

Article

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THE INFLUENCE OF IRISH INSTITUTIONS
UPON THE ORGANIZATION AND DIFFUSION OF SCIENCE
IN VICTORIAN CANADA*

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At the time of the 1871 census, the first since the confederation of British North American provinces into the Dominion of Canada, nearly one-quarter of the population was of Irish origin. Few in this substantial group were destitute refugees of the Famine years, but included prosperous farmers in Upper Canada and urban workers descended from labourers who came out to Canada two or three generations earlier. Two-thirds of the Canadian Irish were Protestant and not a few well educated. Canadian historians have long recognized the importance of Irish politicians and writers, for example, but have been silent on the impact of the Irish upon Canadian science. Nineteenth-century Ireland boasted a number of important scientific institutions, such as the Royal Irish Academy, Royal Dublin Society and Trinity College, along with an impressive array of internationally-respected men of science. I intend, in this paper, to review some of the ways in which Irish institutions and their representatives helped to mould the way in which Canadian science was organized and diffused before 1900. The three main areas of influence appear in higher education, elementary education and the organization of the Royal Society of Canada.

It was in the arena of education that the strongest impact of Irish institutional models upon Canada was felt. Historians of higher education stress the influences of the English and Scottish universities in the early nineteenth century, followed by German and American practices towards the turn of the century. Some fifty years ago, Sir Robert Falconer, President of the University of Toronto, published a series of articles, in the *Transactions* of the Royal Society of Canada, on the English, Scottish and Irish influences upon higher education; the Irish article was the slightest and devoted most of its space to enumerating Irish-born or -educated professors.¹ The Irish origins of Canadian higher education are rather more significant. In three universities in particular -- Toronto, McGill and New Brunswick, all of which were early centres of science education --

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the Irish influence was notable.

The history of the University of Toronto, Canada's pre-eminent science university in the twentieth century, has usually been seen as the evolution from the Oxford-Cambridge style of education to a hybrid of British and American practices.² Yet, until the last quarter of the nineteenth century, the Irish traditions were surprisingly strong. Although the university received its charter as King's College in 1827, its doors opened to students only in 1843. Its founder, John Strachan, eventually Anglican bishop of Toronto, intended that the university be a strictly Anglican institution, patterned after its namesake in London. Even when King's finally was launched, with a predominately Anglican faculty, it was beneath a cloud; the growing democratic feelings of the Upper Canadian population and the demands of the other denominations for a share of state funds for university education meant that no exclusive college could survive long without considerable opposition. The Methodists had created Victoria College in Cobourg in 1841, the Presbyterians Queen's College in Kingston in the same year and the Roman Catholics Regiopolis College, also in Kingston, in 1837. None were to receive direct grants from the Legislature from the sale of immense tracts of Crown Lands set aside for educational purposes, although they, not adherents to the Church of England, comprised the majority of the population. A series of legislative acts during the 1840s and early 1850s attempted to come to grips with this issue; nonetheless, it was an Anglican college that opened in Toronto in 1843.

A number of histories allude to King's College as a bastion of English-style higher education, but we need only survey the first professors to sense that the story is more complex. The divinity professor was an Oxonian, the professor of mathematics and natural philosophy -- who soon resigned -- was a Cambridge man, as was one of the medical professors. The surgery professor was a product of London and Paris schools. The most accomplished scientific man on staff, Henry Holmes Croft, Professor of Chemistry, was a native of London who had attended Tavistock House school, presided over by John Walker, Jr., son of the noted Trinity College, Dublin, classicist. Croft completed his education under Mitscherlich and Rose at Berlin. The remaining members of the early King's faculty were all Irish-born or -educated. The Professor of Classics, John McCaul, the Professor of Medicine, John King, the Professor of Anatomy and Physiology, W.C. Gwynne and the Professor of Law, William Blake, were all Trinity graduates. Another professor of medicine, Henrick, and the demonstrator in anatomy, Henry Sullivan, were products of Dublin medical schools. When Blake soon resigned, he was replaced in the law chair by his partner George Skeffington Connor, a fellow TCD graduate.³ Thus, three-quarters of the initial staff at Toronto had Irish connections, but the most important was John McCaul.⁴ McCaul, a Dublin native, had had a distinguished career at Trinity, first in mathematics under Stephen Sandes, then in classics. After taking his MA in 1828, he remained a scholar and tutor and took holy orders. In 1839, on the recommendation of the Archbishop of Canterbury, he was offered the post of Principal of Upper

Canada College, the Anglican collegiate school founded by Strachan. In 1842, when the professors for King's College were being selected, Strachan tapped McCaul to be Vice-President and Professor of Classics, Logic, Rhetoric and *Belles-Lettres*. Strachan's official duties precluded him from active organization of the college curriculum, which was left to McCaul; the only model the latter knew well was that of his *alma mater*.

