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Article abstract

Lorsque l'énergie hydroélectrique s'est intégrée à l'économie ontarienne à la fin du 19^e siècle, plusieurs étaient impressionnés par les potentialités de la « houille blanche ». Au centre de l'Ontario, les barrages nécessaires à la production d'électricité étaient déjà en place ou en construction dans le cadre du développement de la voie maritime Trent-Severn entrepris par le gouvernement fédéral. Cependant, pour assurer le passage des bateaux dans le canal, les autorités gouvernementales devaient assurer une profondeur suffisante alors que les entrepreneurs qui voulaient utiliser les barrages pour produire de l'électricité avaient plutôt besoin d'un débit d'eau élevé. Des petites compagnies d'électricité s'établirent tout de même de long de la voie Trent-Severn, mais la production d'énergie demeura secondaire par rapport à la navigation.

PULLING BETWEEN OLD AND NEW: NAVIGATION AND POWER DEVELOPMENT ON THE TRENT-SEVERN, 1860-1911

Bill Rawling¹

ABSTRACT

The transition from water to steam power has long been an interesting issue in the history of technology. Newly created data for the 1871 manuscript census are used to examine features of the transition in Ontario. Industrial characteristics and geographical variations of each power source are discussed. Questions and implications for further research are explored in relation to contemporary work environments and power technology.

RESUME

Lorsque l'énergie hydroélectrique s'est intégrée à l'économie ontarienne à la fin du 19^e siècle, plusieurs étaient impressionnés par les potentialités de la "houille blanche". Au centre de l'Ontario, les barrages nécessaires à la production d'électricité étaient déjà en place ou en construction dans le cadre du développement de la voie maritime Trent-Severn entrepris par le gouvernement fédéral. Cependant, pour assurer le passage des bateaux dans le canal, les autorités gouvernementales devaient assurer une profondeur suffisante alors que les entrepreneurs qui voulaient utiliser les barrages pour produire de l'électricité avaient plutôt besoin d'un débit d'eau élevé. Des petites compagnies d'électricité s'établirent tout de même de long de la voie Trent-Severn, mais la production d'énergie demeura secondaire par rapport à la navigation.

Introduction

Rivers, lakes and streams have had an important impact on Canadian history.² The Saint Lawrence was the heart of New France, the Welland Canal a symbol of potential prosperity, while the Rideau system demonstrated Britain's determination to fight on in the face of any American invasion. In central Ontario the Trent-Severn Waterway slowly emerged from fits and starts of construction that lasted from the 1830s to 1920,

1 Directorate of History, Department of National Defence, Ottawa, Ont

2 For an in-depth study of the role of natural resources in modern Canadian history, see H.V. Nelles, *The Politics of Development* (Toronto, 1974).

eventually linking Georgian Bay to the Bay of Quinte on Lake Ontario. The canal did not capture the imagination of Ontarians or Canadians at large, but it was critically important for the entrepreneurs and their supporters who lived and worked near its sinuous path. To them the waterway meant trade and prosperity, and the politicians of the villages, towns, townships and counties of central Ontario, many of whom were entrepreneurs themselves, lobbied for the waterway completed so as to form a commercial link with both Lakes Ontario and Huron and potentially the rest of Canada and the world.

To control the flow of water for navigation required dams, but these could serve other purposes and quickly became the focus of conflict between those who wanted to maintain depth and hence navigation and those who wanted to maintain flow to provide power. Though lumberers and millers had been building dams since the early days of settlement in the 1830s, there was little conflict until the Federal Government, spurred on by central Ontario entrepreneurs, sought to improve navigation in the area. At the same time, flood damage problems added urgency to dam construction projects. Beginning in 1882, the federal Department of Railways and Canals hired contractors to complete the stretch of navigation in the Kawartha Lakes, again requiring substantial dam construction. The project was just on the verge of completion when hydroelectricity entered the scene to complicate matters even further. Both hydroelectricity and canal transportation require water, which is plentiful in central Ontario. Amounts vary, however, and to ensure a constant supply, dams were required to create reservoirs. In the period from the 1890s to about 1911, the dams of the Trent Canal's watershed, most of which had been built to serve the lumber industry, became the focus of cooperation or debate between those who saw the area's future in terms of water-power and others who believed prosperity depended on navigation. In the background, the governments of Ontario and Canada sought ways to control the new natural resource. Here again there were elements of conflict and cooperation, with the Department of Railways and Canals attempting to create reserves of water for navigation on the Trent-Severn and the Hydro-Electric Power Commission of Ontario (HEPC) and private power companies trying to maintain reserves to produce electricity. Canals needed depth while power needed flow, and the two could at times be mutually exclusive.

