstanding gathering a great quantity of plants in this country, I

inform you that I will be very glad to correspond for botanical specimens with the Kingston Society. As soon as you will have given a favorable answer to this letter, I will send you a large packet of specimens of this country; in return, you will very much gratify me by forwarding such interesting plants as *Onagrariæ*, *Cruciferæ*, *Calycanthaceæ*, of which many kinds and species are peculiar to North America.

I am, Sir, your most obedient,

DR. EUG. FOURNIER,
*Vice-Secretary of the Botanical Society of France,*
20, Rue Bonaparte a Paris.

To Professor Lawson, Secretary of the Botanical Society, at Kingston, Canada.

## COMMUNICATIONS FROM DR. BERTHOLD SEEMANN.

Professor Lawson read letters from Dr. Seemann, who had lately returned to Europe from an Exploration of the Fiji Islands. The letters were accompanied by a copy of the "Bonplandia," a botanical journal, ably edited by Dr. Seemann, and containing an article on the Botanical Society of Canada, of which the following translation has been prepared by Mr. John Machar, A. M., a Fellow of the Society:

The Botanical Society of Canada.—Were the Spanish adventurers, who, after a bootless quest for imagined treasure, cried out in their disappointment "Aqui nada," to visit Canada now, after the lapse of three hundred years, they would probably see cause to choose another exclamation than the one which, if tradition is to be believed, gave to a land of so great promise so unpropitious a name. In every direction signs of prosperity and progress meet the traveller's eye. Steamships of prodigious size and power maintain a regular and rapid communication with the ports of the old world. Railroads traverse the country in all directions. The white sails of countless vessels enliven the great inland waters, and what was erewhile regarded as the daring feat of a reckless Indian, to shoot the rapids of Lachine in his birch bark canoe, is now part of the daily route of Canadian steamboats. With the aid of the ever-increasing Teutonic element, surmounting the obstacles afforded by the early circumstances of the country, * * * Canada marches on with giant strides towards a prosperous future. Edifices, which can challenge Europe to surpass them, adorn the streets of new cities, arisen as if by magic from the soil. The bridges spanning the Niagara, the Ottawa, and the mighty stream of the St. Lawrence, are with reason counted among the wonders of the world. Science, now pioneer like, striding on in advance of the arts, now, singularly enough, straggling behind with halting step, has found here a congenial home—a hearty welcome. To this the rapidly rising universities, the well known school system, *the Institut Canadien*, containing in itself the germ of a national academy, the Natural History Society of Montreal, amply testify. And now to this noble array a new union has been added, under the name of the Botanical Society of Canada—a union to which we can extend a hearty welcome, not as botanists alone, but even as Germans.

Between the inhabited parts of North America and the inhospitable regions of the Arctic circle there lies a broad belt of land, which has hitherto been to the botanist almost a *terra incognita*. In Canada, therefore, a Botanical Society has for its operations a most extensive field, whereon many a (new) plant buds, blooms and withers unnamed, unknown—whereon many a species attains its northernmost limits, and awaits the hour when some savant shall record its discovery in the annals of the science.

Such facts as these, more even than that of 93 members having given in their adherence to the society on the very day of its foundation, encourage us to hope that in this new body we may expect something more than one of those ephemeral unions of local savans, who exhaust all their strength in the production of annals which are never read by the learned, whose perpetual contentions as to who shall fill their petty offices make them the laughing-stock of their fellow-citizens, and whose scientific investigations, because they do not come under the notice of the general public, are seldom conducted with the care exercised by those who know that their papers will not only be read beyond their own locality, but perused with interest by the learned of other lands. We in Europe will watch with interest the progress and the labors of the Canadian society, and we shall ever be curious to learn the result of each new expedition into the unknown region. The very circumstances of the infant society

afford a sufficient guarantee that it will never degenerate into a mere inert local club. Its mission is one in which the whole botanical world is interested, and all the gentlemen who met together on the 7th December, 1860, at Kingston, in particular the members of the faculty of Queen's College, deserve the cordial thanks of their scientific brethren, both in the old world and in the new, for having so heartily laid their hands to the work of freeing Canada from the reproach of indifference to the claims of botanical science. Besides the interest which we naturally feel as botanists merely in the birth of a new society, ready to go hand in hand with us in the accomplishment of our common great end, for us as Germans the investigation of Canadian botany possessess the peculiar interest that one of our own countrymen, the gifted Frederick Pursh, first conceived and strove to execute the very plan now proposed by the Botanical Society at Kingston. After Pursh had travelled through the (then) United States, and had written on his return a Flora of North America, he set out once more for the new world, this time turning his steps towards Canada. Limited as were the means at his command, he explored a considerable part of Eastern Canada, and had almost completed his very valuable collection when the fruits of so many months of weary toil fell a prey to the devouring flames. Other misfortunes befel him, and on the 11th day of July, 1820, he died at Montreal, in the 40th year of his age, so poor that the charity of a few friends defrayed the expenses of his funeral. We may imagine his manes may have looked on with rejoicing when on the 7th December, 1860, forty years after his death, the exploration of Canada was undertaken once more, and the sequel promised to justify his most sanguine anticipations.

The first meeting of the new society was held in Queen's College at Kingston. Dr. Leitch presided, and in a genial speech set forth the object and the necessity of such an association. Universities, he thought, discharge only one half of their functions when they restrict themselves to merely communicating the existing sum of acquired knowledge. They should incite to, nay, should themselves institute, original investigations. Referring to the numerous attendance at this first meeting, he remarked the difference between the auspices under which this society was ushered into the world, and the circumstances attending the foundation of the great European learned societies, with what difficulty a handful of faithful disciples of science were brought together, and how from that handful, by dint of their steadfastness, were developed those institutions which were now the pride of the old world. After Dr. Leitch a somewhat longer address was delivered by Dr. Lawson, in whom we recognise an old acquaintance and former active member of the Botanical Society of Edinburgh. The science of botany, he remarked, had been hitherto more neglected in Canada than in almost any other educated country. Up to the close of the 18th century but five Botanical Treatises had appeared throughout the length and breadth of the North American continent. Much improvement had since been made, but a Flora of Canada yet remained a *desideratum*. To collect materials for this end must be the chief function of this Society, and the report of the investigations in this Province will occupy a prominent position in the (to be) published '*Transactions*.' Dr. Litchfield, whose talent for organization was of much use in the formation of the Botanical Society of London, next occupied the attention of the meeting. He dwelt particularly on the necessity of a Botanical Garden—set forth the advantages which would accrue to Canada from its institution, and directed attention to the means already at their disposal. Dr. Leitch ther passed in review what had been brought before the meeting, and after paying Dr. Lawson a well-merted compliment, moved, seconded by Dr. Williamson, 'That this meeting resolve to form a Botanical Society.' This motion having been unanimously agreed to, Prof. Mowat read the proposed laws, which, on motion of Dr. Dupuis, seconded by Dr. Yates, were received, with the reservation of the right of the Council to make any desired alterations. This having also been agreed to, the Botanical Society of Canada was declared to be constituted, and it was agreed that all official communications should be addressed to Prof. Lawson, Kingston, Canada. Business over, the members repaired to a sort of Converzatione in the Laboratory, where were exhibited microscopic preparations, drawings and scientific works, among which the reporter of the Daily News observed Schnitzlein's Iconography, Hooker's Rhododendrons, Harvey's American Algæ, Seemann's Herald Botany, Hooker's Flora of North America, and other illustrated works.

