CHAPTER 4

THE GREAT EXHIBITION, AND AFTER

The successes of the railway in other parts of the world had not yet been repeated in New Brunswick. Hence travel throughout the province was still a trying matter. The Rev. W.C. Atkinson writing an account intended for immigrants[1] points out that even by May, "The snow falls heavily at intervals, and melted by the increased power of the sun, mixes with mud till the streets are like a bog, and would be considered in any other part of the world impassable".

Communication between communities had changed little over the first half of the nineteenth century. Saint John took some time to reach from Fredericton; in winter it was a 67 mile trek by sled or snowshoe and might take the better part of a week. In summer, passage could be afforded by the river route. However, for the six weeks of spring there was effectively no communication. The promise of the railroad was thus looked upon with considerable eagerness. It may be remembered that the feasibility of rail freight had been established only in the previous decade when in 1830 George Stephenson's rocket, successfully completed its run from Liverpool to Manchester. The telegraph, so newly invented, promised to bring news of the outside world in the blink of an eye.

Even a cursory glance at newspapers of the era convey the excitement which must have been felt by everyone on the hearing of these technological marvels. Meetings were held in every community along proposed rail and telegraph routes to solicit subscriptions for either enterprise.

The Fredericton and Saint John Electric Telegraph Company was incorporated in the Legislature at Fredericton July 10, 1850. In the same year we find the report in the press of the "Great Portland Railway Convention", held between July 31st and August 2nd, 1850 to discuss, among other things, the projected European and North American Railway. And, of course, these great and marvellous inventions received much attention from the press. Scarcely a week went by but some fresh news was reported. Indeed, when tenders were being let, this visible evidence of the advent of the age of technology was being hailed with a great swell of enthusiasm.

The European and North American Railway Company was incorporated in 1849 with the objective of linking Halifax to Portland, Maine, via Saint John. That portion being within the boundaries of New Brunswick lay within the immediate jurisdiction of the company which was funded by the British firm of Messrs. Jackson, Peto, Brassey and Company. It was intended to finish the line by 1857, starting from the letting of contracts in 1853, at a cost of 6,500 sterling per mile. However, the arm from Shediac to Saint John was not actually completed until 1860.

News had also reached New Brunswick in the early fifties of the tremendous success accorded the Great Exhibition in London. The exhibition was housed in Joseph Paxton's magnificent Crystal Palace, a building itself a testament to the ingenuity of man. this was the first

iron-framed, public, prefabricated structure. It was 408 feet wide by 1850 feet long and was comprised on a complete side of panes of glass. In fact 300,000 panes of glass were blown for the building. Thirteen thousand exhibitors from all over the Commonwealth and the world showed their wares, among them the latest technological marvels[2].

Queen Victoria visited the exhibition on numerous occasions writing, after one visit, in her diary on May 10; "...From here we made a detailed inspection of the Sheffield ware, beginning with a model of the process by which steel is made from iron and finishing with the most beautiful cutlery".

On May 12, she wrote: "then we crossed over to the other side where the carriages were ... Visited the locomotives ..". and on May 14: "...our visit being confined to the paper stationary, printing and bookbinding department". May 16: "Visited in detail, 1st the Austrian section where there is printing of the very finest kind ... there are fine cabinets, exquisitely worked, china from Munich, Berlin and Dresden, jewelry and sculpture, ... musical instruments ... The Austrian commissioner, Ritturburg, told us that the English workmen had adopted some of the Austrian tools, and theirs some of the English tools, so both have profited".

This last remark gives some evidence of the effects of communication established by this exhibition. However, it not only provided a forum for exchange of technological ideas and manufacturing processes, it served to show the general public the benefits of science. It established more demonstrably than any other single event in the history of the British Empire that the age of

scientific inquiry and endeavour had arrived. From that time the authority of the church over every facet of education, including science, began to crumble.

After several more descriptive visits, the Queen notes in Her diary for June 7: "What used to be done by hand and used to take months doing it is now accomplished in a few instants by the most beautiful machinery. We saw first the cotton machines, from Oldham - the whole process of cleansing and flattening out the raw wool by which means it comes out white and soft - crushing it, combing and carding - lengthening, twisting it - and then spinning it, all in numberless machines of different kinds".

