

## Article

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*HSTC Bulletin: Journal of the History of Canadian Science, Technology and Medicine / HSTC Bulletin : revue d'histoire des sciences, des techniques et de la médecine au Canada*, vol. 8, n° 1, (26) 1984, p. 32-58.

Pour citer cet article, utiliser l'information suivante :

URI: <http://id.erudit.org/iderudit/800182ar>

DOI: 10.7202/800182ar

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THE DAWNING OF A NATIONAL SCIENTIFIC  
COMMUNITY IN CANADA, 1878-1896\*

Vittorio M. G. de Vecchi (1941-1983)

The thesis argued in this paper is that the revival undergone by the imperial ideal in Britain and in Canada affected the development of the institutions of science in the Dominion and the values that those institutions represented. A combination of British Conservative political choices, of constitutional changes affecting the role of the Governor General of Canada, and of personal proclivities, were at the root of Lord Lorne's activities in the realm of culture during his vice-regal tenure. The Royal Society of Canada he founded and the series of events affecting the scientific community thus set in motion, reflected an emotional, intellectual and institutional commitment to a preferential link with Britain. This choice was evident in the relations of Canadian men of science with the British Association for the Advancement of Science (BAAS).<sup>1</sup> But, given the higher sophistication of British science with respect to its Canadian and American counterparts, Canadian scientists repeatedly appeared, to the Dominion government, excessively theoretical and therefore useless because of their association with British colleagues. The tension between the different interpretation of the values of loyalism and usefulness held by scientists on the one hand, and government on the other, was one of the forces that shaped the profession of science during the period 1878-1896.

I

The burgeoning of imperialism in Britain in the last quarter of the nineteenth century was linked to a complex role for imperialism in Canada. The imperialist movement in Britain in the 'eighties was limited to the realm of ideas; in the same way its Canadian counterpart was nurtured by the Conservative governments particularly in the sphere of ideas. It should be noted that loyalism, as an emotion, was sincerely shared by J.A. Macdonald and by other Canadian politicians of both parties; what matters here is that loyalism, or imperialism, or the 'British connection,' had implications which affected both social behaviour and policy. It was in this context that the

\*This is the first of three articles by Dr de Vecchi that will be published in successive numbers of *Scientia Canadensis*. They are taken, with minor editorial changes, from his doctoral dissertation, 'Science and Government in Nineteenth-Century Canada' (University of Toronto, 1978). His death last year, at the peak of his years, was a grievous loss to all who knew him. He intended to prepare this material for publication. Ann Hopper de Vecchi has authorized the publication of this and the next two articles. The editors welcome them as valuable contributions, and as a memorial to a cherished colleague. Ed.

members of the Canadian scientific community played their part.

The background, experience and inclinations of Lord Lorne seemed particularly suited to the limited role he had in Canadian life. Born in 1845, the first son of the 8th Duke of Argyll, Lorne found himself at the centre of the liberal life and enthusiasms of the 1860s; his father, a noted geologist and palaeontologist as well as the Secretary of State for India in Gladstone's cabinet, frequently received at Stafford House exponents of Continental liberal movements of his time. In 1878 Disraeli appointed Lorne and his wife, Princess Louise, as representatives of the Crown in Canada;<sup>3</sup> they could serve as the focus of loyalist feelings.

The new Governor General's cultural activities during his tenure proceeded essentially along two main ideally converging courses. Firstly, his arrival was followed by the most generous distribution of honours since Confederation: in May 1879 six KCMGs were granted, mostly to politicians of both parties. As an observer wrote in the *Canadian Monthly*:

The significance of the appointment of a son-in-law of the Queen as Governor-General of Canada, with all the attributes and insignia of royalty which accompany his advent, point to the Dominion as the colony on which this great experiment [Imperial federation] will first be tried, and which will prove a test question with the Canadians as to whether Monarchical or Republican principles are to prevail. 4

The second line of attack was the promotion of culture in all its forms, and particularly of native men of culture. At the opening of the Art Institute in Montreal, the Governor General proposed the foundation of 'a Royal Academy whose exhibitions may be held each year in one of the capitals of our several Provinces.'<sup>5</sup> Just as the notions of democracy, republicanism, materialism and the spectre of American annexation were associated in the Canadian Tory literature of the time, in the same way social rank, loyalism, high-mindedness and learning came to be part of Canada's way of differentiating itself from the United States.

Thus Lorne's two lines of action--the first stressing formality and rank, the second fostering culture--served a common political purpose. A corollary was the attribution of rank to men of culture; beside the appointment of members of the Academy of Art and of the Royal Society of Canada, it was worth noting the granting of a CMG in 1881 to J.W. Dawson, the foremost exponent of Canadian science, and to Alpheus Todd, the eminent Canadian scholar of British constitutional law.

Goldwin Smith immediately perceived the meaning and import of the new acts of policy:

There can be no doubt that the erection of a Court and the shower of titles were a part of the Tory Premier's general policy; or that he was advised by those whose information

he had every reason to trust that Canada was ripe for the experiment. The leading organ of our Government proclaimed that this was the most aristocratic of all colonies. 6

## II

The Royal Society of Canada, or 'my other Canadian child' as Lorne thought of it,<sup>7</sup> was the extension of the ideas behind the Royal Canadian Academy of Arts to the fields of science and literature. In the summer of 1881, during his stay in Quebec, the Governor General approached a number of Canadian scholars, as well as the president of the Royal Society of London, to ascertain the possibility of establishing a national academy of letters and science. In particular, Principal Dawson of McGill visited him in the Citadel, and was asked to lend his influential help to the enterprise.<sup>8</sup> One of the reasons for entrusting somebody else with organisational affairs was the absence of Lord Lorne from settled Canada for almost the entire second half of 1881, first in the North West and West, then in England. The visit to the North West provided further reasons for Lorne's determination to found a national scientific society. He wrote on 17 September 1881:

As soon as I get back to Ottawa, I am going to set about the founding of a Canadian Scientific and Literary Institute, an interesting undertaking which will require a good deal of trouble and correspondence to bring about. I was provoked the other day to find that one carved stone had been carried off by Americans to the Smithsonian Institute at Washington, and these things are sure to happen until we have some such Association of our own. 9

Lorne's enthusiasm was not shared by some of his advisors. Daniel Wilson, the president of the University of Toronto, had reservations:

Telegram from Cheyenne--somewhere away in the N.W. The Marquis of Lorne wants me to meet him in Ottawa, where he hopes to be on the 15th [October 1881], "to consult on important matters." The Marquis, with the very best intentions, wants to call into being an academy of Science and Letters for Canada. The material out of which such an untimely birth must be concocted, or generated rather, is of the most incongruous sort. Out of courtesy to the governor general, and respect for his wholly disinterested and altogether well-meant efforts, we are bound to cooperate. . . 10

The doubts were widely shared, in particular about the wisdom of extending the membership to include men of letters. G. Mercer Adam, the editor of the *Canadian Monthly*, pointed out the difficulties inherent in the very idea of a literary academy as early as July 1881; Principal Dawson himself would have preferred to limit the membership to men of science;<sup>12</sup> finally, Nicholas Davin, the ebullient journalist and future Conservative MP for Assiniboia argued extensively against the idea of a literary section and focussed his indignation on the man appointed Honorary Secretary, J.G. Bourinot: 'Nothing could more

clearly show the absurdity of a Society for the encouragement of literature than [that] a dunce should be its first Honorary Secretary.' <sup>13</sup> By contrast, no objection was raised against the possibility of selecting scientists and appointing them to the Society:

I make no remarks on the scientific branch of this Society. Scientific attainments may be measured as you would measure a yard of cloth. <sup>14</sup>

Even Goldwin Smith, at the other end of the political spectrum, although sceptical of the value and future of the institution, concurred in attributing scientific pre-eminence to the men chosen by Lorne: 'Canadian science will always be advancing while it possesses such inquirers as Dr. Dawson, Dr. Selwyn, and Dr. Sterry Hunt.' <sup>15</sup> It is striking that both Davin and Smith, literate men of different political persuasions who were very keen on the politics of culture, accepted the internal system of evaluation of the scientific community at face value. The success of the Canadian scientific community in exhibiting a 'politically visible feature,'<sup>16</sup> that is, an apparently reliable internal machinery that would produce consensus, made scientists a 'natural' for Lorne's new Royal Society.