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22, Canonbury Square, London N.,
December 9, 1861.

Dear Sir:

Dr. Schultz Bipontinus, an intimate friend of mine, and a great laborer in the field of Compositæ, desires me to address a few lines to you, and through you to the Botanical Society of Canada. He is most anxious to get a set of Canadian Compositæ for his herbarium, and would be very glad if any member of your society would send

him what he could spare. Schultz would make him ample returns for what he gets, so that your members would not be the losers by this exchange. Anything sent to me shall be forwarded to him.

I had another article in the Bonplandia about your Society, using your reports (kindly sent to me), to show the usefulness of admitting *ladies* in popular societies, and at the same time giving a list of the papers you have published in the two first parts of your (I should say *our*) Transactions.

The Bonplandia will be illustrated with colored plates, drawn by Fitch and printed in England. This to commence on the 15th of December, 1861. None save really new genera and species will be coloured.

With best wishes for the success of your Society,

Yours very truly,

BERTHOLD SEEMANN.

## REMARKS ON THE PREPARATION OF SKELETON FLOWERS.

By Prof. JOHN R. DICKSON, M. D.

The parts intended for preparation should be macerated in rain-water until such time as the succulent portions are thoroughly decomposed. Summer is the best season for this process, and if the vessel in which it is conducted be exposed to the sun's rays, decomposition will more readily take place.

There should not only be sufficient water to cover the contents of the macerating vessel, but also an additional quantity added to make allowance for what will be lost by evaporation, so that no portion of the plant may become exposed to the air, and thus desiccated, as its form and color would thereby be destroyed.

At the end of a fortnight or three weeks, the plant may be taken out of the water and placed on some soft fabric such as flannel, and an attempt made to remove the succulent parts by gentle friction with a camel's hair brush. If the fibrous part is not readily denuded thus, the plant must be replaced in the water, and allowed to remain some time longer, but occasionally may be subjected to the process above indicated.

As soon as it is found that the succulent parts can be readily removed, the maceration has been continued long enough; the preparation should be removed from the water, and the ligneous portion thoroughly but carefully cleansed and freed from all other tissues with the camel's hair brush.

If it is now found that the preparation is not sufficiently white, it may be bleached by immersing it for a few days in cold water, holding chloride of lime in solution, and may afterwards be exposed to the sun, or allowed to dry in a warm room.

If there is any difficulty in maintaining the natural shape of plant, the stem may be strengthened by passing fine wire for some distance through its centre, which will enable it to sustain the weight.

This process is adapted to the various parts of plants having a fibrous-tissue framework, such as stems, leaves, fruit and flowers, and also to grasses.

*Tenth Meeting.*

## FRIDAY EVENING, 10TH JANUARY, 1862.

The Very Rev. Principal Leitch, President, in the Chair.

In opening the proceedings the Chairman stated that the first blank in the Society had been caused by the death of Colonel Jackson, of Portsmouth, near Kingston, who had been well known as the most successful cultivator of culinary vegetables in this part of the country.

The President also alluded in feeling terms to the lamented death of H. R. H. the Prince Consort, which had cast a gloom not upon England alone, but upon every English colony and every country in which science was pursued.

The following new members were admitted, viz:

*Fellows*—Mr S. D. Grasse, Mr John V. Noel.

*Members*—Mrs Harper, Johnson Street; Mrs Maxwell Strange, Union Street; Miss Logie, Queen Street; Rev. K. Maclennan, Whitby; James Gray, Esq., Banker, Picton, C. W.

*Corresponding Members*—Dr. Ferdinand Cohn, Breslau; Dr. Patterson, Leith; Dr. W. H. Lowe, President Botanical Society of Edinburgh; Dr. Eug. Fournier, Vice-Secretary, Botanical Society of France, 20 Rue Bonaparte a Paris; Dr. Schultz Bipontinus, Hanover.

The Secretary exhibited specimens of the remarkable fruit of Martynia proboscidea, from the garden of Thomas Briggs, Jr., Esq., and from Mr A. Bell, Perth.

Professor Williamson stated that he had cultivated the plant successfully for many years.

The following donations were announced:

From John Watkins, Esq., a donation of sixty dollars, to be applied to the improvement of the Botanic Garden.

From Principal Dawson, Montreal, a collection of White Mountain Plants.

From Mr B. Billings, Jr., Prescott, a collection of Flowering and Cryptogamic Plants, chiefly mosses.

From Mr R. J. Holmes, F. B. S. C., for the Society's Library:—1-2. The Canadian Naturalist and Geologist, Vols. I. and II. 3. Strawberry Culture; by R. G. Pardee. 4-5. The Grape Vine, its Culture, Uses and History; by G. W. Johnson, 2 vols. 6. Studies in Animal Life; by G. H. Lewes. 7. The Principles of Botany, by W. H. Willshire, M. D., M. B. S. London. 8. The American Handbook of Ornamental Trees, by Thomas Meehan.

The following papers were read:—

1. Remarks on the mode of preparing Dissected Plants. By Professor Dickson, M. D. A very beautiful group of dissected specimens was exhibited from Mrs. Dickson, including some interesting species, such as Physalis Alkekenji, Datura,

Stramonium, Lunaria vulgaris, Ilex Aquifolium, Papaver somniferum, Hyoscyamus niger, Nigella sativa, Poa pratensis, Briza media, &c.

2. Lines written for the Botanical Society of Canada. By Mrs Prof. Weir. Read by Rev. Prof. Weir, A. M.

3. On Pimpla lunator and other enemies to the insect-enemies of Vegetation. By Edward C. Fox, Bal. Coll., Oxon, F. B. S. C., with specimens.

4. On the Shore Limits of the Marine Algæ of the North Eastern Coast of the United States. By Rev. Alex. F. Kemp, Cor. M. B. S. C.

In illustration of this paper, specimens were exhibited from Mr. Kemp of Agarum Turneri var. trilaminatum, Chætomorpha melagonium, Gigartina mammilosa, Halosaccion ramentaceum, Furcellaria fastigiata, and Fucus furcatus.

A very interesting collection of American Sea-Weeds was also exhibited from Mrs John Macpherson, Barrie Street.

Professor Williamson alluded to some of the more interesting phenomena presented by the distribution of marine plants along the American coast, and referred to some of the results of observations which he had made at different points along the coast.