A comparison of the curriculum at King's in the 1840s with that of Trinity, outlined in its *Calendar* of 1836, shows striking similarities. Although the Toronto programme was only three years in length, the terms freshmen, junior and senior sophisters were in use. Mathematics and science followed the Dublin scheme more than that of contemporary Oxford or Cambridge, as did the reliance upon examinations. More emphasis upon experimental work differed from Dublin, thanks to Croft, but the organization of honours was much the same. Several incumbents of the mathematics and natural philosophy chair were English trained, but the programme outline remained Trinity inspired until the last quarter of the century.

The continuing debate over university financing led to structural changes. Here, again, the Irish influence has gone unnoticed. The college became the secular University of Toronto in 1850, but the major shift came with the University Act of 1853 which suppressed the University of Toronto as a teaching institution, making it purely an examining body. Henceforth, all teaching would be in the hands of a new school, University College, and by any other colleges that cared to come into federation with the new university. The author of the bill, Francis Hincks, was then Premier of Canada. He tells us in his autobiography that the bill was framed in imitation of the charter of the University of London so as to funnel all state aid to University College rather than to denominational colleges.⁵ The Act itself speaks of following the London model.⁶ A closer look shows that not to be the case. The real model was, I suggest, the Queen's University of Ireland, which came into being in September 1850. The long-standing university question in Ireland was largely based upon denominational struggles for state aid, just as in Upper Canada. The Queen's Colleges were federated by the 1850 act.⁷ The Queen's University consisted of a chancellor and senate, appointed by the Crown, and a vice-chancellor chosen by the senate. Degree requirements and examinations were set by the university, but curriculum, matriculation and scholarships remained in the hands of three colleges with their presidents, vice-presidents and councils. The new University of Toronto had virtually the same structure. University College was an equivalent of the colleges in Cork, Galway and Belfast. It is true that both Toronto and Queen's shared many of the features of London University, but with important differences: many institutions could affiliate with London, but a prospective degree candidate need not have attended any of them nor, excepting medicine, have attended lectures anywhere. At Queen's, however, the only route to university examinations was through the college programmes, and in Upper Canada a student had to complete a course of study at any present or future chartered college or other institution that the university would recognize.

The aim of the 1853 legislation, like that of 1850 in Ireland, was to accommodate the educational aspirations of different denominations without directly funding denominational colleges. That Hincks would utilize the Irish model -- despite failing to mention it -- is obvious on reflection. He was the son of Thomas Dix Hincks, born in Cork in the year his father founded the Royal Cork Institution. Educated at the Belfast Academical Institution, where his father was classical master, Hincks went into business, emigrated to Canada and soon joined the political reformers. He must have been well informed about the course of Irish university education through his brother William who was the first Professor of Natural History at Queen's College, Cork, in 1849. The year after the university act was passed in Upper Canada, William Hincks was named Professor of Natural History at University College, Toronto. That he beat out Thomas Henry Huxley for the post is generally considered due to this brother's influence. William Hincks was admitted to be a lack-lustre teacher at Toronto, but he was responsible for bringing one more facet of Irish scientific influence to Canada. By the late 1870s and early 1880s, when a younger generation began to fill university posts, the Dublin scientific tradition began to wane at Toronto in favour of the American and German emphasis upon experimentation and research.⁸

Before the turn of the century, the foremost centre of scientific activity in Canada was McGill University. Although founded early in the century, its arts faculty was nearly moribund by 1850. When a legislative enquiry into education surveyed McGill's programme in 1849, the Acting Principal and mathematics professor, Edward Meredith, a TCD graduate, forwarded a copy of the McGill programme, a three-year BA course superficially like that of Dublin which employed, amongst others, texts by Helsham and Brinkley.⁹ A stronger emphasis upon science was inaugurated by John William (later Sir William) Dawson, named Principal in 1855. He invigourated the arts faculty with new appointments, including that of Alexander Johnson as Professor of Mathematics and Natural Philosophy. The Nova Scotian Dawson received his scientific training at Edinburgh so that in the natural sciences, the Edinburgh traditions -- and American textbooks -- were the norm, but Johnson was an Irishman educated at Trinity who organized mathematics and physics along Dublin lines. In the new four-year course, the first two years were devoted to mathematics, the third to mathematical physics, with experimental physics spread out over the third and fourth years. Astronomy was teamed with mathematical physics.¹⁰ The increasing study of experimental physics at Trinity was reflected at McGill, with Johnson employing the popular texts of Galbraith and Haughton and those of Lardner in the ordinary course and books by Griffin, Salmon and Lloyd, along with others, in the honours course. As at Toronto, the Dublin traditions lasted until the generational change; in Montreal, this did not occur until after 1890 when a succession of English--especially Cavendish Laboratory-trained men--shifted the emphasis to laboratory practice and research.¹¹