A brief examination of the list of five men of science the Governor General called to the Provisional Council of the Society and who, together with the men of letters, met at Dawson's house in Montreal on 29 and 30 December 1881, shows how well they embodied the system of recognition of their community. Four out of five could show impressive academic credentials: Dawson, a graduate of the University of Edinburgh, was Principal and Professor of Geology at McGill; T. Sterry Hunt, sometime professor at Laval, McGill and MIT, had studied at Yale with Silliman Sr.; George Lawson, educated at Edinburgh University and a Giessen PhD, taught at Queen's and Dalhousie; finally, Charles Carpmael, a Cambridge 6th Wrangler, was Professor of Astronomy at the University of Toronto. Furthermore, three members, Sterry Hunt, Dawson and Selwyn, had already received what amounted to imperial recognition when they became Fellows of the Royal Society of London. In addition, Selwyn shared with Carpmael the distinction of being the head of a scientific department of the federal government--not in itself a sign of scientific recognition, perhaps, but definitely a position of strategic importance in any government initiative which would involve the scientific community.

The Provisional Council was confronted with the task of giving an institutional shape to Lorne's idea. The Governor General suggested that 'local reasons also weighed in favour of giving [the Society] a democratic character,'<sup>17</sup> but the final choice of the Council seemed to give a stronger emphasis to exclusiveness and scientific achievement. There were two main models of an academy or learned association present in the minds of nineteenth-century men of science and letters; the traditional academies, born mainly in the seventeenth century and in many cases rejuvenated or reformed during the nineteenth, and the associations for the advancement of science. The first type, centralised,

immobile and with strict criteria of election, appeared to be the bastion of the cultural elite; the second, elastically structured, itinerant and with open membership, represented the corporate attempt of the various national scientific communities to reach out towards the provincial centres and local societies, and to display to the great public the results of the scientific method.<sup>18</sup> In short, it may be said that the second model, that of the British and American Associations for the Advancement of Science, had a 'democratic character.'

Indeed, the idea of a peripatetic institution was present in Canada, in the shape of the Governor General's 'first Canadian son,' the Royal Canadian Academy of Arts, which met in a different city each year. It would appear, too, that there was some expectation abroad that the new institution would be similar to the BAAS and AAAS. The *Montreal Gazette*, announcing the forthcoming first meeting, referred to the 'Royal Society for the Advancement of Science and Literature,' misreading the term used by the Provisional Council, which was, unambiguously, 'promotion.' It was further underlined that, according to the rumors, the meetings may be held in any city of the Dominion.<sup>19</sup>

It was clear that a national society could only become truly national, in a country as large and as sparsely settled as Canada, if it could become a forum for the isolated practitioners of learned disciplines and a link between the various far-flung local scientific societies. Both Lord Lorne and Principal Dawson, the first president of the Society, mentioned these functions in their opening speeches on 25 May 1882. In the end, admittedly, these needs were partially served by diplomatically appointing fellows of the society as members of local academies. Furthermore, it was proposed to invite some provincial societies (twelve in the first instance) to become associates of the Royal Society of Canada, and to send one representative, elected yearly, to take part as an observer in all the functions of the national society.<sup>20</sup>

But in practice the new body followed the model of national academies, in particular that of the Royal Irish Academy which included science and literature within its purview. In Canada there were four sections: French literature and history, English literature and history, mathematical and physical sciences, and geological and biological sciences. Each section could be composed of a maximum of twenty members to be chosen among persons resident in Canada or Newfoundland 'who have published original works or memoirs of merit or have rendered eminent services to Literature or to Science.'<sup>21</sup> For good measure, the initial eighty fellows were appointed by Lorne and the provisional council. Considering the lack of scientific or literary distinction of many of the first crop of members, it cannot be said that the creation of the Royal Society marked the recognition of an existing elite. It marked, rather, the attempt to create an elite: insofar as it was a conscious act, it was also a deliberate political act.

A consequence of the restrictive constitution of the Society was the scarcity of public interest. Admittedly, the dissolution of Parliament and the campaign leading to the elections of 20 June 1882 took up most of the space in the newspapers when the Royal Society convened in Ottawa. But even the Toronto papers, not

to mention those of the Maritimes and British Columbia, printed at most only a few lines reporting the bare facts and names. Only newspapers in Ottawa and Montreal treated the matter more fully; they too, however, like Daniel Wilson and Goldwin Smith, considered the enterprise at least premature, and proceeding from such a sceptical viewpoint printed mainly 'colour' pieces. The conformity of the opening ceremony with the etiquette of *levées*, the majority of ladies among the public and the secession of some French Canadian members over T. Sterry Hunt's profession of materialistic faith, were duly noted.<sup>22</sup> The mood of the press before and during the meeting was summed up by a tongue-in-cheek editorial of the *Ottawa Free Press*:

There are those, no doubt, who welcome a Royal Society if only for its name. It seems to bring a ray of warmth and sunshine to these remote regions, and help create a comfortable persuasion that perhaps, after all, Canada is not so "rough, raw, and democratic" as has been represented by authority. There are others who look forward to certain practical benefits as likely to accrue from the labours of the learned and accomplished gentlemen whom His Excellency has called together. 23

As the sessions took place, however, a sense of self-congratulation began to appear in the news items,<sup>24</sup> culminating in the cautiously optimistic remark of the *Montreal Gazette*:

If [the Royal Society's] career be only consonant with the beginnings, it is destined to be of no slight service to the cause of science and literature in our Dominion. 24

One of the main ways in which the Society was planning to perform this service was by printing volumes of transactions. The publication of a journal--a common corporate function of learned and professional groups--acquired a special importance in the case of an institution, such as the Canadian one, at the periphery of the scientific world. James Loudon had pointed out the importance of publication both for the diffusion and the advancement of knowledge in the case of Toronto's Canadian Institute;<sup>26</sup> in a similar, though more restrictive, vein William Dawson argued that the Royal Society's planned volumes would increase the visibility of Canadian researchers by providing them with a new outlet.<sup>27</sup>

The problem posed by the high cost of a journal, which would print good quality maps and illustrations often needed for geological and natural history work, was tackled by applying for a grant from the federal legislature. John A. Macdonald's approach during the vote on the publication grant provided an illustration of the politician's perception of science. It should be noted that it was not the first time that Parliament discussed the Royal Society. When the bill of incorporation was considered, the arguments in favour of the measure ranged from reflections on the intellectual and utilitarian interest of scientific investigations, to Joseph Tassé's praise of the vitality of French Canadian literature. The journalist, Conservative MP and recent FRSC went on to castigate the United States where 'the public mind is engrossed in commerce, in industry, and its adoration of the golden calf,' and to en-

courage Canada 'to appropriate with disinterestedness and a noble pride the intellectual, the scientific side of American life in giving preference to the cultivation of sentiment of thought and the beautiful.'<sup>28</sup> When it came to money matters, however, Macdonald made no mention of idealistic purposes. Indeed, not even the existence of the literary section was acknowledged; the Prime Minister stated:

The Royal Society, as is known, has been established for the same purpose as the Royal Society of England, for the promotion of science, and especially natural science. 29

The money--\$5000--was not much and therefore was unlikely to arouse opposition. Furthermore, Macdonald was always vague and rather cavalier about the details of scientific societies; on one occasion, he referred to the Canadian Institute, in the space of a few minutes, both as the Canadian Association for the Advancement of Learning and as the Society for the Advancement of Literature and Science.<sup>30</sup> Yet his insistence on comparing the appropriation in question with the grants received by the Royal Society of London for special projects as well as for the furtherance of research in general, and with the enormous sums given to the Smithsonian Institution showed a determination to portray the Royal Society of Canada as an essentially scientific institution.