Principal Leitch spoke of the importance of such researches in several points of view. The fact of plants being found to inhabit definite zones or lines along the shore to which their distribution was restricted, as found by Mr Kemp, served to show that there was here an apparent barrier to that tendency to specific change which is argued for in the speculations of Lamarck, the author of the Vestiges, and Darwin.

5. On the Plants of the neighborhood of Ramsay, and adjoining localities. By John K. McMorine.

Office-Bearers for the Second Session (1861-62) were elected as follows:—

*PRESIDENT*:—VERY REV. PRINCIPAL LEITCH, D. D.

*VICE-PRESIDENTS*:—PROF. WILLIAMSON, LL.D.; PROF. DICKSON, M. D.

*COUNCIL*:

PROF. FOWLER, M. D., King Street.
W. G. HINDS, ESQ., Banker.
PROF. LITCHFIELD, M. D., Rockwood.
M. FLANAGAN, ESQ., City Clerk.
PROF. H. YATES, M. D., King Street.
W. FERGUSON, ESQ., Bellevue Terrace.
J. DUFF, ESQ., Princess Street.
J. J. BURROWES, ESQ., County Crown Attorney.
GEORGE BAXTER, ESQ., Pittsburg.
OCTAVIUS YATES, M. D., William Street.
THOS. BRIGGS, JR., ESQ., Regent Street.
PROF. LAVELL, M. D., Johnson Street.
AUGUSTUS THIBODO, ESQ., Johnson Street.
REV. PROF. WEIR, A. M., Queen Street.
JOHN WATKINS, ESQ., King Street.
JOHN CREIGHTON, ESQ., Arch Street.
REV. PROF. MOWAT, A. M., Johnson Street.
ARCH. J. MACDONELL, ESQ., Recorder.
JOHN CARRUTHERS, ESQ., Earl Street.
HUGH FRASER, ESQ., Pleasant Street.
JEREMIAH MEAGHER, ESQ., Union Street.
HON. ALEX. CAMPBELL, M. L. C.

*SECRETARY*:—PROF. LAWSON.

*TREASURER*:—ANDREW DRUMMOND, ESQ.

*CURATORS*:

MR. J. F. INGERSOLL,
MR. JOHN K. McMORINE,
MR. W. B. FERGUSON,
MR. JOHN BELL,
MR. A. T. DRUMMOND,
MR. ALEX. BELL.

*LIBRARIAN*:—MR. R. V. ROGERS, B. A.

# A SUMMER RAMBLE IN THE WOODS.

By John May, A. M.

*Read by Professor Litchfield, M. D., 19th December*, 1861.

Quite lately I was asked to write
A paper to be read to-night;
(Something on shrubs, or flowers, or trees;)
So here is my attempt to please,
As full of reason and of rhyme
As I could make it in the time.
It might, perchance, not be unwise,
Ere going further, to premise
That none can speak, with any shew
Of sense, on what he does not know;
And thus my simple, modest Muse
Avoids the lofty and abstruse,
But loves in simple garb to go
Where forests wave and streamlets flow.

O! it is sweet on summer morn,
When flowers the grassy mead adorn,
To wander in the wild-wood glen,
The thicket shade, the quivering fen;
To climb the heights and see the spray
Dash'd on the face of toying day;
To hear the distant waters roar,
Or gather pebbles on the shore;
To start the hare, or, with your cur,
To know the partridge by his whirr;
To hear on some tall bough the dove
Utter the soft complaint of love;
Whilst mocking squirrel on lofty limb
Defies you to get up to him;
The chipmonk, too, in nimble style,
Darts tim'rously to the stony pile,
Sits temptingly a moment there,
Then vanishes into his lair;
Or if, perchance, his house should be
Beneath the roof of some tall tree,
He quick descends, with sudden squeak;
For him your dog begins to seek;
First snuffs a while, then tears away
The leaves, the rubbish and the clay,
With many a howl and rapid scratch,
Intent the little scamp to catch:
Perhaps, while thus engaged, his prey
Makes his escape some other way,
Leaving his foe to dig with pain—
As better folks have done—in vain;
But, should the persevering brute
Find him at last beneath the root,
The hapless little creature's fate
Is far too mournful to relate!

You next descry, a few yards hence,
A squirrel sitting on the fence,
His wide tail sloping o'er his back,
Endeavouring a nut to crack,
Or chiselling out with yellow tusk
The fleshy part within the husk.
In high relief, on topmost rail
He sits; you think you cannot fail
To end his days with random shot;
You shy the stone—it hits him not!
Away he springs. and doubly quick
You give pursuit with murd'rous stick;
That lofty oak!—see how he strains
To reach it! should he, all your pains
Are lost; for if you have no gun,
Here is the end of all your fun.

Now, when your sport begins to fail,
Perchance upon the morning gale
A fragrant odour steals along;
At first 'tis faint, but soon how strong!
Then, as the odorous spot you fly,
A pretty creature you espy
With bushy tail above his back;
While broad, clean stripes of white and black
With fair pretence attract the eye
Of 'th unsuspecting passer-by.
Like some lost child of splendid sin,
All bright without, all foul within;
Or like the scamp with pious art
That hides the blackness of his heart;
Outward all grace and beauty bloom;
Within—more noisesome than the tomb!
A person, once, to skunks unknown,
Was rambling through the woods alone;
When suddenly, at bend of road,
He lights upon the skunk's abode.
Enravish'd with the creature's charms,
He takes the sweet thing to his arms;
Returning home at evening gray
He meets a neighbour by the way;
His prize displays, and asks "is that
Not a fine sample of the cat?"
Whilst thus engaged in quick retreat,
A sudden rustling at your feet,
Among the leaves and herbage dry,
Announces that a snake is nigh.
An instant fear your heart assails,
As one before the spectre quails
That sudden rises on his sight
Passing a lonely house at night:
A moment only: stooping quick,
You seize the nearest stone or stick;
His wrathful head is raised on high,
Malignant gleams his baleful eye;
His rapid tongue, fork'd, quivering, bright,
Breathes deadly challenge to the fight:
Brave, foolish thing! swift on his head
Descends the blow, and he is dead!
But, should you, in a boyish vein,
His scaly body part in twain,
Half moving off with toilsome gait
Leaves the remainder to its fate;
And only when the sun doth fail
Ceases the motion of the tail!
Or, if the serpent you would slay
A more refined and neater way,
Seize it as though it were a whip.
Snap it, and off the head will slip!

Pray whence this feeling mixed with fear
And hatred when a snake is near?
How comes it with such eager will
We haste the harmless thing to kill?
Who meets a partridge with his gun
And kills it, does so just for fun;
But all men seem to think it right
To kill the snake for very spite.
Methinks 'tis some unsettled score
Dated in ages long before
The flood, when Satan lying spake
From the curs'd belly of the snake
Words fraught with ruin and disgrace,
And death and torment to our race!
Hark! 'tis the baying of the hound;
The hemlocks echo back the sound.
Behold! a creature strange is here,
Thick coated with the prickly spear;
A bristling porcupine with skill
(Some people say) to hurl his quill.
Your dog, impatient, fumes in vain;
Advances, snaps, retreats with pain!
Swift on the sturdy creature's pate
Descends the club and seals his fate.

