Scientia Canadensis
Canadian Journal of the History of Science, Technology and Medicine
Revue canadienne d'histoire des sciences, des techniques et de la médecine

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Volume 10, Number 1 (30), Spring–Summer 1986

URI: https://id.erudit.org/iderudit/800223ar
DOI: https://doi.org/10.7202/800223ar

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Publisher(s)

CSTHA/AHSTC

ISSN

0829-2507 (print)
1918-7750 (digital)

Explore this journal

Cite this article

Connor, J. (1986). To Promote the Cause of Science: George Lawson and the Botanical Society of Canada, 1860-1863. *Scientia Canadensis*, *10*(1), 3–33. https://doi.org/10.7202/800223ar

TO PROMOTE THE CAUSE OF SCIENCE: GEORGE LAWSON AND THE BOTANICAL SOCIETY OF CANADA, 1860-1863

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(Received 27 June 1985. Revised/accepted 1 May 1986)

Within three years after its formation in 1860, the Kingston-based Botanical Society of Canada (BSC) was defunct. During this brief period just over a dozen meetings were held, one volume of the Society's *Annals* was published and the public garden that this society had once tended was allowed to wither. While it operated, the BSC's membership consisted mainly of doctors, Queen's College professors and other leading members of Kingston society with such people also occupying the more than thirty executive positions within the society. Finally, it is fair to say that the primary cause of the BSC's failure was the departure of its leading light, George Lawson. From this brief overview of the BSC's activities, one might think this society was typical of the many local, ephemeral scientific institutions that were common in Canada in the nineteenth century. Such groups acted more as centres for polite learning and cultural and social exchange than as scientific societies; the structure and ultimate fate of these institutions have been well described by Jarrell.[1]

To be sure, the Botanical Society was purely a social group for many of its members, but acting in tension to this element was another which envisioned the society as a professional scientific organization. It is this theme of the tension between 'amateur' and 'professional'[2] and the concomitant issue of natural history/theology versus science[3] that constitutes one aspect of the following study of the BSC. The various social functions of the BSC, especially the concept of it as an 'information system'[4] will also be considered. Occasionally comparisons will be drawn between the activities of the BSC and, what may be termed its sister society, the Entomological Society of Canada founded in 1863.[5] As will become evident, it was the efforts of one man, George Lawson, that were instrumental in the founding and subsequent success of the BSC. But first, the following profile of early scientific activities in Kingston will establish the background for Lawson and the BSC.

Kingston acquired its first scientific institution in 1834 with the formation of a Mechanics' Institute in which were housed numerous scientific apparatus and books.[6] With the commencement of instruction at Queen's College during the

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following decade, science in Kingston received an additional boost. Owing to that institution's Scottish and Presbyterian orientation, which encouraged the diffusion of scientific knowledge,[7] many scientific topics were incorporated into the lectures that were delivered. In this regard, the appointment of the Edinburgh University graduate James Williamson as Professor of Natural Philosophy and Mathematics is noteworthy; although a classicist and divine by training, Williamson also took first prize in natural philosophy and mathematics while at Edinburgh. In addition to his teaching responsibilities at Queen's, Williamson also was responsible for building up the college's collection of scientific apparatus which he used to perform private and public chemical analyses. He was a member of the British Association for the Advancement of Science and a member of the American Association for the Advancement of Science from 1857 to 1859.[8]

Yet another aspect of Williamson's scientific life was his pursuit of astronomy; indeed it was in this field that Williamson and Kingstonians in general distinguished themselves. Since his arrival in Kingston, Williamson had been reporting meteorological and astronomical data to the British Ordnance Department and thus established Kingston as a centre for observational astronomy. These activities assumed greater importance with the establishment, in 1855, of a well-equipped observatory in the city which was financed by private subscription and by city and government funds. Williamson was instrumental in the foundation of this observatory, and he and Colonel the Baron de Rottenburg, the Garrison Commander of Kingston, were responsible for equipping the institution with a 6 1/4-inch Alvan Clarke refracting telescope; in so doing the Kingston Observatory became one of the better-equipped observatories in North America.[9] Additional support for the pursuit of astronomy and scientific studies in general were forthcoming when William Leitch became Principal of Queen's College in 1860. Leitch was educated at the University of Glasgow, and like Williamson was ordained as a minister in the Church of Scotland; however, the new principal was also an avid astronomer. Perhaps not surprisingly, then, within a year of Leitch's arrival in Kingston, the observatory became officially affiliated with Queen's College, and its equipment and facilities were improved.[10] These early activities in Kingston show that there was private, public and institutional support for science; similarly, equipment and personnel existed there that allowed the prosecution of scientific studies.

However, when discussing science in Kingston during the period of 1850s and 1860s, mention should be made of the context for it. While men like Williamson and Leitch were keen astronomers and did contribute to the fund of scientific knowledge in their field of interest, they were first and foremost men of the cloth. Like the society of which they were a part, they were religious people and their science reflected this. For example, consider the treatise on astronomy written by William Leitch and published in 1862, and which was further published in at least three American editions until 1866. In this work, entitled *God's Glory in the Heavens*, Leitch presented much of the contemporary conventional wisdom on such topics as stellar groupings, comets, binary stars and applied spectroscopy, but such a presentation was not the

sole purpose of this 300-page volume. In the preface to this work Leitch declared that his object was to offer a

> survey of recent astronomical discovery and speculation, in connexion with the religious questions to which they give rise. These questions impart a new interest to astro-theology, and the present contribution is intended to meet, in some measure, the felt necessity of a better adjustment between the arguments of the theologian and the discoveries of the astronomer.

And elsewhere in *God's Glory* Leitch wrote that the 'grand lesson of astronomy is that man's true dignity does not consist in the mere outward and physical. The more that the discoveries of astronomy make this world shrink into insignificance, the more amazing is the view of man's spiritual dignity.'[11]

The interests, activities and beliefs of Leitch and Williamson are wholly consistent with the 'gentleman amateur' and/or 'clergyman scientist' of the mid-Victorian period.[12] And it is against the intellectual background of such men that George Lawson's academic background, his pursuits and aspirations, especially as related to the Botanical Society of Canada, must be examined. Lawson was educated at Edinburgh University and the University of Giessen, where he graduated PhD in 1857. While in Edinburgh during the 1840s and 1850s, Lawson became Curator of the University herbarium, was Demonstrator in Botany and was also secretary of several scientific societies there. In Canada he held two academic posts: professor of chemistry and natural history at Queen's from 1858 until 1863 and professor of chemistry and mineralogy at Dalhousie University from 1863 until 1895. In addition to his founding the BSC, he held several executive positions in the Nova Scotian Institute of Science and was a founding member and president of the Royal Society of Canada. Of his more than 150 publications, two-thirds were related to botany, with the remainder discussing aspects of chemistry, zoology and agriculture.[13] In sum, Lawson was trained as a scientist, earned his livelihood as one, was a prolific writer in his field and helped develop and uphold the values of 'science' in general. Stated briefly, Lawson, in contrast to men like Leitch and Williamson, was a professional scientist -- by any standard.[14]

The novelty of Lawson's background is underscored by the fact that he was Queen's first non-clerical appointment, although he was a Church of Scotland elder -- a state of affairs that the College Trustees placed great importance on.[15] Additional evidence that Lawson's approach to science was different from that of his predecessors and colleagues is afforded by his teaching technique. First, Lawson integrated the subjects of chemistry, biology and histology into his lectures, thereby shifting the orientation of the Queen's course from natural philosophy to more that of natural science. Second, he established a teaching laboratory in which students performed their own chemical analyses, microscopical examinations as well as

other 'hands-on' scientific learning experiences.[16] Clearly, this latter innovation expecially reflected Lawson's Giessen graduate training where master scientist and pupil worked together and individual scientific investigation was encouraged.[17] As a result of these teaching activities, several public lectures and the mounting of an evening course in chemistry for 'working men,' Lawson soon demonstrated to Kingstonians the basis for his sound reputation as a teacher and scientist.[18]

The formal origin of the BSC may be traced back to 7 December 1860 when a large group of predominantly Kingston residents met in Queen's College in response to an announcement in the local press concerning the formation of a botanical society. This notice also acquainted readers with the backward state of Canadian botany as well as the advantages that might follow if this science were systematically pursued.[19] Specifically, the relationship between botany and potential natural prosperity was outlined:

> [Botany's] 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 industry ought to be guided. . . . 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 [*sic*] 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.[20]

The meeting was devoted to three things. First came the introductory speeches made by Principal Leitch and George Lawson. Following these, those present formally organized, planned and constituted the botanical society. Finally, the assembly adjourned to the Queen's chemistry laboratory where 'tea was served' and where the group also examined microbiological and botanical specimens and 'rare botanical books.'[21]

One passage of Leitch's public address is of especial interest.