The central, non-itinerant character of the Royal Society of Canada was soon to prove a source of difficulties. The meagre attendance at the yearly Ottawa meeting was the source of periodical complaints and of proposals for an extension of membership.<sup>31</sup> Goldwin Smith, an early Fellow and critic, objected to the elitist nature of the society:

The Canadian Society suffers in comparison with its American counterpart for the Advancement of Science. It is a closed corporation, it is not migratory, it offers no fund for the prosecution of individual research. Even its plaudits can have little effect, since their echoes do not pass beyond its portals. 32

During the fourteen years of activity considered in this paper, the Society met only once away from the capital. The 1891 meeting took place in Montreal by the invitation of the Natural History Society; the intention behind this departure from accepted practice was clearly expressed in the invitation extended to British, American, French and Belgian scientists:

It is expected that the meeting will be a large and important one, similar to the former meeting held in Montreal of the British Association for the Advancement of Science, and to that of the American association. 33

The reference to the past glories of 1882 and 1884 (which are discussed in the next section) was not just a device to attract foreign scientists, but reflected a cautious attempt to transform the Royal Society of Canada into an association similar to the BAAS. In the best tradition of the societies for the advancement of science, stress was laid on the participation of delegates of local societies, and the possibility of creating



a broad class of associate members was entertained.<sup>34</sup> In the event, the plan failed. There were, admittedly, logistic reasons: the European scientists were notified only one month before the meeting, and the chosen date--27 May--fell during American term time.<sup>35</sup> Not only did the desired foreign contingent fail to materialise, but strong opposition also arose within the RSC to the very notion of the idea of changing the character of the Society. 'I entirely disapprove of the idea of such popular holiday makings as the Montreal gathering,' wrote the President of the University of Toronto to the Principal of Queen's, 'and shall in no way encourage such a meeting in Toronto.'<sup>36</sup> The RSC ought not be a popular association, Wilson argued, for a very good reason:

I fear my views with reference to the Royal Society are not in accordance with the present lines of development. The British Association and its American counterpart have themselves out for a miscellaneous membership and popular gatherings in all large cities. But the Royal Societies of London and Edinburgh; the Royal Irish Academy; and the Washington Institute are all organised on a totally different basis. They devote themselves to science and letters in those higher branches that need their aid *just because they never can be popular.* 37

With the 1891 failure of the attempt to reform, the Royal Society of Canada was confirmed in its central and exclusive character. In exchange for the federal government's help in the pursuit of the 'higher branches' of knowledge, the Fellows thought they could reciprocate by lending their skills to government whenever expert and objective advice was needed. William Dawson, during the very first meeting in 1882, represented the new RSC as 'a body of men free from the distracting influence of private and local interests,' the depositories of certain knowledge in well defined fields.<sup>38</sup>

In a similar way, the Librarian of Parliament, Alpheus Todd, in a paper commissioned by the council of the Royal Society, 'On the Relation of the Royal Society to the State,' carefully qualified the scientists' field of expertise by specifying 'in matters which are distinctly apart from the domain of party politics, and from the ordinary range of executive responsibility.'<sup>39</sup> The British precedent, a natural term of reference for a constitutional historian such as Todd, was appealed to as the legitimating factor in the relations between science and government. Indeed, it was pointed out, the entire network of meteorological observatories was made over in 1865 by the imperial government to the Royal Society of London, whose exclusive responsibility it was. Furthermore, various other *ad hoc* and yearly Parliamentary grants to the London institution sponsored the *Challenger* expedition<sup>40</sup> as well as smaller research projects. A colonial precedent could also be found in the incorporation and promotion of the Royal Society of New South Wales in 1881.

There was, however, one important difference between the British and the Canadian state of affairs: the different degree of representativeness of the Royal Societies of the two countries. The Royal Society of London came to acquire its leading posi-

tion among a complex set of British scientific institutions (universities, local societies, specialists' societies, etc.) before government showed any interest in fostering, and making use of, science.<sup>41</sup> It could be credibly maintained, therefore, that the British scientific society could muster the skills of a separate and independent scientific community and place them at the government's disposal. But in Canada in the 1880s, the government was the largest single employer and trainer of men of science; furthermore, it was the main source of livelihood for most of the members of section IV (geological and biological science) and of quite a few of section III (mathematical and physical sciences) of the national Royal Society. There was little point, in short, in the government going elsewhere to find the expertise it already had within its own departments. What the Royal Society appeared to offer, therefore, was that rather rarified type of higher science of no obvious immediate use for which politicians had no taste. In 1890, after six years of unsuccessful lobbying, Professor Alexander Johnson, FRSC, of McGill, resentfully noted:

One of the chief difficulties encountered in the attempt to secure systematic tidal observations has been the suspicion that, as the associations recommending them were scientific, therefore the object could not bring practical advantage to the country. 42

It was not, however, only a matter of the politicians shortsightedly misunderstanding the proposals of the Royal Society. For, in a time when the federal scientific departments were subjected to pressing Parliamentary demands for practical, industrial, wealth-producing results, the RSC went repeatedly on record, through its officers, in support of non-utilitarian research. Daniel Wilson interpreted the very establishment of the Society as evidence of a spontaneous 'recognition of the value of abstract science.'<sup>43</sup> Similarly, William Dawson expressed the hope 'that our public men will beware of falling into the popular mistake of limiting our scientific expenditure by a narrow and slavish utilitarianism which defeats its own ends.'<sup>44</sup> George Lawson, in turn, stated 'science is best pursued for its own sake.'<sup>45</sup>

These positions not only had an implicit polemic content, having been taken amidst public demands for practical benefits from the scientific branches of government, but also reflected a set of value judgements. The underlying metaphor was that of seeding and reaping: pure research was as necessary to useful application, as seeding was a necessary condition for the crop. The demand for quick practical results was, as mentioned, 'slavish utilitarianism,' and, on a moral plane, 'misapplied thrift;' in contrast, delayed gratification underlined the 'value of that self-denying search for abstract truth in all its scientific relations.'<sup>46</sup> As may be expected, the condemnation of utilitarianism proceeded *pari passu* with the indictment of the United States, where a bill forbidding the expenditure of federal money for the publication of palaeontological material and the discussion of geological theories was introduced into Congress.<sup>47</sup> Once again, the themes of learning, non-materialistic values and anti-Americanism were associated. In this light, the functions of the Society

appeared clear:

The institution of this Royal Society by the Canadian Legislature is in itself a recognition of the value thus assigned to pure science. By our constitution it is provided "that the advice and assistance of the Society shall at all times be at the disposal of Government"; and in no way can this be more legitimately rendered than by interposing to prevent a premature demand for economic results arresting the researches of science. 48

Just as clearly, the Macdonald regime was willing to entertain a certain amount of Victorian high-mindedness so long as it promoted values that would further the acceptance of the Government's policies, but not when it would create difficulties in Parliament. Hence the 'suspicion' Alexander Johnson found in government circles that delayed support for a programme of tidal observations. Embittered by the experience, Johnson caustically remarked on the standard of governmental and, by implication, public intelligence and concluded:

There is so much practical scientific work yet to be done which the government has never attempted, that it is unnecessary to mention the purely scientific except as a protest against the opinion that the state should under no circumstances give aid to it. 49

The state of tension between the federal government and the Royal Society became quite severe in the early 'nineties. Politicians and scientists had converged only for a time when the Royal Society was established. The first saw it as one element of what Goldwin Smith called the 'paraphernalia' with which Lord Lorne tried to stimulate a national loyalist sentiment;<sup>50</sup> the second found in the new emphasis on status and rank their chance to have scientific achievement recognised and rewarded. The Society thus formed was immediately accused of being 'aristocratic,' and it soon came to appear as the organ of that part of the Canadian scientific community which, like the academic scientists, prized pure and abstract pursuits. 'It was the purity,' one may repeat Nathan Reingold, 'of social climbing.'<sup>51</sup> But politicians had very little time for an institution which took federal money only to declare that it was not interested in practical applications. Hence the mistrust the Royal Society felt when dealing with the Ottawa authorities. In short, the Royal Society of Canada could give its members national rank but not a national function.

### III

The scientific community the Royal Society of Canada was meant to represent, was exposed to, and conditioned by, the examples of Britain and the United States. Despite the professed universalism of science, a subject of pious declaration whenever American and Canadian scientists got together, the national scientific society of Canada repeatedly showed a marked proclivity to form preferential links, both institutional and intellectual, with Britain. This intellectual counterpart of the 'British connection' of the world of politics, was realized

in a set of projects involving British and Canadian colleagues, under the aegis of the BAAS; no comparable set of projects was developed in collaboration with the AAAS.