Whence comes that hollow, ringing sound
Echoing through the woods around?
Most like the sleeper's heavy snore,
Or rapid tapping at one's door?
At rise of sun, on April morn,
The farmer hears this rousing horn,
Invoking loud each slumbering thing
To rise and hail th' approach of Spring.
On yonder dry and barkless tree
The little workman you may see,
Pecking away with all his might
To bring forth maggots to the light;
With scarlet night-cap on his head,
Out early toiling for his bread.
Though hard the wood, 'tis morticed well,
In rows of holes all parallel;
Or curved with nicest art and rule
As though the bird had been at school.
Now, dragging forth the struggling prey,
He fills his beak and hies away
With wavy flight to where his brood
Are waiting for their morning food,
In a most curious house on high
Hid from the truant school-boy's eye.
And scoop'd and planed with nicest skill,
With no tool save the little bill,
In a tall trunk whose branchless form
Heeds not the howling of the storm;
But come away and let him rest,
Touch not the little fellow's nest.

Here dashes by the hurrying stream,
Scarce reach'd by one faint struggling beam;
Dense heaves the wood on either side
The swelling bosom of its pride;
Here lifts the oak its awful form
To woo the breeze or mock the storm;
The gloomy fir, of shapely height,
Rising so scrup'lously upright;
The maple, too, whose useful trunk
Affords us fuel, sugar, spunk;
The graceful elm, whose equal stem
The settlers found of use to them
To rear the barn, or simple hut
On which the basswood troughs were put,
Well hollowed out and laid with care,
Each one above an under pair,
Twofold; the insidious rain to catch,
In lieu of shingle, slate or thatch;
The basswood, seldom useful found—
Outward too soft, within unsound;
The spreading beech that idly fares
Two years for every one it bears;
The cedar, too, whose pounded bark
Oft lights the traveller in the dark—
Whose light, free wood material yields
To roof your house or fence your fields,
Or chase with sparkling heat away
The frosty breath of wintry day;
With various plants of humbler fame
Which space forbids me now to name.

Hark to the moaning of the wood!
The distant dashing of the flood,
As wild it tosses on alone
Its headlong path of craggy stone,
To where it lulls itself asleep,
Or faint its weary waters creep
Across the low and level marge,
And spread among the trees at large;
Once trees; now but a leafless grove,
Where the hoarse bull-frog loves to rove,
And raise that far-resounding note
That booms from his capacious throat.
Two Red-men, if the tale be true,
Once fell asleep in their canoe;
And when they woke a monstrous frog
Was sitting near them on a log;
In idle humour him they seized,
And the unlucky creature teased
By pouring spirits down his throat,
Then set the staggering thing afloat,
When loud he roared, "More rum! more rum!"
But the historian here is dumb,
Whether 'twas from the pain he bore,
Or that his frogship wanted more:
Yet all tradition plainly shows
That thus the bull-frog's cry arose.

Now droops the day on ocean's breast;
The weary warbler seeks his rest;
The sombre crow, with pond'rous flight,
Makes homeward on th' approach of night;
Whilst deeper in the ethereal plain
Laborious floats the heavy crane.
Night moves apace in ebon chair;
A peaceful silence fills the air,
Save when some dire mosquito wings
About your face, alights, and stings!
Or frogs symphonious join to raise
In neighb'ring pond their hymn of praise;
Or e'en remote in shady dell,
The half-heard tinklings of the bell
Shew that the greedy cow may fail
To seek betimes the welcome pail.
O! is there here some bearded man
Who, when a little school-boy ran
His dreary mile or lonely league,
Oppressed with terror and fatigue.
To seek the truant herd, not yet
Returned, although the sun is set?
If such there be, he too can tell
How vague fear in his heart did swell
As desperately he gallop'd by
The thicket shade where panthers lie;
And how his breath returned again
As he emerged into the plain.
This is the cows' accustomed spot,
Yet here the pluguy beasts are not;
A moment now he glances round;
He sees no sign, he hears no sound;
Before him lies the dismal road,
Dense woods around—the wolf's abode!
Fast beats the tim'rous youngster's heart;
He dashes on, but oft does start;
At stir of leaf or sigh of air,
He fancies some dread thing is there;
And scarce his very hat for dread
Will keep its place upon his head!
Swift ply the feet; no fleetest hind
Could leave the frantic youth behind.

Now o'er the sable robes of Night
Fair Cynthia sheds her silver light;
And, humming soft notes thro' the trees,
Wings gently by the evening breeze.
Night warns us home; too late's the hour
To seek for lichen, moss or flower;
Call in the dogs, bring home the gun,
My Summer Ramble now is done.

Kingston, Nov. 29th, 1861.

*Eleventh Meeting.*

## FRIDAY EVENING, 14TH FEBRUARY, 1862.

Professor Dickson, Vice-President, in the Chair.

The following new members were admitted:

Mrs Prof. Litchfield, Rockwood; Mrs Rybert Kent, Union Street; Miss Wylie, Almonte; Mr. Burrowes, Kingston Mills; Mr. Samuel Andrews, Clark's Mills, Camden.

Edward Tuckerman, A. M., Professor of Botany, Amherst College, was elected an Honorary Member.

Dr. Duncanson, Forth Bank, Alloa, was elected a Corresponding Member.

The following donations were announced:—From Judge Logie, Hamilton, a valuable collection of Tree Seeds for the Garden. From Professor Blytt, Christiania, his Norge Flora, part I. From the Australian Apiarian Society, the Society's Rules, &c. From the Board of Arts and Manufactures of Upper Canada, several numbers of their Journal. From the Horticultural Society of Melbourne, List of Prizes, &c. From Principal Dawson, Montreal, several papers on Fossil Botany.

The following papers were read:—

1. On Fungi.

2. List of Lichens collected chiefly on the Thousand Islands. By A. T. Drummond, Jr., B. A., and R. Drummond.

3. On the Polar Plant. By W. Gorrie, with Remarks by Rev. Prof. Williamson.

4. Additional observations on the Medicinal Plants of the neighborhood of Harrowsmith. By Thos. R. Dupuis, M. D.

5. Notices of the Great Dragon Tree of Orotavo, from the writings of Baron Humboldt and Prof. Piazzi Smith. By Rev. Prof. Mowat.

Photographs, including one of the Dragon Tree, taken by Prof. P. Smith at Orotavo, were shown by means of an oxy-calcium microscope; also, preparations illustrating the minute structure of woods, &c., and the reproductive organs of Cryptogamic plants, the antheridia and archegonia of mosses, &c.