> Universities [Leitch noted] do not discharge all their functions by merely teaching the acknowledged truths of literature and science; it is 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.[22]

Clearly Leitch was advocating a new role for Queen's in

which the advancement of knowledge was to be considered as important as the diffusion of information; that is to say, the university should address itself more to research. By expressing this sentiment Leitch and Queen's College were very much ahead of their time in Canada, and one suspects perhaps that Lawson had influenced the new principal in this regard.[23] Of course, this announcement could have been construed by those Queen's faculty who would also become BSC executive members -- such as George Lawson -- that approval had been given to pursue botanical research using the college facilities such as the library, laboratory, scientific equipment such as microscopes and, as it turned out, such was the case.

Also of interest is Lawson's speech in which he outlined his understanding of what the aims of the proposed scientific society should be, and also what they should *not* be.[24] For Lawson, the primary aim of this organization was the 'prosecution of scientific botany' which included the study of the structure, physiology, geography and systematic nomenclature of plants. To effect this goal Lawson suggested that, in addition to monthly winter meetings and summer field trips, 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.

However, Lawson also fully appreciated the importance of pursuing botany as a utilitarian enterprise, noting that many plants 'capable of yielding food and physic, dyeing and tanning materials, oils and fibres for spinning and paper making' were readily available in the Kingston region. But despite this willingness to entertain the idea that botany could be useful, Lawson saw the proposed society to be first and foremost a *scientific* one.

Underscoring this point are two passages from Lawson's speech where he noted first that as a 'utilitarian institution' the society was worthy and should receive 'warm support,' but he continued, ' . . . 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.' Here it is instructive to compare Lawson with Leitch vis-à-vis 'higher motives.' For the former, the promotion of science was itself a worthy end; indeed, such was the higher motive. On the other hand, however, Leitch saw the pursuit of science merely as a means to an end: an appreciation of the workings of God was the ultimate goal of scientific studies. This issue throws into relief the intellectual difference between these two 'men of science.' In a second passage, Lawson addressed himself not only to the point that the society should be scientific

in its purpose, but that it must guard against falling prey to a trap that had ensnared many other similar contemporary societies:

> Scientific societies on a broader basis [Lawson stated] 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 can be no doubting the message contained in Lawson's admonishment: the new Kingston society was indeed to be a scientific one rather than a popular one.

Reflecting Lawson's aim were the regulations pertaining to membership which clearly demonstrate that he wished the society to be elitist in nature rather than democratic.[25] There were to be four classes of members: Honorary, Fellows, Annual Subscribers and Corresponding Members.[26] Specifically, the Fellows and Annual Subscribers were to assume the responsibility for constituting the bulk of the BSC's membership. The main differences between these groups were that Subscribers could not vote for Fellows as office-bearers nor were they entitled to receive a diploma, while in common with the Fellows, they could receive plant specimens and any Society publication. To become a Fellow was a complex procedure which began with the candidate being recommended by two existing Fellows. This recommendation to the Council had to be accompanied by an 'original Memoir on a Botanical subject, containing the results of investigations by the author [the candidate], or by specimens of plants collected by him.' If the Council then decided to uphold the recommendation, the candidate's name was exhibited in the Society's room for one month, whereupon a ballot was taken with a majority vote deciding the candidate's election as a Fellow.[27] The inclusion of a selective test for admission as Fellow is significant, for it is further evidence that there were aspirations that the new society was to be more than merely a club; presumably, the designation of 'Fellow' was to be construed as a symbol of botanical competence.[28]

But acting in tension to Lawson's professionalizing hopes was an element which held that the popular aspects of a botanical organization should not be overlooked. For example, J.P. Litchfield, then Queen's Professor of Medical Jurisprudence and Physician Superintendent of the Rockwood Asylum, wrote about the virtues of establishing a botanical garden in conjunction with the society, which would, he felt:

> afford good space for delicate or exotic productions during the Canadian winter, and admirable exhibition buildings during the summer and autumn. From the [proposed] balcony, in fine weather and during exhibitions, addresses and announcements might be made to members and visitors on the terrace beneath. . . . The balcony would serve the purpose of a music stand when music is deemed desirable. . . .
> Botany is a science that may be taught in a popular as well as a scientific form to the young as well as the old, and to one sex as well as to the other. The botanical garden has charms which can be appreciated by all.[29]

That it was Litchfield who championed the popular aspect of botanical science might seem surprising given his professional position. But while Litchfield did occupy a prominent place in Kingston society and the medical community there, he lacked medical qualifications, although he did hold a variety of medical appointments in England, Australia and America before arriving in Canada. Of more specific relevance to his interest in popular science was Litchfield's career as journalist which included pieces for a variety of British, American and Canadian monthly periodicals and newspapers.[30]

To throw this inaugural meeting of the BSC into relief, one can compare it with the early days of the Entomological Society of Canada. At the founding meeting of the ESC those who gathered required only that future members should be 'students and lovers of Entomology,' and further that membership was open to all those who expressed their desire to join the society.[31] Moreover, at the ESC's first meeting the attendance amounted to nine 'ardent votaries' of that discipline, as compared with over ninety who attended the BSC's founding meeting in 1860.[32] The activity in Kingston did not go unnoticed by contemporary Canadian observers. An editorial in the *Canadian Naturalist and Geologist* referred to the 'vigorous Botanical Society in Kingston,' drawing specific attention to the fact that George Lawson was the evident 'initiator of the movement,' who also would prove to be the 'soul of the Society itself.'[33]

Early in January 1861 the BSC met for the second time, during which office bearers were elected.[34] Included in the thirty-one people who held office were Principal Leitch (President), James Williamson (First Vice-President), Lawson (Secretary), Litchfield (the primary Council member); the remaining positions comprised second Vice-President, treasurer, librarian, four curators and several Council members. These latter offices were held by a miscellany of Queen's professors, doctors, clergymen and City of Kingston officials, In addition to these appointments, nine honorary members were named, including J.W. Dawson, William Hincks, W.E. Logan and W.J. Hooker. The typically extensive list of foreign Corresponding members was also presented which literally spanned the globe. In particular one notes the mames Asa Gray of Harvard and Alphonse DeCandolle of Geneva, but there were also representatives from the following countries or

regions: England, Scotland, France, Prussia, Australia, Ceylon, Norway, Japan, India, Greece, Italy, Africa, Brazil and the Pacific Islands. Based on this geographic array, there can be no denying that Lawson's plan of establishing correspondence links with international botanists was certainly going into effect.

Concerning other membership matters: more than one hundred people attended this meeting, including forty new members, mostly from the Canada West -- and in particular Kingston -- region; among them were professors, doctors, schoolmasters, lawyers, military men and many women too.[35] In particular one notes such names as John A. MacDonald, John Schultz and a young John Macoun.[36] Clearly, the social composition of the membership further demonstrates that, despite Lawson, the BSC was perceived as a form of polite learning. The continued enthusiasm displayed by the Society's members seemed to surprise even its executive. William Leitch, now acting as the BSC president, was moved to deliver the following encouraging remarks:

> 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. . . . [N]o doubt, in time to come, many now present would rejoice that they had assisted in laying the foundation of the Botanical Society of Canada.[37]

Again, one can only marvel at the brave beginnings of the BSC, with a paid-up membership of 140 by only its second meeting: it took the Entomological Society ten years before it amassed an Ontario membership of 136!