In the Maritimes, the University of New Brunswick, though more modest in size, underwent much the same evolution as Toronto, from an Anglican liberal arts college to a state-supported

secular university. Its early professoriate were Scots and Americans. The President and Professor Mathematics and Natural Philosophy, William Brydone Jack, had been a student of Brewster's at St Andrew's. When he retired in 1885, his successor was the Professor of English and Philosophy, Thomas Harrison. Born in New Brunswick, Harrison held three degrees from Trinity College and such was the well-rounded education of Dublin University that Harrison not only assumed the Presidency of the university but also Jack's professorial chair. The four-year programme at New Brunswick now began to resemble that of Trinity, with a heavy emphasis upon mathematics and mechanics. Harrison's textbooks, by Galbraith and Haughton, Brinkley, Salmon, Williamson, Minchin and Boole, were perfectly suited to his course. New Brunswick followed in the pattern of McGill and Toronto by moving to more modern practices after Harrison's retirement.¹² Amongst the younger men was Stephen Dixon, a Trinity engineering graduate, who helped to modernize the engineering course at the university before moving on to a distinguished career at Dalhousie in Halifax, Birmingham and Imperial College. Although a modicum of Irish influence can be seen at a number of other Canadian universities during the last century, most was restricted to the use of Irish-authored textbooks; the manuals of Galbraith and Haughton and of Lardner, popular in the United States, were ubiquitous in Canada. It is significant, however, that New Brunswick, McGill and Toronto were the first schools in Canada to produce scientific PhDs and all three were early to build schools of engineering upon the solid basis of mathematics and physics in the Trinity College tradition.

In the arena of elementary education, the influence of the Irish experience was felt from the early years in the organization of Ontario's public schools.¹³ The virtual founder of the school system of Upper Canada and Ontario, the Methodist educationist Egerton Ryerson, was, from the first, cognizant of the parallels between the Irish educational context and that of Canada. As in Ireland, the established church was locked in perpetual struggle with the other Protestant denominations; thanks to American immigration, the Methodists and Baptists were as numerous and vocal as the Scottish Presbyterians, and all were arrayed against the privileges of the Church of England, which had control over Crown Land holdings earmarked for the maintenance of education. Although Roman Catholics were a minority in Upper Canada, they too had to be reckoned with. Thus, any scheme of public education in the newly-formed Province of Canada after 1841 would have to take into account the disparate needs of the various denominations. National Education, and that is how Ryerson and others referred to it, would have to accommodate all of them. When he was appointed Superintendent of Public Instruction for Upper Canada in 1844, Ryerson realised that a complete scheme would have to be devised to replace the patchwork collection of schools that already existed but was far from adequate for the growing population of the colony. There were obvious examples close to hand in the United States, but Ryerson believed that any system for Canada should utilize the best features of any system, adapt them to Canadian circumstances and improve them. In 1844-45, during an extensive educational tour of the

United Kingdom and the Continent, he was very impressed by the Irish National System then in place for more than a decade. Ireland was similar to Canada in several respects: its population consisted of several denominations; it was economically underdeveloped; it was primarily agricultural; and it was in serious need of educational resources. In an elaborate report published in 1846, Ryerson laid out the features that would soon exist in Upper Canada, borrowing from the Irish system and from American experience.¹⁴ Some of the features of the Irish National Schools that impressed him most were mixed schools, the official textbooks published by the Commissioners and the teacher training scheme. As he reflected in a later report (1857), the Irish system allowed for religious education without overriding parental desires. The Upper Canadian system had successfully adopted those features -- indeed had improved upon them -- but had also forged a far more democratic and responsive system, following the lead of the Massachusetts and New York school systems;¹⁵ the Irish system, with its appointed commissioners, was to his mind a top-down, autocratic system. With local school patrons, the Irish schools could, and did, quickly evolve into virtual denominational schools with little or no responsibility for parents. This was anathema to North Americans who insisted upon locally-elected school trustees, ratepayer financing of schools and the local choice of teachers.

In the 1840s, science was scarcely of importance to the elementary curriculum of English-speaking countries, but Ryerson himself recognized its importance as part of a liberal education. In his inaugural address as President of the Methodists' Victoria College in Cobourg in 1841, he underscored the importance of science in collegiate education.¹⁶ It was no less important in the common schools. As Superintendent, he would have control over the curriculum of the entire western section of Canada. One problem was the dearth of good textbooks. As a young colony, Canada had yet to develop its own community of textbook authors, given few schools or universities. As a consequence, the texts employed in British North American schools were English or American, few of which were satisfactory. In Upper Canada, Ryerson was particularly opposed to American texts which extolled Republicanism and denigrated the British. An alternative was the set of textbooks commissioned for the Irish system. These books were cheap and universally admired for their utility; equally valuable, they were religious without being denominational, making them well suited for Canadian needs. Ryerson had spoken favourably of the books after his tour of inspection.