## REMARKS ON DR. TROUSDALE'S CASE OF POISONING WITH CICUTA MACULATA.

Professor Lawson called attention to a serious case of poisoning that had occurred through the mistaken use of the roots of Cicuta maculata for those of Aralia racemosa. He remarked:—

Settlers in a new country are prone to seek, in the plants around them, reme-

dies for the diseases under which they suffer. The woods and swamps of Canada are rich in plants having energetic properties, and when mistakes are made through ignorance, or want of proper advice, melancholy accidents frequently happen. A case of this kind is reported as follows, in a letter from Dr. J. D. Trousdale, of Melrose, a graduate of the Kingston University, and a Fellow of the Botanical Society :—

"On the afternoon of Wednesday, 11th December, Mr. Henry Jones, of the Township of Thurlow, went out into his fields to gather what is commonly called "spignut" or spikenard (*Aralia racemosa*, L.), to make a syrup for his step-daughter, to relieve a "pain in the stomach." Unfortunately he gathered by mistake, the roots of another herb (*Cicuta maculata*, L.), of which he ate, and on returning to his house he cut off pieces, of which he and the different members of his family partook. They had no sooner sat down to supper than Mr. Jones leant back, and fell from his chair in a spasm, and in a few minutes more others of the family were taken ill. Being from home when sent for, I did not reach the patients till about ten o'clock in the evening (five or six hours after the first seizure), and in a few minutes afterwards, Dr. Chanonhouse, of Shannonville, who had also been sent for, arrived. We found Mr. Jones in spasms, which were subsiding, and most of the members of his family were very sick. We carried out the treatment for such cases, but seeing that Mr. Jones was sinking, we complied with his wife's request than another medical man should be sent for. All our efforts failed, and the man died in about twenty hours after partaking of the poison. By the vigorous use of emetics and other remedies, the three other members of the family who had partaken of the poison were restored. The surviving members described to me their sensations. They first felt a deathly sickness and sinking feeling in the regions of the heart and stomach, then extreme weakness of the lower limbs, followed by general weakness, in consequence of which they were unable to stand ; but all the while they knew *perfectly well all* that was being said or done. Even Mr. Jones, although unable to speak, would open his eyes when requested to do so, and would occasionally observe what was being done as though he knew all about it : but on account of the remarkable dilation of the pupils, he could only keep his eyes open a moment at a time. I never saw the pupils more, if as much, dilated, even by Atropa for the operation of cataract. There was also a twitching or throwing of the legs. Deceased's pulse was from 120 to 140 ; breathing variable, from 45 to 58.

J. D. TROUSDALE, M. D."

We have here a case, which, but for the timely services rendered by Drs. Trousdale and Chanonhouse, might have resulted in the death of a whole family.

Dr. Trousdale has determined the plant whose roots were used to be *Cicuta maculata*, L. He has also forwarded specimens of roots, dead stems, and fruit, to the Botanical Society, and an examination of these has confirmed the accuracy of

the determination. This plant belongs to the natural order *Umbelliferæ*, an eminently poisonous order, which contains such plants as Conium maculatum, Cicuta virosa, Œnanthe crocata, Æthusa Cynapium, &c. The Cicuta maculata, which has been the cause of the present accident, is known throughout Canada and the States, by such common names as Water Hemlock, Spotted Cowbane, Beaver Poison, Musquash Root, &c. That it is mistaken for Aralia racemosa, at this season of the year when foliage is absent, is not at all remarkable. However, in summer it more closely resembles other innocent plants of its own order, Umbelliferæ. The Cicuta is widely distributed. In the central parts of Upper Canada it appears to be common. It is recorded as growing at Montreal (Holmes' list of Herb.) ; and East Riding of Northumberland (Mr. Macoun). We have examined specimens from Prescott, (Mr. Billings), Churchill, Hudson's Bay Territories, (Mr. McTavish), Banks of Comale Creek, Texas, (Lindheimer), &c., so that it has evidently a wide range. It does not occur in any of our local plant lists, from Hamilton or the west, but as Torrey and Gray speak of it stretching to Oregon, it is probably common *throughout* Canada. Dr. Trousdale alludes to the accidental poisoning some time ago of seven horses, which fell a sacrifice to this weed in the same locality whence the present more serious case reaches us.

The plant grows in swamps and lowland meadows, from four to six or eight feet high, the stem is, at the base, of the thickness of the forefinger, more or less, cylindrical, hollow, finely striate with green and purple, sometimes spotted. The foliage varies greatly as in most water plants. The leaves are compound biternately divided, with short broadly sheathing petioles; segments lanceolate, of variable breadth, mucronately serrate, all stalked, the primary veins running to the *notches* (instead of the *points*) of the serratures. The flowers are in large, chiefly terminal, umbels, composed of little umbellets, with sometimes one or two leaflets as a false involucre. The involucels are composed of from five to six short linear leaves. The fruit is appropriately likened by Torrey and Gray to Anise. The root consists of a cluster of large somewhat fusiform tubers not unlike those of Aconitum Napellus. The tuber in section shows a large white pith, surrounded by a well-defined ring of a yellow or greenish hue, outside of which the tissue is paler, the outer skin brown. The whole tissue is soft and cellular, the cells being transparent, some containing minute, regular starch granules, and large quantities of a green oily fluid are seen throughout the tissue. The part forming the dark ring or zone contains spiral vessels, which present the anomaly of being angular, somewhat like scalariform vessels, but the fibre is unrollable, and the apparent angularity depends merely upon the nice adjustment of the sides of the spiral vessel to the smaller cells, with which it is surrounded.

The roots sent by Dr. Trousdale have been planted in the Kingston Botanic Garden.

It seems proper to allude to the allied species of Cicuta, viz., *C. virosa*, which is best known in Europe, being an indigenous European plant. It does not occur in the United States, and is little known in British America beyond the record in Sir William Hooker's "Flora Boreali-Americana," vol. i., page 259, viz., "Woody country of North America, between lat. 54° and 64° North. Sir John Richardson and Mr. Drummond."

There is still another North American species of this genus, viz., *Cicuta bulbifera*, which is a common Canadian plant, growing by the edges of creeks and in wet swamps. It is particularly abundant in the neighborhood of Kingston, as along the little Cataraqui Creek, and many other places. It is always profusely bulbiferous on the upper part of the stem.

## LINES FOR THE BOTANICAL SOCIETY OF CANADA.

By Mrs Professor Weir.

*Read 10th January*, 1862, *by Prof. G. Weir, A. M.*

Altho' my modest muse may not aspire
To climb the heights of Scientific Lore
Where sons of Genius shine,
And though I dare not even hope to please
This *erudite* and *learn'd* Society
By simple lay of mine.

Yet, with a *humble Fellow* bear, I pray,
Though mine is no seraphic strain,
While I my song shall sing,
To say how much I love our pleasing themes,
How much I wish that I to this great shrine
Could worthier off'ring bring!

### THE FLOWERS.

Why love the flowers, those perishable things
Whose starlike blossoms fade so soon away?
Why gaze with tender longing on the bloom
Which even now is falling to decay?