The good fortune of the BSC continued to wax when at its third meeting another thirty-one people became members; in all two hundred attended the meeting.[38] At this meeting several scientific papers were delivered. First was a discussion of plants of medical significance conducted by Dr Fife Fowler, Queen's Professor of Materia Medica, in which he outlined the anti-helminthic properties of the male fern. Other papers presented discussed Canadian lichens, the squash and Mrs G. Lawson discussed the food plants of the silk-worm and other fibre-yielding insects. George Lawson himself addressed the practical aspects of science when he discussed the properties of a new dye that he had prepared that resembled cochineal, but came from an insect of the genus *Coccus* found on the common black spruce tree.

Finally, the rules pertaining to the distribution of seeds among Society members were released during this meeting.

When one reviews these regulations one senses Lawson's influence at work, for the distribution of seeds to members was not merely an act of courtesy that might eventually lead to more beautiful Kingston gardens; rather, as rule 6 noted,

> 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.

In effect, then, Ontario and Kingston gardens were to become extension field-testing laboratories of the BSC where the hardiness and suitability of non-native plant species could be ascertained.

Two more meetings were held in March of 1861, bringing the total number of BSC assemblies to five. Their proceedings constituted the Society's first published volume.[39] The *British American Journal* reviewed the *Annals*, noting its numerous botanical papers and the general activities of this society, and highly recommended the volume to its medical readers. Moreover, the reviewer commented on the BSC's success and noted that if the Society 'continues its career and displays the same amount of inherent vigour it will speedily take rank as the foremost worker in the cause of natural science in these Provinces.' Although this review centred on the activities of the BSC, its author took advantage of the opportunity to view the Kingston society's progress in the larger context of Canadian science in general:

> We have thus shown, by an examination of its own proceedings, that the originators of this Society have struck a chord in the public mind which has cheerfully responded. The success so far of the Society proves that such an organization, such an association, was needed to direct individual enquiry into the proper channel. Nor need any of the other sister scientific societies fear aught from the prosperous commencement of the present one. Let each work in its own sphere, and the whole becomes a labour of love, in which he gains the most, who works the hardest. The success of one should prove and be the stimulus to increased exertion of the other. . . . We had not the slightest idea that there existed in our midst so much taste for the natural sciences, as we have seen the last few years give evidence of. We are pleased

> to see it, for we feel persuaded that in Canada, there is to be found much to reward the exertions of an industrious student whether in the zoological, botanical or mineralogical or geological branches of science.[40]

Clearly the success of the BSC was a signal to some that science was alive and well in Canada, and that other Canadian scientific institutions perhaps could capitalize on the botanical society's example by furthering their own development and hence the nascent Canadian scientific enterprise in general.

The passage of spring and summer of 1861 saw the Society continue to prosper. Several Fellows were elected; many new members in the subscriber category joined the BSC. The library and seed collection were augmented by many donations. Several papers were read at meetings which included studies on silk production, fungi and their relation to disease and the geographical distribution of Canadian coniferae and lichens. In addition to these activities, the pleasant summer weather allowed the Society to organize and conduct its first field trip which took place along the Kingston-Bath road; this excursion was most successful, for the group returned home 'laden with spoils' such as specimens of ferns, mosses, flowers and algae.[41]

The support that the BSC received was not restricted to local membership and national recognition in the editorials of Canadian journals. As we have seen, since its inception the Botanical Society made every effort to acquaint an international audience with its existence and purpose. This goal was achieved through the formation of a network of corresponding members. By late summer and early fall of 1861, word began to filter back to Canada that the European scientific community wholeheartedly endorsed the BSC and eagerly sought information about and material related to Canadian flora. For example, Berthold Seemann, chief editor of the German botanical journal *Bonplandia* wrote:

> In Canada . . . 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 northern-most limits, and awaits the hour when some savant shall record its discovery in the annals of science. Such facts as these, more even than that of ninety-three members . . . encourage us to hope that in this new body we may expect something more than one of those ephemeral unions of local savants, 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 . . . are seldom conducted with care . . . . We in Europe will watch with interest the progress and the labors of the Canadian society, and we shall be ever 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 . . . .[42]

Seemann's remarks, although complimentary to the Society, also contained a veiled warning for it. If the BSC were to gain professional recognition, it must act as a professional society; that is, it should conform to scientific community standards and conduct itself accordingly. That Lawson would have fully comprehended Seemann's message is sure, but how other BSC exeuctive members perceived it is open to conjecture.

Augmenting Seemann's good wishes and interest were those of several other European botanists.[43] The Director of the Botanical Garden of Palermo had learned through the *Bulletin of the Botanical Society of Greece* of the BSC's existence. He too wished 'to enter into the most intimate and frequent communications with the eminent Society.' In particular, the Sicilian botanist offered to send seeds and dried plants of his country and the rest of the Mediterranean region, in exchange for 'even the most ordinary' Canadian and American plant species. Similarly, T. Garuel of Tuscany would supply Tuscan plants in exchange for American *Ranunculaceae*. In France Dr August Le Jolis of the Imperial Society of Natural Science of Cherbourg would exchange French marine algae for Canadian species. Finally, Eugène Fournier, Vice-Secretary of the Botanical Society of France wrote to George Lawson, informing him that

> 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, with several European and Algerine [*sic*] 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 *Onagrariae*, *Cruciferae*, *Calycanthacae*, of which many kinds and species are peculiar to North America.

The greater significance of this exchange process will be discussed more fully later; but suffice it to say here that these communications are evidence that Canada was not invisible on the nineteenth-century international scientific map.

But with this recognition went added responsibilities and duties for the Society, especially for its Secretary Lawson now that he had to co-ordinate a world-wide trading of specimens. To facilitate this exchange Lawson devised additional regulations pertaining to the Society's annual distribution of seeds and plant specimens.[44] Now, in order for a Fellow or Subscriber to be eligible to a share of the BSC's duplicate specimens, he had to have donated no fewer than fifty species of plants to the Society in that year. Furthermore, all specimens were to be carefully prepared and identified by a label containing the name of the plant, when and where the plant was collected, as well as the collector's name. Even if a Fellow followed these regulations, there was no guarantee that he would secure any of the Society's specimens because Lawson also stiuplated that 'Universities and societies forming herbaria and corresponding with the Society will be permitted to take precedence of the members in the annual distributions.' Emphasizing his serious intent, Lawson admonished his botanical colleagues that these rules would be 'strictly observed' because

> Foreign botanists, in various parts of the world, have expressed a desire to contribute to the Society's collections. There are spontaneous and liberal offers from Tuscany, Sicily, France, Australia, and other distant parts. It remains for the botanists of Canada to say, by their contributions this autumn, whether the Society will be able to enter upon advantageous exchanges.

Clearly then, Lawson's allegiance lay towards other 'Universities and societies' -- his international colleagues in general -- rather than his fellow Society members.

As the Society approached its first anniversary, some of its executive felt it appropriate to reflect and review the organization's progress. Vice-President Williamson felt justified in commenting that the BSC '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.' Williamson drew attention to the establishment of a botanic garden in Kingston -- Canada's first. And he also noted the fact that the Society was in the course of forming a public herbarium to which 'the student might repair to resolve his doubts in the determination of obscure species.'[45] On a more prospective note, the Vice-President expressed the hope that the Provincial government might view the Society's labours in the 'same favorable light in which they were viewed by scientific men.' It could do so by bestowing

support on it as governments in other countries did for their own similar, scientific institutions.

At the final meeting of the BSC's first year of operation several botanical papers were read, among them one 'On the Shore Limits of the Marine Algae of the North Eastern Coat of the United States' written by the Rev A.F. Kemp, a corresponding member of the BSC. Regarding this paper, what is of interest is the discussion that it occasioned. In particular, the President of the BSC, Principal Leitch, commented that

> ...the fact of plants being found to inhabit definite zones or lines along the shore to which their distribution was restricted . . . 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 [of the Natural History of Creation by Robert Chambers], and Darwin.[46]

Not surprisingly, Leitch's statement demonstrates his anti-evolutionary belief; moreover, his grouping of Lamarck, Chambers and Darwin together and his use of the term 'speculations' suggests a strong disdain for the whole issue.[47]

Kemp's paper and Leitch's response to it raises the general question of the Society's response to the evolution issue. Unfortunately, as there is a dearth of information one can only speculate about what the situation vis-à-vis Darwin might have been. In all likelihood, Leitch's view was probably typical of his colleagues -- at this early stage even Lawson had rejected Darwin's ideas, although by the 1880s he appeared to be more receptive to the concept of natural selection.[48] But, it is worth noting that one of the BSC's earliest members was the Kingstonian Joseph A. Allen, an Anglican clergyman, poet, playwright and writer who was to become one of Canada's strongest Darwinian apologist. In 1862, Allen resigned from the ministry and in later years became an associate of Alfred Russel Wallace; Allen was Wallace's host when the latter lectured on Darwinism in Kingston in 1886.[49] Whether or not any ideological conflict arose between Allen or any others like him who were members of the Society and those of Leitch's and Lawson's belief, one can only conjecture.