On June 11: "...we saw the first part was all for making tools, and Mr. Whitworth's planing of iron tools, another for shearing and punching iron of just 1/2 an inch thick, doing it as if it were bread! Other machines were for making screws and rivets, another a very curious measuring machine, a knitting one, whose needles are made to move, just as if they were worked by fingers; -"

"We saw principally hydraulic machines", on June 14, "pumps, filtering machines of all kinds, machines for purifying sugar, - in fact, every conceivable invention".

On June 16: "First we saw a very curious machine for cutting wood....lithographic printing in colours and varnishing; sugar mills and sugar refiners of different sorts; mills for grinding wheat and linseed and for extracting oil from the latter; a machine for making biscuits. A large one, the largest in the exhibition, invented by Mr. S. Russell, for crushing sugar cane and extracting the juice,

another for cleansing corn and grain; - coffee mills; - a very curious machine for making chocolate; - a very ingenious one for making cigarettes and wrapping them up in paper, ... silk spinning machines, then many models of engines, bridges, screws, one of a double propelling screw for ships..".

In short, every facet of industry and communication, from the electric telegraph to steam locomotion was on display and working and explained in simple lay terms for the public benefit and edification. And anyone who was anyone at all visited the exhibition. Head's great friend Lyell was one of the commissioners; who was pleased to note that 6,063,986 visitors attended during the exhibition period of 140 days, an incredible number of people for those days of travel.

Head was profoundly influenced by the Great Exhibition, as indeed was the whole province. In 1851 he decided to return to England for a visit, writing to his long-time friend and companion, C.G. Lewis, "I am very much afraid you people who live at Knightsbridge will not let the Crystal Palace stand till I see it, however it cannot be helpted". His visit was timed for the summer of 1852, long after the close of the exhibition and before the reopening of the Crystal Palace at Sydenham, where it was to remain until destroyed by fire in 1936. The grandeur of the exhibition could easily be discerned from the photographs taken at the time and published throughout the globe. Indeed the City of Saint John was moved to put on their own "Exhibition of Industrial Arts and Manufacture" in 1851, and Fredericton followed suit in 1852. The whole face of the Western World was about to be changed by these circumstances, affecting not only the social fabric of society, but every facet of public mores, including religion, politics and commerce.

Head's visit to England coincided with the publication of the Oxford University Commission Report. Hence, it was little wonder that on his return to Fredericton, in company with Sir Charles Lyell, with whom he no doubt had many discussions on the matter, Head determined to subject King's College to the same sort of scrutiny as had been carried out at his alma mater. For opinion had turned decidedly against King's College, in spite of the tacit inclusion of science in the curriculum. Lyell, writing on he subject while visiting with Head in September of that year, remarked to Leonard Horner[3] that the College was "rendered useless and almost without scholars, owing to an old-fashioned Oxonian of Corpus Christi, Oxford, having been made head, and determining that lectures in Aristotle are all that the youth in a new colony ought to study, or other subjects on the strict plan which may get honours at Oxford. I trust that Sir Edmund may succeed in his exertions to get something taught which the pupils can afford to spend their time in learning. At present they must go to the United States".

The "Oxonian" Sir Charles referred to was, of course, Dr. Jacob. And, indeed, the actions taken a few years earlier in amendments to the act had merely stemmed the tide of opposition for the nonce. With Jacob still firmly in control of the fortunes of the College, and Bishop Medley still serving on the Council, opinion, even local opinion, had firmed into outright and outspoken antagonism especially of the students who were afforded the opportunity to go there. We may gather some measure of the dislike of the townspeople of Fredericton for the college and its students from Lieut. Col. Baird's memoirs[4]. As apprentice to the druggist's trade, he was required to learn something of Latin. He entered the Collegiate, then affiliated with King's College, in an effort to accomplish this task. "Many of the boys," he wrote, "were sons of the so-called aristocracy of that

day, and Segee and myself were subjected to no small amount of taunts and sneers, at and after the competitive examinations which twice in each year were held on the hill at King's College". And further on, on the same subject, "I have seen one of our late judges, when attending King's College, enter the Fredericton Library and in a flood of tears relate to my father the indignities he was made to suffer from the class of young men referred to above". Indeed, few newspapers in the whole province lent any substantial support to the institution, excepting the Headquarters, a Fredericton Weekly, under the editorship of Marshall D'Avray, who was himself a Professor at King's.