The Irish readers, written in the 1830s by the Rev James Carlile, William McDermott and Archbishop Richard Whately were a graded series that introduced geography and natural science beginning in the *Second Book of Lessons*, in its two sequels and in the third and fourth and supplement to the fourth books. The level of scientific knowledge in the advanced books of the series was surprisingly high for the period and should be classified as intermediate level. In fact, few Irish students -- and the same was true in Upper Canada -- reached the level of the third and fourth books. The Irish series also included fine textbooks on geography, arithmetic and natural philosophy,

but these were more typically employed in such secondary schools as had appeared. Thanks to the advocacy of science educator Richard Dawes and others, the Irish readers soon eclipsed all others in England by mid-century; as Layton comments, 'Containing much scientific information the works provided a partial answer to the need for secular texts to support the teaching of elementary applied science.'¹⁷

Until Ryerson's superintendency, there were no guidelines for the adoption of textbooks. To ensure that American texts which ignored or maligned Canada were largely eliminated from the common schools, he had a provision placed into the 1846 Common School Act giving his office the right to authorize texts.¹⁸ The Commissioners of National Education in Dublin authorized textbooks and distributed free sets of their own books to schoolmasters at regular intervals, and Ryerson wished to emulate them. In July 1846, the Board of Education for Upper Canada -- itself modelled on that in Dublin -- authorized thirty-one of fifty textbooks already in use in Ireland. To maintain the flow of books at low cost, Ryerson requested the permission of the Dublin Commissioners to reprint their texts in Canada; this was agreed to, and subsequent issues of virtually all National School textbooks were published in Canada.¹⁹ The Irish readers, in particular, already in use in Lower Canada and Newfoundland, quickly spread in popularity, with requests by the governments of Prince Edward Island and New Brunswick for special arrangements for their schools.²⁰ By 1848, Ryerson could report that the Irish readers and some other Irish texts were already in wide use throughout the province.

By the 1860s, the Irish readers, now in almost universal use, were becoming rapidly outmoded as the authorized Canadian editions were still those written in the 1830s. In answer to numerous complaints, Ryerson appointed John McCaul and Rev Ormiston to revise the series. In 1868, the Canadian Series of Reading Books, the so-called 'Ryerson Readers,' appeared, yet they maintained the organization and much of the content of the older series. A further revision appeared in 1875 but were dropped in favour of a Scottish series after Ryerson's retirement. George Ross, Ontario Minister of Education from 1883 to 1899, wishing to maintain tight control over textbooks, contracted three Ontario teachers to produce a new series, the Ontario Readers. Published from 1884, this series was a return to the Irish format; these texts remained the authorized readers in the province until 1909. Thus, the Irish approach to teaching elementary science and mathematics was central to the Ontario educational system for more than sixty years and the first large wave of Ontario-educated scientists who began graduating from university in the 1890s was brought up on Irish texts and methods.

Two other features of the Irish National System attracted Ryerson: teacher training and agricultural instruction. In his 1846 sketch of an educational scheme, he argued that both should be adopted in one form or another. Agricultural education had made little progress in Ireland until the late 1840s and fared no better in Upper Canada during Ryerson's regime. Teacher training, however, was a greater success.

The 1846 educational act created a normal school with associated model schools in Toronto. Ryerson had visited a number of normal schools during his 1844-45 tour but was most impressed with the Marlborough Street establishment in Dublin -- even if many Irishmen were not. In September 1846 he requested the Commissioners of National Education to name a suitable person to be headmaster of the Toronto school.²¹ The Board's choice being unable to go out to Canada, a second selection was made and Thomas Jaffray Robertson, a head inspector with the Board, was appointed in the summer of 1847. He organized the Toronto school along the lines of Dublin's. The groundwork had already been laid by Ryerson by sending his chief clerk, John George Hodgins, his former student at Victoria College, to the Marlborough Street school for a complete course in the winter of 1844-45. Hodgins also brought back plans for the normal and model schools. His own long tenure in the education office -- he retired as Deputy Minister in 1890 -- meant that Irish influence in teacher training lasted beyond the retirement of Ryerson.