Yet the American Association for the Advancement of Science arguably had a prior claim to the loyalty of Canadian men of science. As early as 1857 the Association met in Montreal upon the invitation of Principal Dawson and T. Sterry Hunt, the latter a member since the first meeting and one of fifteen names listed in the 1874 Act of Incorporation. During the 1870s, a number of prominent Canadians were elected officers of the AAAS: J.W. Dawson was vice-president for Section B (Geology and Geography) at the 1875 Detroit meeting; Daniel Wilson, the future President of the University of Toronto, was chairman of the permanent sub-Section D (Anthropology) twice, in 1877 and 1879; William Saunders, the commercial chemist and fruit grower of London, Ontario, was a member of the sectional committee of Section B in 1879 and General Secretary of the Association in 1881; T. Sterry Hunt himself, admittedly not technically a Canadian, was president in 1870.

It is not surprising, then, that in the early months of 1880 the Natural History Society of Montreal began to establish contact with the AAAS with a view to extending an invitation to meet in Montreal a second time. It should be remembered that the removal of the Geological Survey to Ottawa, decreed in 1878 and carried out in the first months of 1881, meant a loss of valuable members as well as prestige for the Natural History Society. Principal Dawson, who always opposed the move to Ottawa, commented after his defeat:

The Society has sustained a great loss by the removal to Ottawa of several very efficient members connected with the Geological Survey and it [is] the more important on this account that it should endeavour to increase its membership and more particularly to attach to itself young men who take an interest in science. 52

The year 1882 suggested itself as a convenient time for a public celebration, being the fiftieth anniversary of the incorporation of the Society, and the twenty-fifth of the first visit of the AAAS to Montreal. It was more than a year after the decision was taken to invite the American Association to Montreal that Lord Lorne broached the idea of a Royal Society to Dawson. The project, then a novelty to Dawson,<sup>53</sup> eventually changed the scope of scientific life in Canada, especially by means of the links established with the BAAS. But in 1880, the invitation extended to the AAAS was the act of a local society, for local, not national reasons, and one aspect of a broad campaign to raise funds and increase membership. The drive was successful; after the low point of 1879, when the yearly provincial grant was not paid to the Society for the second time in succession, and when unpaid mortgages and other strictures imposed a cut-back in personnel and in wages, in 1882 the treasurer could announce the extinction of all debts and the enrolment of 125 new paying members.<sup>54</sup> Another successful coup was the endowment of the Peter Redpath Museum, which Principal Dawson secured for McGill in 1880, in order to make up, at least in part, for the removal of the collections of the Geological Survey.<sup>55</sup>

After Montreal's success in hosting the AAAS in 1882, Toronto developed a similar plan. Daniel Wilson and James Loudon, both long-standing members and fellows of the Association, began taking soundings as early as 1883, and again in 1884, to gauge the members' opinion about a return to Canada. The first agreement in 1886 fell through, but eventually the AAAS gathered in Toronto in 1889.<sup>56</sup> Once again, the final invitation and arrangements were the work of local bodies, such as the Canadian Institute, the University of Toronto and the City of Toronto with the financial support of the Province. The Royal Society of Canada simply sent a delegation composed of Bailey, Harrington, Laflamme, Saunders and Selwyn.<sup>57</sup>

By contrast, the visit of the British Association to Montreal in 1884 not only involved the Governor General, the Dominion Parliament and the Royal Society of Canada, but it became the occasion for speculations and dreams about the future of the British Empire. One main logistic fact clearly required the intervention of the federal government: if the Montreal meeting was to succeed at all, enough British members should be induced to cross the ocean. The expense of sponsoring transatlantic passages was a totally new item in the list of outlays a host city had to provide for. The \$25,000 appropriation the federal parliament eventually granted had the strong support of the Prime Minister himself, who declared:

We believe it will be of the greatest consequence to Canada to have this great Association come here, not only as a matter of science, as showing that Canada is taking its position and is recognized as such an important part of the British Empire that this great meeting should be held within our bounds. 58

The Governor General, for his part, established contacts in 1882 with the British Association and extended an official invitation on behalf of the Royal Society of Canada, to hold the 1883 meeting in the Dominion. The fluctuations of the proposal's fortunes are a good illustration of the motives and forces at play. The idea of going to meet in Canada was first mooted in 1881, at the York meeting, by Capt Bedford Pim, the arctic explorer, former Conservative MP and Fellow of the Royal Colonial Institute.<sup>59</sup> Before Pim could table his proposal, Lord Lorne's invitation reached the BAAS but plans had already been made for 1883.<sup>60</sup> In view of the possibility of a renewed invitation for 1884, the Council of the BAAS determined, by means of a postal ballot, that a plurality of members were opposed to the idea.<sup>61</sup> At the Southampton meeting of 1882, however, Canada's offer won the approval of the majority. The *Times* took a dim view of the matter:

We have already expressed our strong objection to a meeting in Canada, and it is noteworthy that the leading officials of the Association, and those who do the work of the Association and of science, are strongly averse to such a meeting-place, and there can be little doubt that next year an attempt will be made to overturn the decision brought about by the able tactics of Captain Bedford Pim. 62

A memorial trying to reverse the Council decision was indeed submitted, in a last-ditch attempt, in February 1884, but failed

in its purpose. By then, a number of steps had been taken to help render irreversible the 1882 decision. The Royal Society of Canada officially appointed Principal Dawson, Sterry Hunt, and Chauveau as its delegates at the 1883 Southport meeting; Dawson himself was elected, for the second time in his life, one of the vice-presidents of the BAAS, and a few papers illustrating the attractions of Canada were read during the session of 21 September 1883.<sup>63</sup> At the same time, the American Association decided to hold its 1884 meeting in the East of the USA to favour exchanges and communication.<sup>64</sup> In short, an attempt was made to dispel the strong suspicion, repeatedly voiced, that the BAAS members were engaging in a 'somewhat extended picnic' and that, considering the scarcity of scientific achievements there, they could have 'no serious purpose of holding a scientific meeting in Canada.'<sup>65</sup>

It was not only love of science, or reverence for its declared international scope, that brought more than five hundred members of the BAAS, some with their families, to the city of Montreal. There was a sense of celebrating the victories and mutual support of science and the Empire. Science, by making communications easier with its applications, had drawn the Empire together and rendered possible this first meeting of the Association outside the British Isles.<sup>66</sup> Tomorrow, perhaps, Australia's invitation could be accepted, because the existence of the CPR would provide a fast route to the Pacific.<sup>67</sup> Conversely, it was felt that the possibilities of cooperation, exchange, and the varied experience offered by a world empire implicitly served the cause of knowledge. The scope of scientific activity, as the new Governor General, Lord Lansdowne, reminded the Fellows of the Royal Society of Canada just before the arrival of their BAAS colleagues, was imperial:

When you applied for and obtained permission to assume the title of "Royal", when you determined that the Queen's representative should be your Honorary President, you were giving expression to a feeling that the work in which you were engaged was one which deserved recognition, not only as of national moment to the Dominion, but as one having an interest for the great Empire of which the Dominion forms a part.<sup>68</sup>

Sir Lyon Playfair, on the British side, drew the crucial comparison:

Whilst the public generally are taking so much interest in the Federation of our Colonies, there was one step which could be at once taken, before politicians had time to remove the difficulties with regard to the greater scheme, and that was that the science of the Empire should be federated.<sup>69</sup>

William Dawson, Sir William since 1884, and president of the BAAS in 1886 (the year of the Colonial and Indian Exhibition in London), and thus the incarnation of Lorne's ideas, summed up in Birmingham:

By its visit to Canada the British Association has asserted its imperial character, and has consolidated the scientific interests of Her Majesty's dominions, in advance of that great gathering of the industrial products of all parts of the empire now on exhibition in London, and in advance of any political plans of Imperial federation.<sup>70</sup>

Much as the statements of British and Canadian scientists seemed to reflect an identity of views, there was in reality quite a substantial difference in emphasis. Declarations pronounced in celebratory speeches, during the days of the Colonial Exhibition, of the foundation of the Imperial Institute and of the Queen's Jubilee in 1887, were often generated by a mixture of true conviction and a sense of what the occasion called for. The reactions of colonials seemed not to take the latter component into account. Thus when T.H. Huxley, at a meeting of the Royal Society of London in November 1885 referred to scientific federation as the immediately realisable aspect of the ideal of imperial federation, he was doing so in the context of devising a special title -- not that of foreign member, but not that of FRS either -- that would be suitable to indicate the recognition bestowed by the Royal Society of London upon colonial men of science. Likewise, when in 1886 G.G. Stokes, Huxley's successor to the presidency of the Royal Society, made further comments on science and the Empire, he was simply reminding his colleagues of Huxley's suggestion about membership.<sup>71</sup> The proposal explicitly meant a subordinate role for colonials -- the title of FRS would carry too much 'responsibility.' It was the same subordination that had been implicit in the way in which the Royal Society of Canada had been cast by Lord Lorne in the position of a local, not national, society when he invited the BAAS on its behalf.