It is not clear just when Head decided to introduce technology into the curriculum as an interim measure to save the College. He had, of course, supported this pursuit very actively since his arrival, especially the agricultural aspects. Not only was it at his instigation that Johnston's Report of the Agricultural Capabilities of the Province of New Brunswick, had been produced for the legislative assembly; and at his expense that Robb's lectures had been given, but also, he had actively encouraged the New Brunswick Society for the Encouragement of Agriculture. This was a very effective organization to promulgate new agricultural ideas. (Robb served in office from the founding of the society in 1849 until his death some twelve years later.) Head was also a patron of the Fredericton Athenium, a literary and scientific society which fostered lectures on various subjects of scientific or literary merit. As well, Lyell's theories on the need for inclusion of practical science in university curricula must have had some effect on Head. Although he did not at all agree with a proposed bill in the House, presented by Gilbert on March 10, to convert King's into an Agricultural School. This bill never did come to fruition. However, there was considerable discussion of the matter, as George Fenety noted. Fenety[5] quotes a correspondence he received in

the spring of 1851: "Let any impartial man compare the proportions of Episcopal with other influences in the Councils and Chairs of the College - the number of Ministers for the stalls of the establishment, who have received assistance from the public funds, and honours and titles from the College - the entire absence of Students for the pulpits of other churches - let him remember that while those who are intended for the legal, the medical, or the mercantile professions, must surely outnumber the students of the divinity class; yet no provision is made for them, not even a good, or I believe indeed any system of mental philosophy; and then recollecting the relative numbers of the different religious denominations in the Province; let him answer the plain questions - Is this Institution free and equal in its favours? Does it savour of Episcopacy and Sectarianism? Is it substantially Episcopalian and Sectarian, or is it not?"

An effort was also made in that sitting to withhold the College funds, and authorize the funds to be devoted to a more useful purpose, because "the returns from time to time laid before this House shew that but a very limited number of persons have availed themselves of said establishment for the objects of education, making apparent the inefficiency and failure of the Institution for the purposes intended, involving, as it does, an expense far beyond what the people can any longer bear, and entirely at variance with the condition, or wants, of the country; and whereas it is the opinion of this House, that the time has now arrived when the expenses of the said establishment should be materially reduced, and its revenues applied to a system of education better adapted to the wants of the country, and of more general benefit and advantage to the people of this Province".[6] This effort too failed. But the tide could not now be stemmed for long.

Head returned from England in 1852 and, while Lyell was yet visiting him, suggested that a committee be established to recommend methods for making the College more useful. After citing the Oxford case and the harm which must surely follow to its imitators, his letter to the Chancellor[7] went on to speculate on ways the College could be turned to more use: "The elements of science and natural history, as applied to arts and manufactures, including agriculture, the theory of shipbuilding or navigation, mensuration, surveying, and civil engineering, all these might be offered as being immediately and practically useful in enabling a boy to earn his own bread".

Elsewhere in his letter he states: "I desire to rescue the College from what I consider a position of comparative inaction and consequent danger. I desire to anticipate agitation or complaint by energetic action on the part of the College Council; and, however temporary my connection with New Brunswick may be, I desire to afford all the aid in my power towards promoting and diffusing superior education in this Province".

He sent a copy of this letter to Lewis[8], explaining: "The Institution was entirely a mistake in a new country of this kind as you !may suppose by what I have stated. My real end and object is what I say - to save the endowments if I can, for if popular agitation against their misapplication of public money begins in earnest it will be impossible to obtain any funds for superior education, whereas by popularizing the instruction in some degree and convincing the assembly that we wish to make it practically useful, I think it may be preserved and profitably applied".

Head's rationale in using engineering and agriculture as a means of saving the College

endowments was no doubt founded as much on the social and political climate as on the proclivities of two of the College professors, Robb and Brydone Jack. Jack had taken up his post in 1840 after graduating with the degree of M.A. from St. Andrews University in Scotland[9]. His teaching responsibilities included mathematics and natural philosophy, but his natural inclinations led him rapidly into the realms of astronomy and engineering. At Jack's instigation an astronomical observatory was built next to the college, housing an equatorial telescope which was at the time reputed to be the finest in British North America.