At mid-century, teachers themselves had little education beyond the elementary course so that the Normal School had to provide substantive instruction as well as discussion of pedagogy in its six-month course. Utilizing Irish-authorized texts, Robertson and his mathematics master, English-educated Henry Youle Hind, provided what was essentially an intensive secondary education. Students practiced in the associated model schools whose headmaster was also provided by Dublin. The first Canadian science and mathematics texts were penned by men associated with the Normal School, Hodgins providing two geography texts, Hind an agricultural manual and John Herbert Sangster texts on arithmetic, algebra and natural philosophy. Sangster, educated in Methodist schools and Victoria College, was Hind's successor as mathematical master at the Normal School and later the headmaster from 1865-71. His texts were Canadianized versions of the Irish textbooks, utilised in both elementary and secondary schools. Robertson became Inspector of Grammar Schools after retiring from the Normal School, although the secondary schools, as in Ireland, did not fully develop until the last quarter of the century. One other facet of Irish teacher training was the establishment of District Model Schools to act as lower-level training centres and as feeders to the Central School in Dublin. Ryerson adopted a similar strategy by creating County Model Schools and eventually other normal schools in the province.

Although Ontario was the strongest imitator of Irish educational practices in terms of textbooks and teacher training, Québec too felt some influence. The first Superintendent of Public Instruction for Lower Canada, Jean-Baptiste Meilleur, was as adamant as Ryerson that foreign texts be kept out of the province. Neither he nor his successor Pierre-Joseph-Olivier Chauveau were able to centralize the authorization of texts in the manner of Ryerson.²² The common school system of Lower Canada, complicated because of two linguistic groups and increasing denominational polarization -- after Confederation the system split into parallel Catholic and Protestant systems -- evolved more slowly. The Irish textbooks were in

vogue in the English-language schools and were much admired by John William Dawson who, besides being Principal of McGill, was a member of the Council of Public Instruction and foremost science educator in the province.²³ Normal schools followed more slowly. Chauveau's educational acts of 1856 created three normal schools for the province, two for Catholic teachers in Québec and Montréal and one for Protestants connected with McGill, with Dawson as head. In the same year, Chauveau inaugurated the *Journal de l'Instruction publique*²⁴ to disseminate items of interest on pedagogy, science and literature to teachers, emulating Ryerson's educational journal in Upper Canada. These journals acted as conduits for Irish ideas into Canadian schools.

Both Meilleur and Chauveau had been youthful enthusiasts for science. Meilleur, trained as a physician in the United States, was author of a chemistry textbook. Chauveau's scientific interests whilst in office were more practically oriented, especially with regard to agricultural education. Before the last quarter of the century, Canada was still, like Ireland, essentially an agricultural nation and fostering new techniques was a high priority. During 1866-67, Chauveau made an extended tour of the British Isles and the Continent to review educational practices and was most impressed with the Irish approach to teacher training in agriculture.²⁵ The method of the Irish National System seemed well suited to Québec. In Ireland, a central establishment, the Albert National Agricultural Training College, had been used by teachers in one form or another since 1833 and was joined in the 1840s by several model agricultural schools throughout the island, along with a number of National Schools with attached farms or gardens. At the time of Confederation, Chauveau became Premier of the Province of Québec, retaining the education portfolio. One of his first acts was to approach cabinet to create a central agricultural normal school with a system of local schools along Irish lines. Agricultural education of a limited form was already offered in some of the classical colleges operated by the Catholic Church, and Chauveau suggested that the abbé Godin, formerly associated with a model farm of the Collège de Ste-Thérèse, be sent to Europe for further information.²⁶ The scheme was halted by opposition within cabinet, one argument being that model farms could not be associated with the three normal schools because the Protestant, anglophone McGill Normal School catered mostly to female teachers who would not teach agriculture in the common schools. As a result, although some agricultural education of a strictly theoretical nature was offered by the two Catholic, francophone normal schools in the 1870s, little else was available except in some of the classical colleges like the abbé Pilote's school at Ste-Anne-de-la-Pocatière.

A variety of scientific societies came into existence in Canada during the last century, and these shared the traits of those in other English-speaking countries. As in Ireland, most Canadian societies were local in focus, often combining the sciences with literature, philosophy or the arts and nearly all catering as much to the cultural and recreational needs as for the strict pursuit of scientific knowledge.²⁷ Yet, by the beginning of the 1880s, Canada lacked a national scientific

society, having formed neither an honorific organization such as the Royal Society of London and the US National Academy of Science or a broadly-based general society such as the British and American Associations for the Advancement of Science. To be sure, some of the local societies had national pretensions: the Natural History Society of Montreal claimed members from various parts of Canada and published a journal devoted to Canadian natural history and geology in the most general sense. In Toronto, the Canadian Institute consciously tried to attract members from other parts of Ontario and other provinces and its organ, the *Canadian Journal*, also aspired to be a national scientific periodical. A visit to Montréal by the American Association in 1857, although of much local interest, failed to spark the movement towards the formation of a similar society. The problem was one of numbers. There were too few men of science in Canada, and where a sufficient number to form the nucleus of a society existed, as in Toronto, Ottawa or Montréal, they could already rely upon a local society to fulfill their needs. Colleagues in other cities were too distant for easy communication. Furthermore, the research ideal could scarcely be said to exist in the universities; government department research, still in its infancy, did not require a national society. Given these conditions, it is no surprise that the impetus to form a national society came from an outsider -- in this case, John Sutherland Campbell, Marquis of Lorne, Governor-General of Canada from 1878 to 1883.