The reaction of Sir William Dawson and of the Royal Society of Canada to Huxley's words about scientific federation went beyond the matter of association with Britain's leading society. In February 1887, Sir William sent a long letter to G.G. Stokes, referring to Huxley's words, and suggesting a geological federation as the first stage of the scientific federation of the Empire. Geology was represented as better suited, because of its nature and its degree of diffusion throughout the Empire, to an intellectual and institutional union.<sup>72</sup> The Royal Society of Canada, albeit with some opposition, supported Dawson's idea, and a committee composed of Dawson, Laflamme and Selwyn proposed a report sketching a programme of local and general conferences.<sup>73</sup>

The discouraging replies of the BAAS, at the Manchester meeting of 1887, and of the Royal Society of London, put an end to the Canadians' proposal. The very events and initiatives that fired the colonial imagination made colonial suggestions seem provincial and peripheral when seen from London. The establishment of the Imperial Institute, an initiative of the Royal Colonial Institute through its chairman the Duke of Manchester, absorbed the attention of the fellows of the Colonial Institute, among whom were the originators of Canada's imperial emergence in science Lord Lorne, a fellow since 1878 and a member of the

Council, and Captain Bedford Pim, a fellow since 1873. The interest of British men of science, on the other hand, apart from being attracted by the scientific potential of the Imperial Institute, was also engaged by the preparations for the International Geological Congress held in London in 1888, and by the complexities of collaborating with continental colleagues in order to prepare an international geological map of Europe.<sup>74</sup> As the critics of Sir William Dawson's idea in the Royal Society of Canada rightly maintained, geological imperial federation interfered with the plans of the two main groups who normally would or could lend support to Canadian men of science, that is, the imperialists and British scientists. In the end, with a significant semantic shift, it became a matter of scientific 'affiliation,' not 'federation.' A new committee of the Royal Society of Canada, led by the former opposition, was appointed in 1889 to collaborate with the Imperial Institute of London in which the Dominion government invested £20,000, and which seemed to be able to obtain the approval of Canadian political men with its emphasis on the scientific development of imperial industrial resources.<sup>75</sup>

The Royal Society of Canada, thus brought back to its limited role of a national forum for Canadian researchers, and beset by the major problem of absenteeism owing to the great distance members had to travel, reverted to the thankless task of petitioning the Dominion government for help in the realization of the research programmes spawned by the 1884 Montreal meeting of the BAAS.<sup>76</sup>

#### IV

The attractiveness of the imperial idea was given substance by the scientific activities sponsored by the British Association and by the leadership that could thus be provided to affiliated peripheral groups of scientists. In this respect, the BAAS presented a clear advantage over the AAAS: it could give grants and had a higher scientific reputation than its American counterpart. At the Montreal meeting, the equivalent of \$7,500 was granted to various special committees of the Association, whereas the AAAS did not even begin to think about setting up a fund for the endowment of research until 1891.<sup>77</sup> In the intellectual sphere, furthermore, the BAAS had a reputation of being more sophisticated. As *Science* recognised in 1884:

On the whole, it will be admitted that the British Association does its work upon a higher plane than that occupied by the American. Its sectional work shows more that is really new and of lasting value, and less that is trifling.<sup>78</sup>

Richard Proctor, the Cambridge graduate at one time a contributor to the *Popular Science Review* and a successful public lecturer in the United States, considered the work done by the BAAS excessively theoretical and obscure, and commented in his weekly *Knowledge*:

I know what American tastes are in matters scientific, how much they prefer fresh to dried food in science,



and I know that the kind of food purveyed, for example, at Southampton this year, would emphatically *not* suit American tastes, whether in the United States or in Canada.<sup>79</sup>

In short -- *pace* Proctor's liberal and egalitarian proclivities -- intellectual glamour, loyalism and sheer availability of funds favoured the collaboration of Canadian and British scientists. In particular, five BAAS special committees, composed of men of science from the United Kingdom and the Dominion, were appointed in 1884 in Montreal.

A group of three committees was concerned with mathematical models for the reduction of tidal and magnetic observations. The first, which sprung from G.H. Darwin's application of the method of least squares to the compilation of tide-tables,<sup>80</sup> included Charles Carpmael, the director of the Toronto Observatory and of the Meteorological Service, and Balfour Stewart, who developed in conjunction with Darwin a set of techniques for recording and collecting data on the tides in a uniform way throughout the British Empire. The lack of any information about tidal motion along the Canadian coastline suggested the appointment of a second committee, entirely composed of Canadians and headed by Professor Johnson of McGill, which would attempt to persuade the Dominion government of the necessity of collecting systematic readings for the publication of tide-tables. The Johnson committee and the Royal Society of Canada, with the support of the Montreal Board of Trade as well as of representatives of the shipping industry, repeatedly memorialised the Minister of Marine with very little effect. At first the expense for the hydrographic survey of Georgian Bay and for the expedition to Hudson Bay was offered as an excuse for not granting funds for an enterprise which, to the layman, seemed to be of the same type. Later, the Canadian government engaged in a re-survey of the Gulf of St. Lawrence with the help of the British Admiralty.<sup>81</sup> Despite the committee's constant contention that the knowledge of tides was essential for safe navigation, it seemed to be difficult to persuade laymen of the utility of observations taken over a span of at least ten years which were to be treated with complex mathematical formulae devised by a Cambridge professor -- especially when compared with surveys performed by the British Admiralty with ordinary methods. Apparently it was of no use to point out that Britain, Ireland, the United States and even India had already published reliable tide-tables. In 1887, Lieut Gordon, freshly returned from the Hudson Bay expedition, was authorised to make some preliminary observations, but there the matter rested for the next few years. Finally, after having circulated a petition among ships' officers in Montreal and Halifax and collected 395 signatures, Johnson's committee arranged for a deputation from the shipping interests and the Montreal Board of Trade to visit the Government in December 1889; in this case the Royal Society's representatives were a minority (only three of a deputation of ten) and the appeal was officially submitted by the businessmen.<sup>82</sup> It was humiliating for science to ride the coat-tails of sailors and businessmen, but the petition was successful and a small appropriation was granted for the first time during the 1890 session of Parliament.<sup>83</sup>

The slowness and circumspection of the government's response exasperated Johnson. In a terse paper he argued that, in accordance with the original charter, the Royal Society should advise the government when requested to do so, but also when not requested if advice was manifestly needed. And in the case of tidal observations and hydrographic work -- the argument went -- the government clearly needed to be told that the country had grown enough to warrant its own body of scientists who would work systematically, and not in the casual and piecemeal fashion that was the norm in the past.<sup>84</sup> The *Montreal Gazette* took up Johnson's address and closely paraphrased it in an editorial, thus making the matter a public issue.<sup>85</sup> If this by any standard moderate campaign was meant to bring the government to its senses, it could not have failed more thoroughly. Charles Hibbert Tupper, then Minister of Marine, accused Johnson of being ungrateful and of having underhandedly written the *Gazette* editorial; he also maintained that if anything was wrong, Carpmael was the one to blame; and finally he concluded that 'if this spirit is to characterise the Royal Society, the less we have to do with them in future the better.'<sup>86</sup> The embryonic programme of tidal observations started by the RSC-BAAS joint committee survived this crisis in the relations between the government and the Royal Society, but the more ambitious scheme of a Coast Survey did not materialise until fifteen years later.

Carpmael, Balfour Stewart and Darwin were also members of a third BAAS special committee on the reduction of magnetic observations. In this case also the techniques used for comparing data from divers instruments were developed in Britain, and in particular in connection with Kew Observatory.<sup>87</sup> Moreover, as Carpmael pointed out as early as 1881, the readings taken at Toronto and elsewhere were used for years by Balfour Stewart in his attempt to connect meteorological and magnetic phenomena with solar physics.<sup>88</sup> As in the case of the treatment of tidal observations, most of the intellectual work was done in Britain.