The second year of operation for the BSC -- 1861 to 1862 -- stands in stark contrast to its first; there were at most two meetings. Also, we know that office-bearers were elected for the session 1861-62, and perhaps it is significant that there were no major changes in who assumed the various roles.[50] Evidence that the Society was not wholly moribund during this period is an exchange of letters that took place in May and June of 1862 between a St Louis doctor, the Governor General's Secretary and George Lawson.[51] In a letter dated St Louis, 1 May 1862,

Dr Frederic W. Hart, a Canadian, wrote to Lord Monck informing him of a plant that could be of potential economic significance to Canada West. Hart felt that as Her Majesty's Government was 'deeply interested in the Cultivation of Cotton in the British Provinces' and, owing to the fact that he had recently discovered in the Rocky Mountains a 'plant that exceeds cotton in length of fibre or staple, finer in texture, and fine as silk,' he decided to send seeds of the plant to Monck. In particular, Hart stated that as the plant grew well on 'creek bottoms' and ripened in the fall, its growth pattern might be well suited to certain Canadian regions, perhaps specifically the London district, along the Welland Canal or the banks of the St Lawrence.

The seeds and accompanying letter were in turn sent to Lawson. In addition to identifying the plant as belonging to the genus *Asclepias*, Lawson also commented in his reply to Monck that the 'silk cotton of our Ascelepiads may now be economised for spinning purposes, and therefore a greater interest is to be attached to Dr. Hart's plant.' Although nothing tangible seems to have resulted from this exchange, it is significant in reference to the BSC. First, it is evidence that Lawson, on behalf of the Society, addressed himself to the utilitarian and economic aspects of botany, thus fulfilling the other half of the mandate of the BSC.[52] Secondly, can some importance be attributed to the fact that the government approached the BSC, albeit through Lawson, to ask for its advice on a technical matter? Such a move by the government might be seen as tacit recognition of the Society and may have marked the beginning of a relationship between the BSC and governmental officials. The former could act as a consultant, while the latter could have provided financial support.[53] Of course, owing to the untimely dissolution of the Society, any such possibility quickly perished.

It would appear that after the hiatus of 1862, the year 1863 augured well for the Society, as its meetings were marked by a 'full attendance of members' who came forward with a plentiful supply of botanically-oriented papers and specimens to discuss. Furthermore, numerous lists of Canadian flora were prepared and submitted to the Society. The library grew through donations by Society members and specimens of plants were also donated.[54] Similarly, on the international scene, the Society was also active. From Italy it had received an 'ample supply' of living cocoons of the new Chinese silk moth *Saturnia cynthia*, which were to be distributed to those members who desired any. And, Dr Muller, the Government Botanist in Melbourne, notified the Society that he had sent a large collection of Australian plants.[55]

It was also during this year that a new committee was struck consisting of Lawson and five other senior members of the Society whose object it was 'to bring before the legislature, by petition and otherwise, the importance of Sir William Hooker's proposed publication.'[56] Furthermore, Dr John R. Dickson, one of the committee members

and Second Vice-President of the BSC

> ... expressed a belief that, if the Government declined to grant the small sum required, persons would be found in Canada ready to raise the amount in a very short time, by private subscription.

The proposed publication that caused such activity was Sir William Hooker's projected work on flora of the British Empire, a section of which would, of course, be devoted to Canada. The importance of this work lay in both its scientific and economic potential for Canada. Respecting the former, this book might well be the most complete catalogue of Canadian plants ever assembled. Because members of the BSC were the most knowledgeable about the indigenous plants of their land, it was possible that they might, in some way, be able to contribute to this grand scientific project. Of the potential economic aspect of this work, several BSC members noted that it might afford

> a most effectual means of making known to Canadians, as well as to the inhabitants of European countries, the nature of the products of our rich Canadian forests, which would stimulate to new branches of industry, and to the development of commercial enterprise.

Hooker's project eventually did materialize, but unfortunately by the time that it did, the BSC was no longer active.[57]

On the basis of this information the BSC appeared to be in sound shape, but there are clues that suggest that all was not well with the Society. One hint is a letter presumably sent to Lawson from a prominent Society member, A.T. Drummond. Included with the letter was a clipping of an advertisement for a *conversazione* held by the Montreal Natural History Society about which Drummond noted that such 'might be kept in view should no other means of increasing our resources be available.'[58] From Drummond's remark it might be inferred that the Society was undergoing some financial strain despite its healthy membership. Dues were $2.00 per annum, and the Society had about 160 names on its books; however, there is no knowing how many people were in arrears. This statement is also interesting from the point of view of Drummond's choice of words, especially the phrase 'should no other means . . . be available.' Clearly, the idea of holding a *conversazione* to raise funds was a last resort, which perhaps was an odd attitude to hold when one considers that these events were commonplace for most nineteenth-century scientific societies. However, because such gala evenings were a staple of institutions which were perceived as being more popular than scientific, it is likely that Drummond and Lawson felt that they might be compromising the higher, scientific ideals of the BSC should a *conversazione* be held under the Society's auspices. In this regard, one should recall the warning offered by

Seemann about scientific societies degenerating into local clubs. Despite any difficulties that some of the Society's executive may have had about holding such an event, it appears that in May of 1863 such an event was held.[59]

On at least one other occasion, the BSC turned to the Kingston public to support it. Perhaps around the same time that the *conversazione* was held, a public subscription drive to support the Society's botanical garden was undertaken. A printed sheet describing the aims of the Society and information pertinent to the garden was prepared and presumably distributed to Kingston and area residents.[60] In the hope that Kingstonians might donate money to further the garden, this sheet made it clear that the garden could be used by the public for its recreation, and thus was not wholly intended for the scientific purposes of the Society. It ran in part:

> Could we erect a Palm House for the growth of those noble Exotics, the Palms, and Tree Ferns, and Sugar Canes, and Indian Figs, and Climbers of Tropical Regions, we should not only forward the interests of science, but afford a most pleasant means of recreation to the citizens of Kingston, In mid-winter, when the lake is covered with ice, and the land with snow, and no green leaf of Hope is visible to cheer the eye, our members might repair to the Exotic groves, and study not science alone, but seek at once knowledge, of tropical vegetation. . . . Let us hope, then, to hear the shrill rustle of the palm tree's foliage in our Academic Groves.

While the author of this appeal is unknown, it is more than likely that Litchfield was responsible for it. He was the original driving force behind the formation of a botanical garden, and the style of writing betrays the hand of the Victorian popular journalist such as Litchfield was. Thus it is evident that the amateur forces within the BSC were active and still viewed botany primarily as a source of relaxation and pleasure.[61]

Whether or not these two fundraising events were successful is not known because the complete financial documents of the BSC do not appear to exist. One surviving financial statement dated 23 October 1863 showing the breakdown of the Society's expenditures is revealing: Of the $685 spent, only $21 (3%) was spent on the botanical garden, herbarium and curing of specimens, as compared with about $500 (72%) on printing and stationery, and $140 (20%) on postage charges. Thus, over ninety per cent of the Society's expenses may be attributed to communication-related activities, especially the *Annals*, as well as notifications of meetings, costs of shipping plant specimens to and from Kingston, letters and so on, while research-related activities amounted to three percent of the Society's expenses.[62] That so much money was spent to

produce only one volume of the BSC's journal underscores the drain such an undertaking could be for a fledgling scientific institution.[63] In contrast to the BSC, the Entomological Society of Canada waited five years to produce its own journal; and within two years of its appearance the ESC received a government grant for its publication.