Lord Lorne and his wife Princess Louise made a great impact upon the Canadian public. Rarely had a Governor-General taken such an interest in the country and its people. Soon after his arrival, he exhibited a strong desire to organize the latent talents of Canadians. In 1880, he was instrumental in forming the Royal Canadian Academy of Art, in imitation of its London namesake. The following year it was the turn of the scientific and literary men. During the summer of that year, Lorne approached William Dawson with the idea of a national academy in hopes that he would assist in its organization. The idea was not an instant success:²⁹ a number of newspapers attached the concept and several notable scholars and scientific figures scoffed at the suggestion, although they would no doubt be included in such a society. Dawson and his opposite number in Toronto, Sir Daniel Wilson, agreed that a purely scientific society might possibly be viable but one in which both French and English literary men would participate would be both ludicrous and unworkable. Lorne was adamant, however, and Dawson agreed to undertake much of the organization whilst the Governor-General visited the West during the latter half of 1881. A meeting of the provisional council at Dawson's home in late December saw the completion of the regulations and general agreement upon the membership. The new organization, to be styled the Royal Society of Canada, was to be an honorific rather than general society with only eighty fellows to be appointed by Lorne from a list provided by Dawson and his close associates. These men, the fellows, would be named to four sections of twenty members. Section I was reserved for French-language literature and history; Section II for English-language literature and history; Section III for Mathematics, Chemistry and Physical Science; and Section IV for Geology and

the Natural Sciences. Much discussion went into the question of whether the Royal Society should be peripatetic, like the British and American Associations, or fixed. Although the peripatetic system would no doubt have had some impact upon the growth of science throughout the Dominion, the fixed-location view won out largely because of the honorific nature of the society and the hopes that it might render itself useful to the Federal government. As a result, the first meeting was held in Ottawa in May of 1882 and, with few exceptions, convened in the capital for many years afterwards.

What was the model for the Royal Society of Canada? It has usually been assumed to have been either the Royal Society of London or the Institut de France. Robert Falconer, writing in the fifty-year anniversary volume, states that the Canadian society took the London society's name but the Institut's 'practice and methods.'³⁰ In the 100th anniversary proceedings, the society's president tells us that 'the founding of the Society on the model of l'Institut de France and its five academies and of the Royal Society of London was generally well received by newspaper reporters and the public ...'³¹ The Canadian society shared its name with the London society -- but then many organizations in the British Empire aspired to the prefix of 'Royal' -- and it was an elite organization, though not strictly devoted to science. The Institut de France, as a model, had its limitations as the Académie française and academies devoted to literature, science, fine arts and moral and political sciences were clearly distinct in membership, operation and focus. The Canadian society had 'sections,' not academies, eschewed the fine arts and, in recognition of Canada's linguistic and cultural divisions, maintained twin literary sections. The most obvious model for the Royal Society of Canada was the Royal Irish Academy, formed in 1785 and devoted to the sciences, polite literature and antiquities. The Academy had much to recommend it as a model for Canada: it was an honorific society which considered itself to be at the heart of Irish national intellectual life, just what Lorne had intended for his society. It included science and literature in one organization, which reflected both the size and cultural outlook of the intellectual establishment of late eighteenth-century Dublin. One of the desiderata for the Royal Society was the collection of materials for a future national museum. The Royal Irish Academy had collected materials for its museum for years; its collection was destined to be exhibited in the National Museum of Ireland.

If by the 1880s many Canadian intellectuals saw the combination of scientists with literary men as absurd, both groups were nevertheless very few in number. A purely scientific honorific society might not have been viable. The catholicity of Lorne's cultural views also meant the Irish example would recommend itself. When the *Proceedings and Transactions* of the Royal Society of Canada began to appear in 1883, they must have struck many scientific observers in other countries as rather odd because research articles on science were published in the same volume as poems, historical articles, ethnology and a wide variety of other topics. But a member of the RIA would not have seen anything odd in this, for their papers for

many years had been published in a common volume. Furthermore, the Academy was fixed in Dublin and did not contemplate a peripatetic or democratic existence. By the 1880s, the Academy could boast far more scientific men than the Royal Society of Canada, and many of them were highly distinguished. Yet there was no strong movement to separate from those cultivating polite literature or antiquities. Lorne and members of the provisional council must have been aware of the success of the Royal Irish Academy despite the seemingly incongruous mixture of interests.