A second group of two committees was appointed to study some aspects of the North-West Territory. The first, asked to report on the depth of permafrost, included Selwyn and Carpmael, as well as the British explorers John Rae and Capt W.J. Dawson. The final report of 1887, drawn up by Sir J.H. Lefroy, the last military director of the Toronto observatory and the first man to take magnetic observations in the North West in 1843, was composed of information collected by Canadian and British scientists during the explorations of the Geological Survey and of the Polar Year 1882.<sup>89</sup>

Finally, in 1884 the Council of the BAAS was empowered to appoint a committee that would 'memorialise the Canadian government as to the urgent necessity of encouraging investigation and publication of reports with respect to the physical characters, languages, social, industrial, and artistic condition of the native tribes of the Dominion.'<sup>90</sup> The timing was delicate: the Geological Survey of Canada, the government agency that had already begun to collect ethnological data, was then under severe scrutiny in Parliament and accused of engaging in activities not directly useful to the country. The opposition blasted

against the expense incurred in buying Indian 'gimcracks' and the publication of a vocabulary of an Indian dialect was declared 'useless.'<sup>91</sup> In view of the unlikelihood of government support, the BAAS in 1886 granted £50 to help the investigation; in the period 1886-96, £800 (\$4,000) were spent by the British Association in aid of ethnological and anthropological research in Canada. Ironically, it was mostly Americans who performed the investigation and published the results. Admittedly G.M. Dawson, Sir William's son and an Assistant Director of the Geological Survey, was a member of the BAAS committee and prepared reports on some of the tribes he came into contact with during his geological explorations. But most of the work, which concentrated on British Columbia Indians, was done by Franz Boas, the German-American geographical editor of *Science* and pioneer of anthropology, and by Alexander Chamberlain, the University of Toronto educated colleague of Boas at Clark University and his successor to the chair of anthropology.<sup>92</sup> The connection was established by Horatio Hale, technically a Canadian representative on the BAAS special committee, together with Daniel Wilson of Toronto and G.M. Dawson. Hale was a Harvard-educated American philologist who settled in Clinton, Ontario, at the age of thirty-nine; he became a member of the Canadian Institute of Toronto and of the American Association (1881), and a fellow of the latter (1882), and after Sir Daniel Wilson's death in 1892 remained in control of the programme until his own death in 1896.<sup>93</sup>

Clearly the AAAS, unable as it was to distribute research grants, could not compete with the work of the BAAS special committees. Until the 1889 AAAS meeting in Toronto, when a committee on the conservation of timberland and natural resources was appointed which included the director of the Canadian Experimental Farm William Saunders, the only joint activities in which Canadian and American members took part was the taking of concerted action in the organization of international congresses. J.W. Dawson and the American T. Sterry Hunt represented Canada on these committees. Furthermore, hardly any Canadians were among the officers of the AAAS from the time of the 1882 meeting at Montreal to 1896, when the Toronto professor of Engineering, John Galbraith, was Secretary of Section D (Mechanical Science and Engineering). J.W. Dawson, as past president, was of course an *ex officio* member of the Standing Committee, but the only other Canadian resident to hold office in the AAAS between 1882 and 1896 was the American Horatio Hale, who was Vice-President of Section H (Anthropology) at the 1886 Buffalo session. It was a clear decline when compared with the relatively frequent election of Canadians to the Standing Committee of the AAAS during the late eighteen-seventies.

The more widespread appeal of the British Association is confirmed by the variation in membership figures.<sup>94</sup> Naturally, at the Montreal 1882 and 1884 meetings both societies attracted a sizeable number of new members. If the numbers for Montreal and the Province of Quebec are comparable (AAAS 61; BAAS 79), those for Ontario (AAAS 17; BAAS 50) and for far-flung regions of Canada (AAAS 1; BAAS 23) can provide a rough measure of the extent to which the British Association meeting was a national affair, and that of the American a local one.

If actually practising scientists are considered, the picture suggests similar conclusions. A few members of the 'old guard,' such as J.W. Dawson, Charles Carpmael, T. Sterry Hunt, William Osler, William Saunders and Daniel Wilson actually held membership in both Associations. In 1884, seven of fourteen fellows of the AAAS resident in Canada were not members of the British Association as well. In 1896, ten out of twelve did not have double membership. As for the members of the BAAS of academic standing equivalent to that of the Fellows of the AAAS, in 1884 seven out of twenty-four were members of both Associations, whereas in 1896 there were only two out of seventeen. The figures point to a small decline in absolute numbers, but also to a sort of radicalisation of allegiance, and suggest the existence of a two-tier scientific community. Although no clear-cut distinction can be drawn, some insight can be gained by noticing that, with the exception of an engineer like Galbraith and medical men like William Osler and Thomas Burgess, scientific faculty members of universities tended to give their allegiance to the British Association. The American Association received the preference of a more varied group comprising government scientists (G.M. Dawson, Saunders), amateurs turned professionals (Fletcher, R. Bell, and Saunders again), and full-fledged amateurs (Horatio Hale, Andrew F. Hunter). This rough separation is suggestive of a similar distinction in the ranks of scientists in the employ of the Dominion government.

## V

The years between 1878 and 1896, which witnessed the Conservatives' efforts to build a Canadian nation, also saw the first steps towards the professionalisation of scientists on a national scale. The similarities between political and scientific developments, such as the emphasis on loyalism and a certain anti-American feeling, are not a coincidence, but a direct consequence of the actions of the federal government -- in the person of the Governor General with the foundation of the Royal Society of Canada and the invitation to the BAAS, and with its weight as an employer in various areas of scientific activity. The universities, the conventional source of professional qualifications in developed scientific communities, had not yet established graduate programmes and, furthermore, were limited by the constitution to the provincial sphere. It is significant that when Sir William Dawson submitted to the Royal Society of London the proposal for imperial geological federation, he mentioned as the Canadian institutions that would do the work the Geological Survey, the Royal Society of Canada and affiliated societies and, as a last thought, 'possibly also the universities.'<sup>96</sup> George Lawson, however, clearly saw the significance of the growing role of universities and the expansion of their laboratory facilities:

Thus a great, if somewhat silent, change has been brought about in recent years in the character of higher education, so far as it related to subjects coming within the range of the physical, chemical and natural sciences.<sup>97</sup>

And he concluded: 'Science itself, as a profession, has come within reach of our youth.'<sup>98</sup>

There was never any doubt that scientists formed an elite. According to the political categories of the time, however, there existed a democracy-aristocracy distinction but not one between aristocracy and elitism. Thus, the critics of the exclusiveness of the Royal Society of Canada could be easily answered that the US National Academy of Science was also exclusive -- science was not democratic. As for Canada itself, J.A. Macdonald's desire was the 'the monarchical idea should be fostered in the colonies, accompanied by some gradation of classes,'<sup>99</sup> to obviate that democratic equality which would lead to republicanism and annexationism.

The leaders of the Canadian scientific community -- Dawson, Carpmael, Wilson -- recognised themselves in the loyalist policies of the Dominion government and, despite a thousand declarations of friendship, occasionally expressed their diffidence towards the United States. The contrast between the American's cheerful, almost glib, appropriation of everything Canadian, and the Canadians' resentment is striking. The American geologist Persifor Frazer, appointed as delegate of the AAAS to the Royal Society of Canada in 1884, told his Canadian audience:

Canada and the United States are bound together by many and strong bonds. They have had the same wilderness to reclaim; the same problem of the new western life to solve. Our borders separate no hostile people; but Canada's glories are ours, and ours are hers. Indeed, some of the names which shed the greatest lustre on science, literature and art are those of Canadians. Is it not noticeable that the dictionary of the people of the United States, so fecund in expanding itself to meet the wants occasioned by new conditions of things, has but one adjective to specify the nationality of our own illustrious men, one which will apply equally to those in Canada, -- *American*. 100

William Dawson, however, who once showed resentment at the Americans' appropriation and use of the word,<sup>101</sup> pointed out the existence of the other side of the coin:

It would be too much to expect that this powerful neighbour and those who enjoy for the time its advantages, should always be generous, forbearing, or even just, or that they should fail to use to the utmost their superior vantage in the race for distinction. Practically, while Canada has had much reason to be grateful for the friendly and generous sympathy of the naturalists of the United States, it has had occasion, in some happily exceptional cases, to smart under their vigorous competition, and in some instances to deprecate a spirit of destraction or of unfair rivalry.<sup>102</sup>

The imperial element, introduced into Canadian science by Lord Lorne, fostered by a diffuse anti-American feeling, and reinforced by the activities sponsored by the BAAS after its Montreal meeting, found fertile ground especially in the academic wing of the Canadian scientific community. But in the process of setting themselves apart from the American community of science by strengthening the ties with the more prestigious world of British science, Canadian scientists placed themselves in a subordinate intellectual and institutional role. To make matters worse, the federal government, suspicious of anything not obviously useful, lost interest in the very institution -- the Royal Society -- it had welcomed at the outset. The type of science politicians wanted became apparent from the demands they pressed upon the scientific departments of government.