If lack of funds was a problem this signalled only the beginning of the Society's troubles, however. On 13 October 1863, only one week before the date of the financial statement, George Lawson submitted his resignation to Queen's College. Despite efforts to influence Lawson, he would not change his mind, and by November of that year he had moved to Halifax where he became Professor of Chemistry in Dalhousie College. Lawson's loss was a serious one for the BSC because for all intents and purposes, Lawson *was* the Botanical Society. It was he who maintained the international liaison with other botanists and ran the Society's affairs. Indeed, as Principal Leitch correctly prophesied at the inaugural meeting of the BSC, the labour of running the Society would fall chiefly on Lawson's shoulders.[64] Illustrative of the amount of work that Lawson did for the BSC was the fact that upon his departure his office was split, with the duties being assumed by Robert Bell who became Corresponding Secretary and A.T. Drummond who became its Recording Secretary. Bell and Drummond made a brave attempt to keep the Society functioning. They called a meeting for 11 December 1863 at which several papers were presented and two new corresponding members were appointed. But as it turned out, this gathering of Kingston botanists marked the last meeting of the Society.[65] In the spring of the following year the Society's President, Principal Leitch, died suddenly.[66] Drummond completed his law degree and moved to London, Canada West, to establish a practice.[67] Bell remained in Kingston and was appointed as Lawson's successor at Queen's College, but he never commanded the same respect as his predecessor.[68] With the loss of these active members the Society collapsed, which further suggests that the majority of the membership were perhaps more interested in recreation than pure science. The fall of the BSC was as abrupt as its rise had been swift.

Because the demise of the BSC was directly related to Lawson's departure, some explanation for his removal from Kingston should be offered. It has been suggested that salary problems, in particular a reduction in class fees, may have induced Lawson to quit Queen's;[69] this, however, is unlikely, for by contemporary standards, Lawson was well paid, apparently £400 per annum.[70] A more likely solution to the problem is to be found in the inter-faculty warfare and its concomitant political problems that plagued Queen's during the 1850s and 1860s. First, there was a scandal which centred on the activities of Professors James George and George Weir over the charge that the former had fathered a child to the latter's unmarried younger sister; the resultant enmity was intense and the whole of Queen's faculty became factious over this issue.

Second, owing to Principal Leitch's handling of that quarrel and other college matters, a schism developed between faculty and administration.

Of especial significance was the issue of the rights and powers of the trustees and Principal vis-à-vis the autonomy of the professors. Early in 1863 Leitch got approval for a new set of statutes which gave the trustees and the Principal new sweeping power to dismiss any professor for almost any breech of social or academic conduct. Debate over these new rules continued throughout the year until a final meeting to discuss the matter was held on 1 October 1863. At this meeting alternative faculty proposals were put forward, but they were ignored by the trustees. Two weeks later Lawson resigned his post, the first of several other resignations and dismissals.[71] That Lawson resigned over this affair is almost certain, for not only was he probably generally frustrated by the year of wrangling, but there was the more important question of academic freedom. Perhaps more than any other faculty member at Queen's Lawson was the most vulnerable if any conflict between scientific practitioner and clergyman were to arise. As we have learned, in the 1860s Lawson had not yet adopted Darwinism, but even if he were contemplating such action, to express such views in public would probably place his professorship in jeopardy. In all likelihood, then, Lawson could foresee the day when ideological conflict was inevitable.[72]

In reviewing the activities of the Botanical Society of Canada, the following conclusions may be drawn. The Society's audience consisted primarily of middle-class people, and especially the professional element of that group. In the main, membership was open to any who were interested in botany and who paid their dues, but there also existed a strong elitist element in the Society. However, the foundation for such elitism was neither class nor money. Rather, it was oriented towards science: to become a Fellow of the Botanical Society of Canada a candidate had to demonstrate to his peers at least some knowledge of botany. Related to this point of the Society's members is that of its status, that is, whether it was an amateur or professional group. George Lawson strove to make the BSC a professional scientific society and not some 'popular institution' or 'inert local club.' On the other hand, even Lawson would have admitted that the majority of the membership were amateurs who looked to the Society as a means for social intercourse. Thus, amateur/professional tension was one that was never resolved during the society's short lifetime.

One should also consider the nature of the Society's leadership and facilities. Clearly, the BSC owed a great debt to Queen's College, for this institution provided not only laboratory and library facilities that enabled Society members to pursue their own botanical researches, but its faculty also provided the Society with members who could be its executive. There was probably also another aspect to the relationship between Queen's and the BSC.

The Society's affiliation with the college must have lent to it an additional air of professionalism and justification. In comparing the BSC with the ESC, we again see that the former enjoyed several advantages that the Entomological Society did not have until relatively late in its development: it was not until over forty years after its foundation that the ESC could take advantage of a university environment and facilities. But as we have seen, the BSC's affiliation with Queen's was also a hindrance; all too easily could college upheavals and politics directly affect the Society's activities. It would appear that any new organization might have been better off to be independent and not affiliate itself with any 'mother institution' until the latter had itself become stable.

A final aspect of the BSC that deserves to be explored is the question of its social functions because in this regard this organization was not typical of nineteenth-century Canadian scientific societies. In his study of the social functions of selected nineteenth-century Canadian scientific societies, Jarrell concludes that

> The 19th-century Canadian scientific society . . . was not an adviser to government, did little to promote professionalization, was rarely an important channel of information and, except for a minority of its membership, was not strongly active in the promotion of the scientific ideology.[73]

When the activities of the BSC are compared with Jarrell's generalizations about the nineteenth-century Canadian scientific society, some interesting distinctions between them can be made. First, although many members of the Botanical Society perceived it solely as a social and cultural institution, there was an element, personified by Lawson, who made an effort to counter any such tendency. This group desired that the BSC be, first and foremost, a professional, scientific society. This sentiment is illustrated when one recalls the 1860 introductory speech of George Lawson when he intimated that the proposed society should not degenerate into a popular institution that was '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.'

Related to this issue of the popular/professional nature of the BSC is that of the promotion of the scientific ethos. Whereas the formation of any organization that was science related probably raised the consciousness of the general public towards the possible worth and methods of science, it was a specific goal of the BSC to promote a more 'professional' concept of science. Again, one may quote Lawson in this regard when he declared 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 serve the popular taste.' The BSC also differed from other contemporary scientific groups in that it did act

once as a governmental advisor. Admittedly, the analysis of Dr Hart's plant by Lawson at Monck's request was an isolated event, but it might have set a precedent. Thus, there is some evidence that suggests that a more active liaison between science and government was being established through the medium of the BSC.

The last facet of the social function of the BSC to be considered is its role in scientific communcation. In his discussion of this issue, Jarrell states that although the 'scientific paper is seen as the primary vehicle for scientific communication,' the actual importance of the 'paper' can perhaps be challenged.[74] Based on this study of the BSC, he may well be right in thinking that, as a mode of scientific communcation, the paper may not have been so important. We have seen that probably the single most significant vehicle for scientific communication for botanists in Canada was the specimen. Such a state of affairs further suggests that for the nineteenth-century scientist that knowledge of 'one more species' could well be of importance, especially if he possessed an example of that species. Not until a sound basis of facts had been established could one begin to generalize or form theories, and plants were three-dimensional or, as A. Hunter Dupree has termed biological specimens in the context of scientific information flow, they were 'non-verbal transmitters of information.'[75]

However, one can consider the BSC as a channel for scientific information at a more general level: to borrow another of Dupree's expressions, the BSC was a 'local station' in a 'global network of communication.'[76] As a result of the establishment of the Kingston scientific society, perhaps moreso than most other Canadian scientific organization then functioning, Canada went 'on-line' with respect to other scientific centres around the world and became one of many 'terminals' that relayed botanical information. When the BSC is viewed in the light of the local station/global network matrix, its activities assume greater importance, for they perhaps also suggest an alternative understanding of what is meant by 'colonial science.'[77]Thus, one perhaps should no longer view the colonial scientific outpost as a mere supplier of raw specimens in a one-way transfer to the mother-nation which would then process these items into recognizable scientific products. Rather,one might understand colonial science as being the two-way international exchange between numerous, admittedly lesser scientific centres, all of which were in communication with established scientific groups located in more mature social and intellectual centres.