Unfortunately, we cannot say with certainty what model was adopted for the Royal Society. There are no indications amongst the Lorne Papers in the Public Archives in Ottawa as to the Governor-General's thoughts. The Provisional Council, meeting at Dawson's home, had a memorandum from the viceroy concerning organization but, as Burpee notes, no records survive of that meeting.³² The source of the idea that the Society was based upon the French exemplar may have been a journalist's jumping to conclusions. The first public intimation that Lorne intended to found such a society was made by the Quebec *Morning Chronicle* on 2 June 1881. Lorne was in Québec at the time, and the newspaper account claimed that he would form a literary academy based upon the Académie française. No mention was made of science and the source of the information was not revealed. Within days, other newspapers across the country picked up the story, some reprinting it almost verbatim; both English- and French-language papers mentioned the Académie française as the model. The story survives after a century, but I believe its basis was an editor's assumptions and no more. Given the strong resemblance between the early Royal Society of Canada and the Royal Irish Academy and the clear dissimilarities with other national organizations, I think we must concur with DeVecchi that the RIA was the obvious model; it best suited Canada's peculiar needs.

The Irish influences upon Canadian science were of two kinds: the influence of Irish ideas and institutional models put into practice by Irishmen who immigrated to Canada and through the conscious -- or perhaps even unconscious -- adoption of Irish ideas because they made good sense in a society with strong similarities. In the former instance, the 'vectors' were men like John McCaul, Alexander Johnson, Thomas Harrison or William Hincks. In the latter form, we can discern direct borrowing by men such as Ryerson, who had no connections with Ireland but recognized the parallels and the advantages in adopting certain Irish ideas. Of course, it is difficult to prove a definite causal link between the use of Irish ideas, people or books and the evolution of Canadian science. That the universities of Toronto, New Brunswick and McGill were successful, particularly in the physical sciences and mathematics where the Trinity traditions were followed, does not mean that other Canadian schools were unsuccessful. Dalhousie and Queen's were both reasonably effective in the sciences towards the end of the century and both owed more to Scottish and German traditions of teaching. But the fact remains that many of the prominent Canadian scientists by the turn of the century had been

educated within Irish traditions of higher education. Subtler are the effects of National School methods and textbooks in Ontario. It may well be that the scientific content of the Irish readers, used in one form or another for so long, reached far more people in Canada than even in Ireland. Certainly Ryerson believed that the system he helped to create was more effective than those of England or Ireland.³³ Whilst we cannot measure the level of scientific literacy of the Canadian population at the end of the Victorian era, it may not be coincidental that the rapid rise in industrialization and government scientific activity in the 1880s followed just after the first generation moved through the new educational system, from common school to universities such as Toronto and McGill. If there is a connection between scientific literacy and industrialization, and many people in the nineteenth century held that connection as an article of faith, then Ireland contributed significantly to the modernization of Canada.

NOTES

1. Sir Robert Falconer, 'Irish Influence on Higher Education in Canada,' *Transactions of the Royal Society of Canada*, Section II (1936) 131-43.
2. For Toronto, see W. Stewart Wallace, *A History of the University of Toronto 1827-1927* (Toronto, 1927); on curriculum development, Robin S. Harris, *A History of Higher Education in Canada 1663-1960* (Toronto, 1976), and for legislative developments, *Universities of Canada. Their History and Organization* (Appendix to Annual Report, Ontario Department of Education, 1896) are useful.
3. As in Dublin, the university was a link amongst the influential families. Professor Blake and later Ontario Premier Edward Blake, himself a chancellor of the university, were part of a prominent family from southern Ireland. Henry Sullivan's brother, Robert Baldwin Sullivan, was an eminent jurist and Supreme Court Justice; their cousin, Robert Baldwin, as Premier of Canada, brought in the bill that secularized the university.
4. On McCaul, consult John King, *McCaul. Croft. Forneri. Personalities of Early University Days* (Toronto, 1914).
5. Sir Francis Hincks, *Reminiscences of His Public Life* (Montreal, 1884), 311.
6. 16/17 Vict., cap. 89. This, and other university acts are reprinted in John George Hodgins, *Documentary History of Education in Upper Canada (Ontario) from 1791 to 1876* (Toronto, 1894-1910).
7. T.W. Moody and J.C. Beckett, *Queen's University, Belfast, 1849-1949* (London, 1959) I, 70ff.
8. For details, see P.N. Ross, 'The Origins and Development of the PhD at the University of Toronto, 1871-1932,' (unpublished ED thesis, University of Toronto, 1973).