Prior to Head's arrival, Jack and Robb had petitioned the College Council in 1847 for a sum of money to put the philosophical (science) apparatus and the museum on a firm foundation. The Council had approved 550 for the purpose, 300 of which was to be used for purchase of the telescope. Not all members of the council were happy with this use of funds and sought to have the order voided. But the telescope duly arrived, a "fine instrument" manufactured in Munich by Mertz and Son, and was installed and operational by 1851, even though the funds were reduced to 220 by the Council in the interim. (The total expenditure on the telescope by 1854 had reached 505).

It was to Head's further advantage in choosing practical science as the basis on which to save the College, that both Robb and Jack had travelled extensively throughout the province, the former in connection with his geological and agricultural pursuits, and the latter in pursuance of his surveying and astronomical interests. Both had actively encouraged application of scientific principles to the solution of practical problems on their speaking tours throughout the province; both were well-known, liked and respected. Jack had strong interests in Saint John. His first wife Marion

was the daughter of Attorney General Charles Peters and came from that city. Indeed Jack spent much time in Saint John during the troubled times ahead, in company with his wife's family[10].

Jack was keenly aware that the college was in difficulty and perceived that the college council was at least partly to blame. He writes to Marion, who was in Saint John at the time, September 6, 1851[11] "...I have been trying to get Fisher (the College Registrar) to work. I have not as yet succeeded however, and, knowing the man I have to deal with, it is impossible to say when I shall. The way in which Fisher and College Council attend to matters here must inevitably, sooner or later, send the institution to the dogs. Every day I become more and more disgusted with their mismanagement".

As early as 1849 Jack had become disenchanted with the College. At that time he applied for a chair at Glasgow in mathematics. From Head's correspondence on the matter[12] we may gather that there was a good deal of discussion between he and Jack. Consequently, it may be assumed that Head was well apprised of Jack's opinions with respect to the fortunes of the college.

King's College, Upper Canada, had been transformed into the non-sectarian University of Toronto by the Baldwin Act of 1849, by which provision was also made to establish a chair in civil engineering[13]. No attempt was made to fill the chair until 1851, when the position was advertised as available[14]. Jack made application for a chair at Toronto in September of that year, although whether it was the chair in civil engineering or mathematics is not entirely clear[15]. Young makes no mention of him among the list of applicants for the chair of civil engineering. In any case no

appointment was made to this post, even though Toronto dates the founding of its engineering school from 1851. The fact is that no civil engineering course was even advertised in Toronto until 1857[16]. the first student did not enter the course until 1859. Since no appointment was ever made to the chair of civil engineering, the course never did achieve any measure of popularity. Seven students did embark upon the two year diploma course in Toronto, the first, (F.G. Robertson,) graduating in 1861, and the last in 1878.

Meanwhile, President George McCawley of King's College, Nova Scotia, had been advocating to his Board of Governors since 1851, that they make provision for instruction in the sciences "applied to the service of mankind". However, the governors did not accede to his request until 1867[17] with the establishment of a course of lectures on "Engineering Applied to Railways".

Head was certainly aware of the need for civil engineers in the construction of the railways in the province, new bills for which were coming before the House at every sitting. Keen observer that he was it *can be said with equal certainty that he was aware of the new turn in scientific thought which had overtaken the decade, especially after the Great Exhibition. As well, there is evidence that he had noted the successes in the engineering arts at the various schools in the United States, since he makes mention of them on occasion. Certainly West Point was by now famous. Its success was noted in the press both at home and abroad, the latter in the popular travel account of Capt. Basil Hall in 1829[18]. Hall devotes the better part of a Chapter to the advantages of that institution, noting that the instruction is in "Civil and Military Engineering, fortification and surveying" as well as mathematics, "which are carried to a very respectable height". The Gardiner

Lyceum was established in Maine in 1822, offering Civil engineering, with its main purpose "to provide a curriculum preparatory to the higher study of agriculture, mechanics, arts and engineering for young men of the labouring class". Rensselaer was founded in 1824 establishing its engineering department in 1835. Then a proliferation of schools appeared, including the Chandler Scientific School (1851), Sheffield Scientific School at Yale (1847), the University of Michigan (1852) and the Polytechnic College of the State of Pennsylvania (1853)[19].

There is evidence that Head was aware of at least some of these developments in curricula in the United States for he quotes a report on the subject in the letter previously alluded to[20]. The letter served its purpose: the college council at last agreed to study the possibility of appointing a commission of inquiry[21], to seek information on the matter and report the best means of improving the institution.