The main difference in this alternative interpretation is the recognition of the international interchange of ideas and materials between scientific groups that were establishing themselves, such as the Kingston society and, say, botanists in other colonial countries as, for example, Australia, in addition to their interchange with recognized scientific centres such as London or Paris. Be that

as it may, it is clear that the social role of the BSC was a diverse one and atypical when compared with other nineteenth-century Canadian scientific societies, with a central aspect being the Society's function as an institutional scientific communicator.

We have seen that although the BSC existed for only three years, in this time its effects were apparent at the local, national and international levels. However, it was still dependent upon local funds for support, and, like many other societies, it was overly dependent upon one man's labour and reputation.[78] Finally, while the Botanical Society of Canada did enjoy successes, ultimately the whole enterprise collapsed; but as Steven Shapin has noted, 'failure often exhibits more clearly than success the constraints and resources available for the diffusion of science.'[79]

ACKNOWLEDGEMENTS

I would like to acknowledge the several helpful suggestions made by S.E.D. Shortt, Queen's University, Kingston, and R.L. Emerson, University of Western Ontario, London in the preparation of this paper.

NOTES

1. Richard Jarrell writes that such groups were

> formed around a kernel of local amateurs, typically professional men , and if the locale had a university or academy, professors would play leading roles and stimulate flagging interests. The societies usually had brave beginnings with a plethora of offices, complicated constitutions, and overly-optimistic programmes. Initial response was encouraging in most cases. . . . Since the kernels of such societies were so small, the removal or death of one or two key members . . . could be sufficient to end the existence of such organizations.

See his 'Colonialism and the Truncation of Science in Ireland and French Canada During the Nineteenth Century,' *HSTC Bulletin* 5 (1981), 140-57; see 145. See also Jarrell's 'Science as Culture in Victorian Toronto,' *Atkinson Review of Canadian Studies* 1 (1983), 5-12. For more comprehensive analysis of science and culture in Canadian society, see Carl Berger, *Science, God, and Nature in Victorian Canada* (Toronto, 1983).

2. Pertinent studies of this issue in the Anglo-American region during the mid-nineteenth century include: Everett Mendelsohn, 'The Emergence of Science as a Profession in Nineteenth-Century Europe,' in Karl Hill, ed., *The Management of Scientists* (Boston, 1966), 3-48; J.B. Morrell, 'Individualism and the Structure of British Science in 1830,' in *Historical Studies in*

the Physical Sciences, 3 (Philadelphia, 1971), 183-204; George A. Foote, 'Science and its Function in Early Nineteenth-Century England,' *Osiris* 11 (1954), 438-54; Morris Berman, '"Hegemony" and the Amateur Tradition in British Science,' *Journal of Social History* 8 (1975), 30-50; George H. Daniels, 'The Process of Professionalization in American Science: The Emergent Period, 1820-1860,' *Isis* 58 (1967), 151-66; Sally Gregory Kohlstedt, *The Formation of the American Scientific Community: The AAAS, 1848-60* (Chicago, 1976); Nathan Reingold, 'Definitions and Speculations: The Professionalization of Science in America in the Nineteenth Century,' in Alexandra Oleson and Sanborn C. Brown, eds., *The Pursuit of Knowledge in the Early American Republic* (Baltimore, 1976), 33-69.

3. See Frank M. Turner, 'The Victorian Conflict Between Science and Religion,' *Isis* 69 (1978), 356-76; Robert M. Young, 'Natural Theology, Victorian Periodicals and the Fragmentation of a Context,' in Colin Chant and John Fauvel, eds., *Darwin to Einstein: Historical Studies on Science and Belief* (London, 1980), 69-107; David E. Allen, *The Naturalist in Britain: A Social History* (London, 1976); Lynn Barber, *The Heyday of Natural History, 1820-1870* (London, 1980); William M. Smallwood, *Natural History and the American Mind* (New York, 1967).

4. This idea is based on A. Hunter Dupree's discussion entitled 'The National Pattern of American Learned Societies, 1769-1863,' in Oleson and Brown, *op. cit.*, 21-32.

5. For additional information on scientific societies in nineteenth-century Canada see Berger, *op. cit.*, 3-27; Richard A. Jarrell, 'The Social Functions of the Scientific Society in Nineteenth-Century Canada,' in Richard A. Jarrell and Arnold E. Roos, eds., *Critical Issues in the History of Canadian Science, Technology and Medicine* (Thornhill, 1983), 31-44; and Peter J. Bowler, 'The Early Development of Scientific Societies in Canada,' in Oleson and Brown, *op. cit.*, 326-39.

6. Margaret Cohoe, 'Kingston Mechanics' Institute, 1834-1850,' *Historic Kingston* 32 (1984), 62-74.

7. For details of the nature of the relationship between Scottish Presbyterianism, science and education in the nineteenth century, see: D.C. Masters, 'The Scottish Tradition in Higher Education,' in W. Stanford Reid, ed., *The Scottish Tradition in Canada* (Toronto, 1976), 248-72; R.D. Anderson, *Education and Opportunity in Victorian Scotland: Schools and Universities* (Oxford, 1983), especially 70-102; George E. Davie, *The Democratic Intellect: Scotland and Her Universities in the Nineteenth Century* (Edinburgh, 1961); see especially 169-200.

8. See Hilda Neatby, *Queen's University Vol. I. 1841-1917* (Montreal, 1978), 60; Henry J. Morgan, *Bibliotheca Canadensis* (Ottawa, 1867), 394-95; Kohlstedt, *op. cit.*,appendix, s.v. Williamson. For details of Williamson's chemical work see W.H. Smith, *Canadian Gazetteer* (1846; fac. ed., Toronto, 1970), 92-3; and J.T.H. Connor, 'Preservatives of Health: Mineral Water spas of Nineteenth Century Ontario,' *Ontario History* 75 (1983), 135-52; see 142. For details of the BAAS and Canada, see the several papers in *Transactions of the Royal Society of Canada* Series IV 20 (1982):470-547.

9. For a fuller discussion of the Kingston observatory, see Margaret Cohoe, 'The Observatory in City Park, 1855-1880,' *Historic Kingston* 27 (1979), 78-91; also Morgan, *op. cit.*, 394-5.

10. For details of William Leitch's life and activities see the entry on him in the *DCB*, IX, 460-2; Morgan, *op. cit.*, 221; and Neatby, *op. cit.*, 83-108.

11. On Leitch's book see Morgan, *op. cit.*, 221; and A. Vibert Douglas, 'Astronomy a Century Ago,' *Journal of the Royal Astronomical Society of Canada* 58 (1964), 128-32.

12. For background material on this issue see those sources in note 3.

13. For a fuller description of Lawson's professional life see: A.H. Mackay, 'Memoir of the Late Professor Lawson,' *Proceedings and Transactions of the Royal Society of Canada* Second Series 2 (1896), Appendix B1-B6; 'Obituary Notice of Prof Lawson,' *Proceedings and Transactions of the Nova Scotian Institute of Science* 9 (1896), xxiv-xxx; Jacques Rousseau and William Dore, 'L'Oublié de L'Histoire de la Science Canadienne-George Lawson, 1827-1895,' in *Pioneers of Canadian Science*, ed. G.F.G. Stanley (Toronto, 1966), 54-66. See also Appendix B of *Pioneers* for reprinted primary material relevant to the Botanical Society of Canada. For more complete details of Lawson's publication record see John G. Bourinot, *Bibliography of the Members of the Royal Society of Canada* (Ottawa, 1894), 49-52.

14. For a brief discussion of the thorny issue of what constitutes a professional scientist see W.H. Brock, 'Advancing Science: The British Association and the Professional Practice of Science,' in *The Parliament of Science*, 89-117, especially 91-3; see also Reingold, *op. cit.*

15. Rousseau and Dore, *op. cit.*, 61.

16. See Neatby, *op. cit.*, 77-8. Even while in Ediburgh Lawson employed innovative techniques in his teaching when he was the 'first to develop the modern biological

methods of embryological and histological investigation with the microscope' (MacKay, *op. cit.*, B-1).