9. Province of Canada, Legislative Assembly, *Journal* (1849), appendix G.G.G.G., No. 35.
10. McGill University, *Calendar*, 1860-61.
11. For the field of physics, this shift has been analyzed by Yves Gingras, 'Les Physiciens canadiens: g n alagie d'un groupe social (1850-1980),' (Unpublished PhD dissertation, Universit  de Montr al).
12. See Richard A. Jarrell, 'Science Education at the University of New Brunswick in the Nineteenth Century,' *Acadiensis* (Spring 1973), 55-79.
13. An overview of the history of Ontario education is provided by Robin S. Harris, *Quiet Evolution. A Study of the Ontario Educational System* (Toronto, 1967); for Ryerson, the standard work is C.B. Sissons, *Egerton Ryerson. His Life and Letters*. 2 Vols. (Toronto, 1937, 1947).
14. Egerton Ryerson, 'Report on a System of Public Elementary Instruction for Upper Canada, 1846,' printed in Hodgins, *Documentary History VI*, 140-211.
15. 'Annual Report of Normal, Model and Common Schools in Upper Canada,' in Province of Canada, Legislative Assembly, *Journal*, (1857) Appendix 43.
16. Egerton Ryerson, *Inaugural Address on the Nature and Advantages of an English and Liberal Education* (1842).
17. David Layton, *Science for the People. The Origins of the School Science Curriculum in England* (New York, 1973), 106.
18. On the textbook question, see Viola E. Parvin, *Authorization of Textbooks for the Schools of Ontario 1846-1950* (Toronto, 1965).
19. Commissioners of National Education, *Minutes*, 3 September 1846; this, and other minutes relating to Canada, are available in transcript form in: 'Extracts from the Minutes of the Commissioners of National Education, Ireland (1831-70),' Public Archives of Canada, MG 24, K63.
20. *Ibid.*, minutes of 19 August and 4 October 1847.
21. *Ibid.*, minutes of 3 September 1846; see also, minutes of 21 January and 3 June 1847. The nature of Irish teacher training is discussed in Donald H. Akenson, *The Irish Educational Experiment: The National System of Education in the Nineteenth Century* (London, 1970).
22. For details on the superintendencies of Meilleur and Chauveau, consult Louis-Phillipe Audet, *Histoire de l'enseignement au Qu bec (1840-1971)* (Montr al, 1971), tome II.

23. E. Ryerson to J.W. Dawson, 8 November 1859. McGill University Archives, RG20/927/11/185.
24. The Superintendent also published an English-language version, the *Journal of Education*, but the content often differed considerably from the French-language paper.
25. For Chauveau's impressions and views on education, see *L'Instruction publique au Canada* (Québec, 1876).
26. 'Rapport du surintendant de l'instruction publique, 1867,' Province de Québec, Assemblée législative, *Documents de la Session*, Vol. 1, No 1 (1869), Document 2.
27. Richard A. Jarrell, 'The Social Functions of the Scientific Society in 19th-century Canada,' in Jarrell and A.E. Roos, eds., *Critical Issues in the History of Canadian Science, Technology and Medicine* (Thornhill, 1983), 31-44.
28. Gingras, *op. cit.*
29. On the founding of the Royal Society of Canada, two interpretations are: Vittorio De Vecchi, 'The Dawning of a National Scientific Community in Canada, 1878-1896,' *Scientia Canadensis* 8:1 (June 1984), 32-58, and R. Daley and P. Dufour, 'Creating a "Northern Minerva": John William Dawson and the Royal Society of Canada,' *HSTC Bulletin* 5:1 (January 1981), 3-13.
30. Sir Robert Falconer 'The Intellectual Life of Canada as Reflected in its Royal Society,' in Royal Society of Canada, *Fifty Years Retrospect* (Ottawa, 1932), 25.
31. Marc-Adélard Tremblay, 'Evolution of the Image and Accomplishments of the Royal Society of Canada,' *Transactions of the Royal Society of Canada*, series IV, XX (1982), 12.
32. L.J. Burpee, 'Introduction,' *Fifty Years Retrospect*, 1.
33. Ryerson, 'Annual Report, 1857.' The superintendent compared his office's statistics for 1857 with those of the annual report of the Commissioners in Dublin, finding that Ireland's national schools enrolled about three times the students as Upper Canada, received a Parliamentary grant almost eight times as large, but had fewer schools per capita; less than one-third of schoolage children in Ireland attended schools, whilst more than four-fifths did so in Upper Canada. There was also much greater absenteeism and fewer completing elementary schooling in Ireland.