Oh! what were man without the Fair and Bright,
The Beautiful, in earth, in sea and sky,
What draws him from himself in darker hours,
What soothes his soul and leads his thoughts on high!

This longing for the Lovely and the True
Inwoven in our inmost souls—would seem
A something borne within us from afar,
Of Paradise a lingering precious dream.

Ah! yes, we've lov'd the flowers e'rs since the days
When happy guileless children, blithe and free,
We gathered gem-like daisies on the mead,
Or shook the snowy blossoms from the tree.

Whence comes that gush of feeling o'er the heart
While gazing on some flower to childhood dear?
A latent chord is touched and memory wakes
Thoughts slumbering there through many a weary year.

While life is yet a dream, and youth's bright sun
Sheds glowing rosy tints o'er earthly bowers,
How throbs the heart to read those words that breathe
Their magic in the language of the flowers!

Bright children of the glad and sunny days
Of smiling spring, and glowing summer-time,
Now twined to form the snowy bridal wreath,
Now wreathed by loving hands to deck the shrine,

The lowly shrine, where sleep the loved and lost—
No, not the lost but loved ones gone before—
Life seemed far brighter while they lingered here—
Whose smile shall light our path on earth no more.

Yes, from our childhood's hours when first we grasp
Too eagerly and crush the wish'd for prize,
We gather, love and scatter flowers, until
We leave this scene to seek our native skies.

Fair emblems of our mortal state, how soon
At Autumn's blasts they wither on the stem;
They die forgotten 'neath the Winter's snows,
And we, too, soon shall droop and die like them.

But genial Spring shall come again, and they
Shall bloom once more, as we again shall bloom
Beyond the grave—for, see the buds and flowers
Of promise springing even from the tomb!

They cling around the sod—those precious things—
Robbing the lonely spot of half its gloom,
Like some now sainted soul whose name yet lives
To breathe, e'en from the grave, a sweet perfume.

Some noble soul—who, while he trod life's path
Liv'd not for self alone, but left behind
Deeds that can never die—for blest is he
Who lives to serve and elevate his kind.

Like him whose earnest voice first called us here,
That son of Science from a distant isle,
Who came at duty's call, whose hand has rear'd
This hardy sapling on Canadian soil.

Long may it flourish in this glorious land,
'Neath Freedom's shelter, and in peaceful times,
Strike deep its roots, and spread its branches wide,
Till it o'ershadows even distant climes!

And may our children's children yet to come
Take pleasure in its ample boughs, and say,
They love to rest beneath its pleasant shade
When we who hailed its rise have pass'd away.

# ON THE GEOGRAPHICAL DISTRIBUTION OF THE CONIFERÆ IN CANADA.

By the Hon. WILLIAM SHEPPARD, D.C.L., F.B.S.C., of Fairymead, Drummondville, Lower Canada.

*Pinus Banksiana* (Gray Pine).†—This is essentially a northern pine, not having been observed south of the St. Lawrence. It grows abundantly in Labrador, and up the north shore of the St. Lawrence, among the rocks of the Laurentian formation. At St. Paul's Bay it has taken possession of the sand dunes near the shore. It appears again at Quebec, on the road to Caprouge, though now nearly all cut away. A few full-grown specimens are preserved in Mount Hermon Cemetery, as a memorial of an extensive grove formerly inhabiting that vicinity; the soil there being the shale of the Oneida sand-stones. Proceeding upwards, we find it in some quantity on the sandhills at Three Rivers. This pine inhabits extensively that Laurentian tract of country between the headwaters of the Saguenay westward to Lake Huron, occupying the fissures of the rocks. It appears to thrive on the dryest and worst of soils. It attains a height of 40 to 50 feet, but is worthless for any economical purpose. The branches are open and distant, not making a picturesque object, except in connection with the wild scenery in which it delights to dwell.

*Pinus rigida* (Pitch Pine).—A scarce tree in Canada; found by Mr. C. Billings, near Brockville, and may be sought for with probable success in the Laurentian Hills, between that town and Kingston, and among the Thousand Islands. Possibly the *P. Banksiana* may also be discovered in the same locality. Its principal habitats are from Lake Champlain southwards.

*Pinus resinosa* (Red Pine; also, though improperly, called Norway Pine).—This pine is found in scattered localities on many of the tributaries of the St. Lawrence and the Bay of Quinte, but in the greatest abundance at the headwaters of the Ottawa, growing in the poorest land. Very large quantities of this timber—principally from the last mentioned tract of country—are yearly floated down to market at Quebec for exportation. It attains a height of from 60 to 70 feet, and the trunks are straight, and generally free from branches to the height of 30 to 40 feet. The timber of this species, if not quite equal, at least approaches in quality to that of the Norway Pine, which is obtained in commerce principally from the ports in the Baltic. Next, after white pine, it forms the greatest article of exportation from Canada. The young branches are well furnished with long leaves of a dark-green color, giving the tree a massive appearance, yet it is wanting in picturesque effect.

† Omitting the diagnoses, I give the botanical name from Dr. A. Gray's "Manual of the Botany of the Northern States," a sufficient identification of the plants; the common names are for the most part local.

*Pinus Strobus* (White Pine).—This pine is the most magnificent, and at the same time the most useful, of all our Canadian trees. It grows scattered throughout the province, preferring richer soil than do the pines already mentioned; the quality of the soil causing it to be social or gregarious. The timber of the white pine furnishes by far the greatest article of exportation the produce of our forests affords. It is taken to market in the shape of square timber, of all sizes, from 12 inches to double that dimension, and in lengths from 20 to 60 feet, and more. Larger sizes are partially squared, to be afterwards wrought into masts and bowsprits, for which purpose it is admirably fitted, by reason of its lightness and strength. Large quantities are also floated to the many saw mills scattered about the province, to be cut into planks and boards, principally for exportation, finding outlets from Quebec to Britain and Ireland, and by railroads and sailing craft to the neighboring states. This pine is exclusively used in the province for carpentry and joiner's work for our buildings, being well adapted to all the purposes of house-building, easily worked, and generally free of knots. While this tree is the most useful and the largest product of our forests, it is the most picturesque of all those we possess, when growing in places where it has room to expand its massive branches from the ground upwards, densely clothed with foliage, and broken into great masses of light and shade, which the painter delights to contemplate. This tree is seen raising its head above all the other denizens of the forest, frequently attaining a height of 120 feet and upwards.

*Pinus serotina* (Pond Pine)—Dr Gray ignores this species, probably referring it to *P. rigida* as a variety merely, though he does not say so; other authors make it a distinct species. On the authority of Pursh, it is here adopted as a native of Canada. The latter botanist found it at Anticosti, on the occasion of his visiting that island in 1817. As this is a southern species, its having established itself on that northern island is a singular circumstance; yet Pursh was well acquainted with the pines of America, and could scarcely have been mistaken. On the same occasion he brought back, in the shape of dried specimens, as well as in a living state, many plants which seem peculiar to the island.