17. For details of the German system of science education and its general academic milieu see: W.V. Farrar, 'Science and the German University System, 1790-1850,' in Crosland, *The Emergence of Science in Modern Europe* (London, 1976), 179-92; R. Steven Turner, 'The Growth of Professorial Research in Prussia, 1818 to 1848--Causes and Context,' in Chant and Fauvel, *op. cit.*, 137-82; and Fritz K. Ringer, 'The German Academic Community,' in Alexandra Oleson and John Voss, eds., *The Organization of Knowledge in Modern America , 1860-1920* (Baltimore, 1976), 409-29.

18. Rousseau and Dore, *op. cit.*, 62.

19. For information relating to the development of botany in Canada see: George Lawson, 'Botanical Science--Record of Progress,' *Canadian Naturalist*, N.S. 1 (1864), 1-14; D.P. Penhallow, 'A Review of Canadian Botany from 1800 to 1895,' *Proc. and Trans. of the Royal Society of Canada* Second Series 3 (1897), Section IV, 3-56; and D.L. Bailey, 'Botany,' in W. Stewart Wallace, ed., *The Royal Canadian Institute Centennial Volume, 1849-1949* (Toronto, 1949), 25-35.

20. Quoted in 'Origin of the Society,' in *Pioneers*, 128-9; also in *Annals of the Botanical Society of Canada* 1 (1861), 1-2.

21. 'The Botanical Society of Canada,' *British American Journal* 2 (1861), 43-4.

22. See William Leitch, 'Opening Address,' reported in Appendix B of *Pioneers*, 130.

23. For example, forty years later the idea that Canadian universities should be research institutions as well as teaching centres was advocated by Sir James A. Grant. In particular, he noted the importance of the German model of the research institution as being a worthwhile one for Canadian universities to adopt. Presidential Address--'The Universities in Relation to Research,' *Proc. and Trans. of the Royal Society of Canada* Second Series 8 (1902), xlix-lix). For a general discussion of the issue see Hugh Hawkins, 'University Identity: The Teaching and Research Functions,' in Oleson and Voss, *op. cit.*, 285-312.

24. George Lawson, 'Remarks on the Present State of Botany in Canada, and the Objects to be Attained by the Establishment of a Botanical Society,' in *Pioneers*, 131-5; also in *Annals of the BSC*, 4-9.

25. For further details of the classifications for scientific societies see Margaret W. Rossiter, 'The Organization of Agricultural Improvement in the United States, 1785-1865,' in Oleson and Brown, *op. cit.*,

279-98, especially 297.

26. 'The Botanical Society of Canada,' *British American Journal* 2 (1861), 44.

27. 'Laws of the Botanical Society,' *Annals of the BSC* 1 (1861), 14-16.

28. For example, D. McGillivray of Chelsea, CW, designated himself 'M.D., Fellow of the Botanical Society of Canada' when he published one of his medical papers; see 'Acute Articular Rheumatism, treated by the tincture of the Boletus Laricis Canadensis,' *British American Journal* 3 (1862), 167-8.

29. J.P. Litchfield, 'Notes and Suggestions Relative to the Establishment of a Botanical Garden,' *Annals of the BSC* 1 (1861), 9-11. While Litchfield did not attend the first meeting, this work was included in the *Annals* under the proceedings of that occasion; therefore it is assumed that the paper was read to the assembled group.

30. For additional details of Litchfield see the article on him in the *DCB*, IX, 470-1; Morgan, *op. cit.*, 226-7; and T. Gibson, 'The Astonishing Career of John Palmer Litchfield, *Canadian Medical Association Journal* 70 (1954), 326-30.

31. See J.T.H. Connor, 'Of Butterfly Nets and Beetle Bottles: The Entom logical Society of Canada, 1863-1960,' *HSTC Bulletin* 6 (1982), 151-71.

32. See *Annals of the BSC* 1 (1861), 13. For the BSC, the membership distribution was as follows: of the ninety-one names that appeared on the original subscription list, eighty-eight were from Canada West (specifically the Kingston region, but others came from London and Chatham); two were from Nova Scotia; and one from Boston. The single largest professional group who subscribed to membership of the BSC were doctors of medicine (seven of the ninety-one).

33. 'Kingston Botanical Society,' *Canadian Naturalist and Geologist* 5 (1860), 462-8.

34. Information based on 'The Botanical Society of Canada,' *British American Journal* 2 (1861), 81-3; and *Annals of the BSC* 1 (1861), 17-20.

35. Contrasting with Berger's contention (*op. cit.*, 13) that women were not allowed to participate in the activities of Canadian societies is the situation of the BSC. Rule 5 of the Society's regulation read in part:

> Lady subscribers 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.

36. In his autobiography John Macoun wrote how the BSC and Lawson furthered his desire to become a botanist:

> This year, also, Professor George Lawson of Queen's College, Kingston, who formed the Botanical Society, came to visit me and asked me to join.
>
> That summer we had a great meeting in Queen's College and I met for the first time young men who were botanical students . . . . These young men were a great inspiration to me when I saw their enthusiasm, and a spur to keep ahead of them. I was older than they were, but they had been taught and I was an outsider. The older men and the professors seemed to take pleasure in some remarks I made and I lost my diffidence and we all became very sociable. Of course I was only a schoolmaster to the young men at first but very soon we were all young botanists together.

John Macoun, *Autobiography of John Macoun, M.A.* (Ottawa, 1922), 40.

37. See reports of Leitch's comments in *Annals of the BSC*, 21.

38. Information based on 'Botanical Society of Canada,' *British American Journal* 2 (1861), 138-9; and clippings in scrapbook located in BSC file in Queen's University Archives, Kingston.

39. Copies of the *Annals of the BSC* are relatively scarce; to date only the following Canadian institutions are known to have copies of this work: University of Toronto, Royal Botanical Gardens-Hamilton, Queen's University, Plant Research Library-Ottawa, National Library, National Museums Library-Ottawa, McGill University and the Université de Montréal.

40. Review of *Annals of the Botanical Society of Canada*, Vol. 1, Part I: *British American Journal* 2 (1861), 259-61. For a review of Vol. 1, Part II, see *Ibid.*, 357-8.

41. See 'Botanical Society of Canada,' *Canadian Naturalist and Geologist* 6 (1861), 331-3; and 'Botanical Society of Canada,' *British American Journal* 2 (1861), 327-8.

42. Seemann's comments were contained in the leading article of the 15 May 1861 issue of *Bonplandia: Zeitschrift für die gesammte Botanik*. In turn, this article was translated by a BSC fellow, John Machar, and reprinted in the *British American Journal* 2 (1861), 379-82.

43. Letters reprinted in *Annals of the BSC* 1 (1861), 172-4.

44. 'Botanical Society of Canada--Regulations for the Exchange of Specimens,' *British American Journal* 2 (1861), 430; see also 'Miscellaneous--Botanical Society of Canada,' *Canadian Naturalist and Geologist* 6 (1861), 394-5.

45. Remarks contained in a report of the meeting of 15 November 1861 printed in *Canadian Naturalist and Geologist* 6 (1861), 468-9; Respecting the botanical garden Williamson further remarked that the garden's existence was due in great part to a sizeable donation of plants by Asa Gray of Harvard University. Gray's gift comprised 113 plants which represented 37 families. See 'Botanical Society of Canada,' *British American Journal* 2 (1861), 524-5.

    For various discussions on the role of private and public patronage and other developments of science in Victorian society see G. L'E. Turner, *Patronage of Science in the Nineteenth Century* (Leyden, 1976); Roy M. McLeod, 'Resources of Science in Victorian England: The Endowment of Science Movement, 1868-1900,' in Peter Mathias, ed., *Science and Society 1600-1900* (Cambridge, 1972), 111-66; and Howard S. Miller, *Dollars for Research: Science and Its Patrons in Nineteenth Century America* (Seattle, 1970).