## NOTES

1. See V. de Vecchi and T.H. Levere, eds., 'A Royal Society of Canada Symposium to Mark the 150th Anniversary of the Foundation of the British Association for the Advancement of Science (1831-1981) held at York, England, 3 September 1981,' *Trans. Royal Society of Canada, 4th Series*, 20 (1982), 469-547. Ed.
2. Carl Berger, *The Sense of Power. Studies in the Ideas of Canadian Imperialism 1867-1914* (Toronto, 1970). Ed.
3. G.E. Buckle, ed., *The Letters of Queen Victoria* (Toronto, 1926), II, 630-31.
4. J. Whitman, 'The Confederation of Canada with Britain in Relation to the CPR,' *Canadian Monthly*, n.s. 2 (1879), 319-27.
5. Lorne, *Memories of Canada and Scotland* (Montreal, 1884), 218.
6. Goldwin Smith, 'Principal Grant on the Destiny of Canada,' *The Bystander* 1 (1880), 479; cf., also, *Canadian Monthly* n.s. 3 (1879), 207, 211.
7. Argyll, *Passages from the Past* (London, 1907), II, 460.
8. *Ibid.*; J.W. Dawson, *Fifty Years of Work in Canada* (London, 1901), 178.
9. Argyll, *op. cit.*, 473.
10. University of Toronto Archives [UTA], Sir Daniel Wilson Journal and Letters, 6 October 1881.
11. [G. Mercer Adam], 'The Proposed Canadian Academy of Letters,' *Canadian Monthly* n.s. 7 (1881), 99-100.
12. J.W. Dawson, *op. cit.*
13. N.F. Davin, *The Secretary of the Royal Society of Canada, a Literary Fraud* (Ottawa, 1882), 17. For Bourinot's

reaction cf. J. Bourinot to Wm. Kirby, 7 October 1882 and 30 October 1882, Ontario Archives [QA], Kirby Papers, file A-22.

14. N.F. Davin, *op. cit.*, 18.
15. [G. Smith], *The Bystander*, 3 (1883), 68.
16. The expression 'politically visible feature' is borrowed from Yaron Ezrahi, 'The Political Resources of American Science,' *Science Studies* 1 (1971), 120. Ezrahi proposes four dimensions of science which are visible to the layman (e.g. a politician) and have political consequences for science.
17. J.W. Dawson, *op. cit.*, 179.
18. There is a growing body of literature on national associations for the advancement of science. Cf., especially, S.G. Kohlstedt, *The Formation of the American Scientific Community* (Urbana, 1976) and A.D. Orange, 'The Origins of the British Association for the Advancement of Science,' *Brit. J. for the Hist. of Sci.* 6 (1972), 52-176.
19. *Montreal Gazette*, 23 May 1882, 4; Cf., also, *Toronto Globe*, 24 May 1882, 3 and the *Toronto Mail*, 23 May 1882, 4.
20. J.W. Dawson, Royal Society of Canada, *Proceedings and Transactions* I (1882), x.
21. 'Regulations,' Royal Society of Canada, *op. cit.* 1 (1882-83), lxiii, No. 6.
22. 'The Royal Society of Canada,' *Ottawa Free Press*, 26 May 1882, 2; 'The Royal Society of Canada,' *Montreal Gazette*, 26 May 1882, 5, and 29 May 1882, 4. Cf., also, 'A "Royal Society" Rumpus,' *Toronto Mail*, 30 May 1882, 2.
23. *Ottawa Free Press*, 26 May 1882, 2.
24. Cf., for example, 'Interesting Papers in Literature and Science,' *Ibid.*, 4.
25. *Montreal Gazette*, 29 May 1882, 4.
26. J. Loudon, 'The President's Address, January 27, 1877,' *Canadian Journal* n.s. 15 (1878), 375.
27. J.W. Dawson, Royal Society of Canada, *Proceedings and Transactions* 1 (1882-83), viii-ix.
28. Canada, House of Commons, *Debates*, 19 March 1883, 264.
29. *Ibid.*, 14 May 1883, 1194.
30. *Ibid.*, 30 April 1889, 1698-99.
31. Cf., for instance, Royal Society of Canada, *Proceedings and Transactions* 5 (1887), iii, and 8 (1890), vii and xliv-xlv; A.T. Drummond, *Canadian Record of Science* 3 (1888-89), 147.

32. G. Smith, *The Bystander* n.s. (1890), 291.
33. McGill University, Rare Books Room, Dawson Papers, CH 364.002.72, Circular dated 23 April 1891.
34. J.G. Bourinot to J.A. U. Beaudry, memorandum [1891], McGill University Rare Books Room, Dawson Papers, CH 364.002.72.
35. J.G. Colmer to W.D. Lighthall, 1 May 1891, McGill University Rare Books Room, Dawson Papers, CH 364.002.72.
36. Public Archives of Canada [PAC], Grant Papers, vol. 4, D. Wilson to G.M. Grant, 4 May 1891.
37. *Ibid.* (emphasis added).
38. J.W. Dawson, Royal Society of Canada, *Proceedings and Transactions* 1 (1882-83), ix.
39. A. Todd, Royal Society of Canada, *Proceedings and Transactions* 1 (1882-83), xlvi.
40. H.L. Burstyn, 'Science and Government in the Nineteenth Century: The Challenger Expedition and its Report,' *Bull. Inst. Océanogr. Monaco*, Special Issue 2 (1968), 603-13; 'Science Pays off: Sir John Murray and the Christmas Island Phosphate Industry, 1886-1914,' *Social Studies of Science* 5 (1975), 5-34.
41. D.S.L. Cardwell, *The Organisation of Science in England* (London, 1957); cf., especially, chapter 4.
42. Royal Society of Canada, *Proceedings and Transactions* 8 (1890), viii-ix.
43. Royal Society of Canada, *Proceedings and Transactions* 5 (1887), xii.
44. J.W. Dawson, 'Presidential Address: Some Points in which American Geological Science is Indebted to Canada,' *Ibid.*, 4 (1886), 8.
45. G. Lawson, 'Address of the Vice-President' *Ibid.* 5 (1887), xxiv.
46. Royal Society of Canada, *Proceedings and Transactions* 5 (1887), xii.
47. D. Wilson, 'Address of the President,' *Ibid.* 4 (1886), xviii. Cf., also, for further anti-American complaints, J.W. Dawson, *op. cit.*
48. D. Wilson, *op. cit.*, xix.
49. A. Johnson, 'Tidal Observations in Canada,' Royal Society of Canada, *Proceedings and Transactions* 8 (1890), sec. III, 57.