Assuming the existence of this pine in Anticosti, we possess five species in Canada.

*Abies balsamea* (Balsam Spruce).—This tree grows sparingly throughout the province, on dry and rocky soils, in the company of the white and black spruce. It grows very symmetrically to the height of about 30 to 40 feet, spreading its branches around the stem, from the ground upwards, in regular tiers, forming a tapering pyramid. It is much grown as an ornamental tree, especially in the south, where it is a favorite object for lawns and plantations. The well-known Canada Balsam is the produce of this tree, showing itself in blisters between the wood and the bark. The timber is soft, and of little practical utility, except for fence rails

and for the manufacture of butter firkins, for which latter purpose it is preferred to any other timber, in consequence of its communicating no unpleasant taint to butter.

*Abies canadensis* (Hemlock Spruce).—A large tree growing abundantly throughout a great part of Canada, congregating densely on dry sandy soils little adapted for cultivation. The timber is coarse, and not much used for economical purposes, except for the walls of farm houses and barns. A moderate quantity is yearly cut up into lathwood, and taken to Quebec for exportation, to meet the limited demand which exists for this article of commerce. The bark abounds in tannin, and is exclusively used in Lower Canada by the tanner, being a good substitute for oak bark. This is a beautiful and picturesque tree, where it has free room to display its light spray and dark-green foliage, becoming varied in shape, and presenting large masses of light and shade. It is well worthy of a place in ornamental grounds.

*Abies alba* (White Spruce).—A straight pyramidal tree, attaining the height of about 50 feet: growing everywhere in dry grounds in the company of the black spruce, but in smaller numbers. The timber is light, on which account it is used in common with the next species for the small spars of shipping; it is also sawed into planks for exportation, being of a colour and texture resembling the white deal of Norway. The leaves are of a bright green, and are longer than those of the black spruce; the cones also are of a different shape. These marks serve to distinguish the two trees, which have a great general resemblance. It is a beautiful object on the lawn, with its graceful branches regularly feathered down to the ground.

*Abies nigra* (Black Spruce).—This is a somewhat taller and stoughter tree than the last-described species, on which account it is more useful as a deal-producing timber, the quality being very similar. It is widely diffused throughout the country, grows on dry and rocky soils, and is generally found along with the white spruce, though in some localities inhabited by this species, the other is absent.—This is the tree from whose branches the well-known spruce beer is manufactured, a wholesome and pleasant beverage in warm weather.

*Larix americana* (American Larch, Tamarac).—The leaves of our larch are in bundles of many, and are deciduous, like its congener of the Old World. It delights in rich moist lands, where it attains the height of sixty feet and upwards, with a proportionately stout stem, straight and taper; it is found scattered throughout the province, growing in such abundance, in favourable soil, as almost to exclude other trees. It is also often seen in sandy soils, in which the moisture is retained by what are called "hardpans" underlying them, and preventing the escape of water; in such situations it grows thickly together, but attains no size, and dies off prematurely. This tree furnishes timber of superior quality, strong, heavy, and

durable, answering well for railway ties, and admirably adapted for ship-building, for which purpose it is floated to market dressed on two opposite sides only. It also makes first-rate firewood for steamers, and is used extensively as such by those plying on our rivers. This tree, when growing singly, forms a beautiful object, its slender, pendulous spray adding much to its gracefulness; it well deserves a place in ornamental grounds.

*Thuja occidentalis* (White Cedar; in Canada erroneously).—It grows in rich, moist soils everywhere, and on the banks of rivers, there taking a bowed shape, and crowding together, frequently to the exclusion of other trees. The foliage is of a dark olive color, becoming foxey in winter. The wood furnishes the best rails and posts for fencing, being almost everlasting, except the portion sunk in the ground, where it is subject to slow decay.

*Juniperus communis* (Juniper).—A recumbent bush spreading on all sides from a common centre. Grows along the banks of the St Lawrence on both sides from Quebec downwards. On the Plains of Abraham a single specimen is found. Upwards it is not met with till we reach the Falls of Chaudiere, in Hull, where a few specimens exist. Foliage, light olive; berries blue, possessing the properties of the juniper berries of the North of Europe.

*Juniperus virginiana* (Red Cedar).—A small tree growing along the shores of the Upper Lakes. It appears to dread the severe climate of Lower Canada, for, with the exception of a few specimens at the Falls of the Chaudiere in Hull, it is not found in this section of the province in the shape of a tree; but a variety with a dwarf prostrate habit grows on the rocks on both shores of the St. Lawrence below Quebec, generally associated with the common juniper; the deep clothing of snow proving a protection to it in the severe winter weather of those localities, and in all probability causing its procumbent habit. This variety rises with a single stem, but, instead of assuming the shape of a tree, becomes quite prostrate, and is blown about in all directions by the wind. The timber of the tree, as growing in Upper Canada, resembles in texture, and has the fragrance of, *J. bermudiana*, with which lead-pencils are made; it is light, close-grained, strong, and indestructible: possessing these good qualities, it is much used for the ties of railroads.

*Taxus canadensis* (Ground Hemlock).—Our yew can scarcely be distinguished botanically from the European tree, its decumbent habit constituting the greatest difference between them. It grows in rich shady woods, steep banks of rivers, and dark ravines throughout the province, forming extensive patches in its favorite localities. It never rises to the size of a tree like its namesake of England, therefore it is unsuited to the purpose for which our sturdy forefathers used this wood. It forms only a prostrate bush, the branches bending upwards. The berries are red, like those of the European species, yet I once found in a deep ravine a very marked variety bearing white berries, partially translucent.

# REMARKS ON A NEW CULINARY VEGETABLE, THE PARSNIP CHERVIL.

By Mrs Prof. Weir.

*Read 15th November*, 1861.

On 30th August, 1861, Messrs. Vilmorin, Andrieux & Co., the eminent Seedsmen of Paris, sent a circular to the Botanical Society of Canada, in which they recommended the cultivation of this root, on the ground that it had acquired new importance from the fact that the disease attacked all the early varieties of Potato.

This vegetable is in fact one of the best of those recently introduced, being desirable for its feculent qualities, its flavor (which is something between that of a chestnut and a potato), and also on account of its productiveness, yielding as it does six tons an acre.

Another merit of this vegetable is that it comes into use early in the season; in the beginning of June the roots are formed, and they keep good until the April following. It requires the same treatment as the potato, and, like it, can be cooked in a variety of ways.

The cultivation of it is very simple. It ought to be sown in the month of September or October, either in lines or scattered as you would carrot seed, care being taken to press down the soil lightly after it is sown.

We ought to remark at the same time that, unlike the potato, which thrives best in a light, dry or sandy soil, the Chærophyllum bulbosum is most successfully cultivated in rather damp soil which has previously been prepared and manured.