46. See *Annals of the BSC* 1 (1861), 178.

47. The literature on evolution is, of course, immense, but two useful introductions fo the history of evolution are John C. Greene, *The Death of Adam: Evolution and Its Impact on Western Thought* (Ames, 1959), and Charles L. Gillispie, *Genesis and Geology: The Impact of Scientific Discoveries Upon Religious Beliefs in the Decades Before Darwin* (New York, 1951).

48. See Berger, *op. cit.*, 72.

49. For details of Canada's reception of Darwinism see *Ibid.*, especially 53-78; P. Roome, 'The Darwin Debate in Canada, 1860-1880,' in Louis A. Knafla *et al.*, eds., *Science, Technology, and Culture in Historical Perspective* (Calgary, 1976), 183-205; and A.B. McKillop, *A Disciplined Intelligence: Critical Inquiry and Canadian Thought in the Victorian Era* (Montreal, 1979). For details of Allen and Wallace see Roome, *op. cit.*, 96 and Alfred Russell Wallace, *My Life: A Record of Events and Opinions* Vol. II (London, 1906), 121-2; 125-6; 187-8. See also Morgan, *op. cit.*, 8-9.

    For a general discussion of philosophy in Victorian Canada and the relationship of Darwinism to it see John A. Irving, 'The Development of Philosophy in Central Canada from 1850 to 1900,' *Canadian Historical Review* 31 (1950), 252-87.

50. The only real difference was that the executive council was expanded by two members to 23 and two additional curators were also appointed, bringing those in that office to six. See *Annals of the BSC* 1 (1861), 178.

51. This information is based on printed material contained in the *Annals of the BSC*, 193-5 in the edition that is kept in The Thomas Fisher Rare Book Library of the University of Toronto. While these letters appeared as part of the *Annals* proper, Hart's last letter, dated 22 May 1862, appeared in printed form but was inserted between pages 194 and 195; no source is evident as to who printed this letter or where it might have appeared originally.

52. In at least one other instance the Society acted in a consultative capacity when in 1861 Kingston farmers approached the BSC to identify an insect that infested their wheat and other grains, causing them great consternation. Lawson identified the insect as the 'cholera-fly,' but he could offer no solution to eradicating this pest. See 'Botanical Society of Canada,' *British American Journal* 2 (1861), 382.

53. Suggestive that the Society hoped for a closer link with government might be the appointment of the Governor General, Viscount Monck, as the institution's Patron beginning in 1863.

54. 'Botanical Society of Canada,' *Canadian Naturalist and Geologist* 8 (1863), 76-80.

55. *Ibid.*, 77; and 'Botanical Society of Canada,' *Canadian Naturalist and Geologist* 8 (1863), 211-12.

56. *Ibid.*, 80.

57. Writing in the *Canadian Naturalist and Geologist*, Lawson stated that

> Canadian botanists will be pleased to learn that the series of "Colonial Floras" now being published under authority of the Home Government, is rapidly progressing; and that Sir William Hooker is now desirous of receiving contributions to the projected Flora of Canada and other British American Provinces, of which Dr. Joseph Hooker is to be the author. As to the nature of materials desired, it may be stated generally that information respecting the occurrence in Canada of plants not hitherto recorded as Canadian, when accompanied by authenticated specimens, will be most useful. 'Botanical Science--Record of Progress,' NS 1 (1864), 1-14.

58. Letter dated 30 January 1863 in BSC file, Queen's University Archives, Kingston.

59. A receipt for labour in Botanical Garden reads '$4.50 plus extra 50¢ for the labourer's attendance at an evening *conversazione* on May 2, 1863;' see *Ibid.*

60. A copy of which is held in *Ibid.*

61. See Berger, *op. cit.*, 48, where he writes about the subject of science and relaxation in Victorian Canadian culture as follows:

> In a culture in which work was regarded as a moral discipline, and idleness was equated with sloth and hence guilt, recreation could not mean unprofitable relaxation. Every moment had to be filled with useful activity. It has been said that natural history in the Victorian period exercised a compelling fascination because "it offered to the Evangelical character an unrivalled range of outlets for its expression." Diligent collecting, the piling up of facts, the measurement of work done in statistical terms of new species discovered or the size of collections all suggested a delight in industriousness and an earnestness that no doubt had their roots in science but were also fortified by religion.

62. See financial statement for the BSC dated 23 October 1863 in BSC file, Queen's University Archives, Kingston. The suggestion that the BSC was lacking funds seems justified as this financial statement made no mention of any reserve funds or any savings account in which additional working capital was available. Of course, it is possible that some other account existed; however, as no other evidence is presently available we might conclude that the Society was indeed running low on financial support.

63. For details on the development and scope of scientific periodicals see: David A. Kronick, *A History of Scientific and Technical Periodicals* (Metuchen, NJ, 1976), and Bernard Houghton, *Scientific Periodicals: Their Historical Development, Characteristics and Control* (Hamden, Conn., 1976).

64. Leitch declared that without Lawson's 'large and valuable experience' in the management of scientific societies, he feared that the Kingston group would 'have little heart to carry out this scheme.' See 'Kingston Botanical Society,' *Canadian Naturalist and Geologist* 5 (1860), 468.

65. Notice of Meeting of BSC, 11 December 1863, in BSC file. Queen's University Archives, Kingston. Interestingly, one of the papers presented was by

William Saunders, who was identified as Secretary-Treasurer of the Entomological Society of Canada; Saunders discussed the plants in the vicinity of London, CW. See 'Plants in London, C.W.,' *Canadian Journal* NS 8 (1863), 219.

66. Leitch died 9 May 1864; see obituary 'The Late Principal Leitch,' *Canadian Naturalist and Geologist* NS 1 (1864), 237-8.

67. In an article entitled 'Observations on Canadian Geographical Botany,' Drummond identified himself as an LLB and dated his work as London, CW, October 1864. See *Canadian Naturalist and Geologist* NS 1 (1864), 405-19.

68. Robert Bell's background was geology and he was criticized for knowing little chemistry. He held his appointment at Queen's until 1868; later he joined the Geological Survey, and, from 1901 to 1906, was its acting director. Neatby, *op. cit.*, 103, 135, 315.

69. Rousseau and Dore, *op. cit.*, 68.

70. Neatby, *op. cit.*, 71.

71. *Ibid.*, 85-102.

72. On this issue Frank M. Turner has written that during the mid-Victorian period there developed amongst the new breed of British scientists the desire to break away from certain segments of British society that had traditionally supported them (such as "clergymen-scientists . . . who regarded the study of physical nature as serving natural theology . . . ."). See Turner, *op. cit.*, especially 364.

73. Jarrell, 'Social Functions,' 38.

74. *Ibid.*, 34. Jarrell writes that

> A large number of Canadian articles in the 19th century tended to increase the stock of details about the country's natural history and geology but offered little new theoretically. Apart from the satisfaction of knowing of one more species of insect, does such knowledge make much difference? Did the 19th-century Canadian Journal reader think it did?

75. A. Hunter Dupree, *op. cit.*, 25.

76. *Ibid.*, 23, 26, 28.

77. For a general discussion of colonial science, see Raymond Duchesne, 'Science et société coloniale: les naturalistes du Canada français et leurs

correspondants scientifiques (1860-1900),' *HSTC Bulletin* 5 (1981), 99-139, especially 100.

78. As a postscript to Lawson and the BSC, mention should be made of the Botanical Club of Canada, a national organization founded in 1891 by him. The shift in terminology from 'Society' to 'Club' is significant, for the Club's constitution notes that the organization is to

> stimulate, with the least possible paraphernalia of constitution or rules, increased activity in our botanists in each locality, to create a corps of collecting botanists . . . to encourage the formation of field clubs, to publish lists of local floras in the local press . . . .

Clearly, with the formation of a national, professional scientific organization such as the Royal Society of Canada, Lawson could divorce such functions from any new botanical group that he formed. For fuller details of the Botanical Club of Canada, see *Proc. and Trans. of the Royal Society of Canada* Second Series 1 (1895), xliv-civ.

79. Shapin, '"Nibbling at the teats of Science,"' in I. Inkster and J. Morrell, eds., *Metropolis and Province: Science in British Culture, 1780-1850* (London, 1983), 151-2.