50. G. Smith, *The Bystander* n.s. (1890), 169.
51. N. Reingold, 'Definitions and Speculation: The Professionalization of Science in America in the Nineteenth Century,' in A. Oleson and S. Brown, eds., *The Pursuit of Knowledge in the Early American Republic* (Baltimore, 1978), 55.
52. J.W. Dawson, 'Annual Address, May 18, 1881,' *Canadian Naturalist* n.s. 10 (1883), 107.
53. J.W. Dawson, *Fifty Years of Work in Canada*, 178.
54. *Canadian Naturalist* n.s. 9 (1881), 181 and n.s. 10 (1883), 243.
55. Susan Sheets Pyenson, 'Better than a Travelling Circus: Museums and Meetings in Montreal during the Early 1880s,' *Proceedings RSC 4th Series*, 20 (1982), 499-518. Ed.
56. 'Executive Proceedings,' AAAS, *Proceedings* 32 (1883), and 33 (1884).
57. The meeting was a financial success. The surplus, shared between the AAAS, the Canadian Institute and the chair of physics of the University of Toronto, was many times greater than the small (\$2,000) and bitterly contested federal contribution. Cf. J. Loudon, 'Memoirs,' UTA, Loudon Papers, II, 119-20; Canada, House of Commons, *Debates*, 30 April 1889, 1697-1701.
58. *Ibid.*, 3 April 1884, 134.
59. Ann C. Hopper, 'Was Canada in the Provinces? The Reassessment of 1881,' *Proceedings RSC 4th Series*, 20 (1982), 479-488. Ed.
60. 'Report of the Council,' BAAS, *Report* (1882), lix.
61. Sir J. Henry Lefroy, 'The British Association in Canada,' Royal Colonial Institute, *Proceedings* 16 (1884-85), 97.
62. *The Times*, 2 September 1882, 4.
63. Royal Society of Canada, *Proceedings and Transactions* 1 (1882-83), lxx; 'Report of the Council,' BAAS *Report* (1883), lviii; H. Moody, 'Canada as it Impresses and Influences an Immigrant, with Notes on the North-West Territory,' *Ibid.*, 612-13; C. Walford, 'A Brief Chronological and Statistical Review of the Past and Present of Canada,' *Ibid.*, 613-16.
64. *Science* 2 (1883), 352. At Minneapolis the AAAS also appointed a committee 'on the interchange of courtesies between the American and British Associations for the Advancement of Science' which counted Dawson and T.S. Hunt among its members, AAAS, *Proceedings* 32 (1883), xvi.
65. Royal Colonial Institute, *Proceedings* 16 (1884-85), 134; *The Times*, 29 August 1882, 7.

66. Sir J. Henry Lefroy, *op. cit.*, 96. Lefroy's article was submitted to, and amended by, J.W. Dawson before being read at the 13 January 1885 meeting of the Royal Colonial Institute; *cf.* amended draft, McGill University Archives, Dawson Family Papers, accession 909A, bundle 18.
67. J.W. Dawson, 'Address,' BAAS, *Report* (1886), 5.
68. Lord Lansdowne, 'The Governor General's Reply,' Royal Society of Canada, *Proceedings and Transactions* 2 (1884), xiv.
69. Lyon Playfair, Royal Colonial Institute, *Proceedings* 16 (1884-85), 132.
70. J.W. Dawson, 'Address,' BAAS *Report* (1886), 6.
71. T.H. Huxley, 'Address of the President,' Royal Society of London, *Proceedings* 39 (1885), 282; G.G. Stokes, 'President's Address,' *Ibid.*, 41 (1886), 380.
72. J.W. Dawson to G.G. Stokes, 17 February 1887, Royal Society of Canada, *Proceedings and Transactions* 5 (1887), vi.
73. 'Imperial Union of Geological Surveys and Unions,' *ibid.*, xii-xiii. The opposition was led by Robert Bell and T. Macfarlane, and was defeated by 16 votes to 7; *cf.*, *ibid.*, xl.
74. The project pre-dated the Montreal BAAS meeting; *cf.* W. Topley, 'Report of the Committee, consisting of Sir A.C. Ramsay, Professor J. Prestwich, Professor T. McK. Hughes, and Mr. W. Topley, appointed to assist in the preparation of an International Geological Map of Europe,' BAAS *Report* (1882), 241-2.
75. 'Imperial Scientific Affiliation,' Royal Society of Canada, *Proceedings and Transactions* 7 (1889), x-xii; 'Despatches . . . in Relation to the Proposed Imperial Institute,' Canada, Parliament, *Sessional Papers* 20 (1887), No. 79. *cf.*, also, Royal Society of Canada, *Proceedings and Transactions* 8 (1890), xi.
76. V.M.G. de Vecchi, 'The Pilgrim's Progress, the BAAS, and Research in Canada: From Montreal to Toronto,' *Proceedings RSC 4th Series*, 20 (1982), 519-32. *Ed.*
77. AAAS *Proceedings* 40 (1891), 451.
78. 'A Comparative Study of the Associations,' *Science* 4 (1884), 271-2.
79. [R.A. Proctor]. 'Science in Canada,' *Knowledge* 2 (1882), 247-48. The subtitle of *Knowledge* was 'an illustrated magazine of science plainly worded -- exactly described.'
80. G.H. Darwin, 'On the Method of Harmonic Analysis used in deducing the Numerical Values of the Tides of Long Period,

and on a Misprint in the Tidal Report for 1872,' BAAS Report (1882), 319-27. The work received from the BAAS a total of £75 over the period 1885-1888.

81. BAAS Report (1885), 33-34; (1886), 150-151; (1887), 31. Commander J.G. Boulton, RN, was sent to Canada from Liverpool to direct the hydrographic operations; cf. 'Department of Marine and Fisheries, Report for the Year ending 30 June 1883,' *Sessional Papers* 17 (1884), No. 7, Appendix 30, 172-4.
82. Royal Society of Canada, *Proceedings and Transactions* 8 (1890), viii-ix.
83. *Debates*, 28 April 1890, 4041. The first year grant was \$2,000, but it grew eventually to \$10,000 p.a. for a total of ca. \$107,000 for the first ten years.
84. A. Johnson, 'On the Need of a "Coast Survey" for the Dominion of Canada,' Royal Society of Canada, *Proceedings and Transactions* 11 (1893), Sect. III, 55-56. Cf., also, D. Wilson, 'Canadian Copyright,' *ibid.* 10 (1892), Sect. II, 3.
85. 'A "Coast Survey" for the Dominion,' *Montreal Gazette*, 31 May 1893, 4.
86. Atmosphere Environment Service, *Meteorological Papers*, file 1893a, C.H. Tupper to W. Smith, 5 June 1893 (copy).
87. 'Fifth Report of the Committee ...,' BAAS Report (1889), 49-50.
88. 'Report of the Director of the Magnetic Observatory, Toronto,' *Sessional Papers* 14 (1881), No. 11, Appendix 35.
89. BAAS Report (1887), 152-8; *Sessional Papers* 16 (1883), No. 7, Appendix 26.
90. BAAS Report (1884), lxxv.
91. *Debates*, 12 July 1885, 3348.
92. By Franz Boas, BAAS Report (1889), 796-899; (1891), 407-49; (1894), 453-64; (1895), 522-92; (1896), 591-96; by A.F. Chamberlain, BAAS Report (1892), 545-615.
93. For Boas' work and Hale's role, cf. R.P. Rohner, ed., *The Ethnography of Franz Boas. Letters and Diaries ...* (Chicago, 1969), especially pt. II, 'Research Primarily for the British Association for the Advancement of Science (1888-1894),' 79-196, and J.W. Gruber, 'Horatio Hale and the Development of American Anthropology,' *American Philosophical Society, Proceedings* 111 (1967), 5-37. See also R.P. Rohner, 'Franz Boas, Ethnographer of the Northwest Coast,' in J. Helm, ed., *Pioneers of American Anthropology* (Seattle, 1966), 149-222, and D. Cole, 'The Origins of Canadian Anthropology,' *Journal of Canadian Studies* 8 (1973), 34-45.

94. The importance of the BAAS for Canadian science is also discussed in R.A. Jarrell, 'British Scientific Institutions and Canada: The Rhetoric and the Reality,' *Proceedings RSC 4th Series*, 20 (1982), 533-47. *Ed.*
95. This will be argued in de Vecchi's next paper in this series. *Ed.*
96. 'Imperial Union of Geological Surveys and Unions,' Royal Society of Canada, *Proceedings and Transactions* 5 (1887), xiii.
97. G. Lawson, 'Address of the Vice-President,' *ibid.*, xxiii.
98. *Ibid.*
99. J.A. Macdonald to Lord Knutsford, 18 July 1889, *Correspondence of Sir John Macdonald* (Toronto, 1921), 450.
100. P. Frazer, Royal Society of Canada, *Proceedings and Transactions* 2 (1884), xii.
101. J.W. Dawson, 'Annual Address, May 18, 1877,' *Canadian Naturalist* n.s. 8 (1878), 298.
102. J.W. Dawson, 'Presidential Address: Some Points in which American Geological Science is indebted to Canada,' Royal Society of Canada, *Proceedings and Transactions* 4 (1886), Section IV, 1.