If sown later than the period above mentioned, it will be necessary to use seed which has been kept for some time in a layer of earth or damp sand; without which precaution it is not likely to germinate till the year following. The roots are gathered in the month of July, and preserved in the same way as potatoes, care being taken to turn them occasionally to prevent their deteriorating.

This root has received various names, such as Myrrhis bulbosa, Spreng. Scandix bulbosa, of some German botanists, Chærophyllum bulbosum, L. But the name by which it is likely to be known in common use is Parsnip Chervil.

Professor Lindley says it is regarded by French gourmands as 'un vegetal des plus delicieux,' and he agrees with them. It is in fact, he says, uncommonly good to eat, very like a boiled Spanish chestnut, without its crispness or hardness. In Europe, as has already been remarked, it is sown in September or October, but it may be found better to sow it in spring in Canada. The plant is a native of Europe, and was cultivated in England by Mr Philip Miller so long ago as 1726, but as a botanical curiosity only. Again, a few years ago, it was proposed for cultivation,

but the roots were found to be too small to be of much use. Since then, however, it has been improved by cultivation; the roots are figured as of the size and nearly the shape of an undersized early horn carrot. It is likely, therefore, to form a substantial addition to our culinary crops.

It has been stated in the Gardeners' Chronicle that the Royal Horticultural Society bought up for their members all the good seed that was procurable, and this was to be distributed in small packets last month. It will, therefore, be satisfactory to the members of the Botanical Society of Canada to learn that our Society had previously secured a supply of seeds, which will be distributed to members in good time for sowing.

## ON THE DEVELOPMENT OF BOTRYDIUM GRANULATUM.

Professor Lawson has given in the Edinburgh New Philosophical Journal for October, 1860, a lengthy description, with microscopical drawings, of a very interesting organism belonging to the group of Algæ, which grows on the lake shore at Kingston. The following extract gives some of the general results arrived at in the paper, which enters fully into all the details of the plant's history. It is the Botrydium (Hydrogastrum) granulatum of modern botanists, and is believed to be identical with the "Bladder-headed Laver" found by Dillenius some hundred years ago, between "Newington et Hackney, prope Londinum," as described by that author.

The mature *Botrydium* consists of a transparent sac, branched in the lower part, filled with fluid, and containing in the upper part or head endochrome, in which are numerous spherules. This sac, which is very tough and elastic, is distended with the fluid contents, and consequently presents a turgid appearance. Thus, if pricked with a sharp point, the sac bursts, and the watery contents are squirted out with force, scattering the spherules. This may probably take place spontaneously. When exposed to drought, the sac collapses, and allows exit to the spores by its gradual dissolution. But one of the most curious facts that I have to mention is one that probably explains the adaptation of the plant for its peculiar habitat. If a patch of *Botrydium in situ* is covered with water for a few hours, and then examined, it will be found that the sacs have burst spontaneously and scattered their contents, even although they did not appear to be quite mature This result seems to depend upon a process of endosmosis. Moisture is absorbed through the whole surface of the plant, and to such an extent as to burst the already turgid sac, and thus the spherules are set free, and floated away from the parent, to form new colonies. While the collapsing of the plant by drought, and its gradual dissolution on the subsequent application of moisture, is one means of permitting the freedom and development of the spherules, the inundation of the plant's habitat by

the water of the lake is a more speedy, and probably a more certain mode of determining the rupture, and transporting the spherules to suitable localities for germination.

These spherules, when carefully watched after their exit, are found to assume a new aspect. They gradually lose their spherical form, becoming more or less elliptical or elongated, and then passing through successive stages, until they have acquired the globose head, and neck, and root of the parent. If a process of impregnation takes place, I think it must be looked for *after* the spherules have quitted the parent sac. I have certainly seen phytozoid-like bodies *apparently* produced from the granular endochrome; but as to the contact of these with the spherules, and the effect thereof, this is precisely the point at which all such investigations become misty.

Several points remain still to be noticed.

Most algæ absorb nourishment through their tissues from the surrounding medium only. This is not the case with *Botrydium*. It is furnished with an extensively ramifying root, the object of which is not to spread over the surface, and give off buds for new individuals, as has been stated by some writers, but to enter the soil and absorb nourishment. Several authors have admitted this to a certain extent. Berkeley suggested the probability that "the rooting threads of *Botrydium*, *Caulerpa*, &c., do absorb nutriment from the soil, and perhaps for the reason that they are frequently exposed to the dry air, and would therefore wither without such a provision," &c. Not only is it capable of so absorbing nourishment; it is truly a terrestrial plant, furnished with a widely ramifying, absorbing root, whose fibres do not contain endochrome; and it is incapable of being developed under water, for submersion has the effect of bursting its cell-wall.

Most authors regard *Botrydium* as unicellular, and truly so. Hassall, while merely quoting in the text brief characters from Greville and Harvey, gives a drawing (Plate 77, fig. 5) which by no means represents an unicellular plant, and I do not understand it.

While correctly describing this plant as developed from a "spore" or "gonidium," we find many authors also describing an additional mode of increase. This is best shown in Endlicher's figure (Lindl. Veg. K. fig. 9). In the words of Griffith and Henfrey, it is described as follows:—"The figure represents a specimen with a second budding from it by vegetative increase, and in this way the plants come to form tufts or groups like little bunches of grapes; hence the name" (Microgr. Dict. p. 103). In reference to this statement, I would mention that I have not been able to find a single instance of a bud arising or being given off in this way from a filament to form a new plant. It may, however, occur. But it must be observed, that the appearance of the plants in clusters does not depend upon such a mode of growth. If it did, we should have each cluster consisting of differently sized glo-

bules, according to their respective ages; whereas there is usually a general uniformity in size, showing that all the plants of each cluster are about the same age, and have probably arisen contemporaneously from one batch of spores.

The conclusions that seem to be warranted by the author's observations are these:—

1. *Botrydium granulatum* is an unicellular plant.

2. It is strictly terrestrial, and is incapable of being developed under water, like most algæ.

3. It is furnished with finely branched root fibres, which enable it to absorb nourishment from the soil, like other land plants.

4. Reproduction is effected by means of young spherical cells, formed in the endochrome in the interior of the parent one, which are set free at maturity, by the bursting of the cell membrane of the parent.

5. Even when the plant is not mature, an inundation of the habitat by water bursts the membrane, and thus effects the liberation of the spores.

6. If a process of impregnation occurs, it probably takes place after the spherules and endochrome have been ejected.

7. The plant does not increase by buds given off from the radical filaments (as stated by several writers), so far as the author has observed.

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| JOHN WATKINS, ESQ., - - - - - | $60. |
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# ANNALS

OF THE

# BOTANICAL SOCIETY OF CANADA.

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Communications for the Society are to be addressed to the Secretary, PROFESSOR LAWSON, Kingston, C. W.

Remittances are to be sent to the Treasurer, ANDREW DRUMMOND, Esq., Banker, Kingston.

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*James M. Creighton, Book and Job Printer, Kingston, C. W.*

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## SECOND SESSION.