Mills, Boats and Timber

In central Ontario dams had dotted the landscape since the arrival of the beaver. In the 1830s, lumberers built dams to guarantee themselves water for driving logs. Millers constructed them to create a head of water to

turn water wheels. The government had entered the picture by 1837 with the appointment of commissioners to oversee construction of the first locks and dams on the Trent-Severn Waterway.³ Thus from the early days of settlement in the area, a dam could perform one or more of three tasks: as an aid to log drives, milling or navigation. The dams of the time were of simple construction, as befitted a pioneer society. Although masonry was being used for locks, dams along what became the Trent-Severn were made of timber and loose stone. The contractor first had to build a coffer dam upstream from the building site to dry out the area. Water could be channelled through ditches or canals around the site, with another coffer dam downstream to prevent backwater from ruining the works. On a foundation of large boulders the contractor would construct a superstructure of timber bents which were then covered with planking, forming a box. To give the dam stability, this box was filled with stone and the face of the structure was piled high with gravel.⁴ These timber crib dams relied on their weight and strength and not their shape to keep water back.

The use of timber in constructing dams made them of uncertain endurance. When winter ended, the wood became waterlogged as the spring freshet immersed the entire dam in water, and in summer the sun baked and cracked the planking exposed by low water. How long one of the structures could last depended mainly on its location, the nature of the spring freshet and whether any shade was available. Thirty years seemed to be about the longest any of these dams stood, although they began to leak long before then. Timber dams required constant maintenance in any case. The Chisholm's dam, built in 1837, had to have most of its downstream planking replaced four years later to make it watertight. Lumberers, other entrepreneurs and the population at large were willing to put up with dams that were easy to build but difficult to maintain, for a dam could easily outlive its usefulness. In the late 1840s local inhabitants in one community near Chisholm's Rapids petitioned Lord Elgin, Governor General of the Canadas, to have the dam removed. The lock was not

3 AC, RG 11, v. 69, ARC-11/69-21, Tender, Edward Hales and Sam Campbell to Sheldon Hawley, 16 October 1837; *Ibid.*, ARC-11/69-14, Tender, John Cullen of Kingston, 16 October 1837

4 *Ibid.*, ARC-11/69-14, Specifications, 1842

being used and they saw the dam as a nuisance to timber drives and, through flooding, a threat to agriculture.⁵

In 1837, N.H. Baird oversaw the first steps towards construction of a dam in conjunction with the renovations to the lock at Bobcaygeon. The main Bobcaygeon dam was completed in 1839 at a total cost of £1,825. It proved to be quite resilient; in 1842, the dam was still in perfect order. It was not until 1846 that the dam had deteriorated enough to be brought to the attention of the Department of Public Works when petitions reached the Governor General complaining that lands below the dam were flooding out. The structure no longer held water and had to be made watertight. Work was completed in 1847, in spite of sickness among the workers attributed to the high water levels. The dam was again repaired in 1857, thus allowing some ten years between major overhauls.⁶ In central Ontario, timber dams like the one at Bobcaygeon remained the norm until the twentieth century. Easy to build and difficult to maintain, they still served their purpose well.

Dams and water-power went hand in hand. Experiments in Europe had shown that the most efficient way to turn a head of water into power was to have it flow through a water wheel from above. Overshot wheels became the norm in North America and dams could increase the height of water and hence the potential energy the wheel could convert to useable power. There was little in the way of policy concerning the use of water for power purposes. In Ontario before 1898, ownership of the banks of a river or stream implied the right to use the water that ran between those banks. If a miller wanted to use water from a government work such as a canal or dam, he could obtain an Order in Council allowing him to rent what he required. In 1850 Timothy Coughlin offered to lease water-power at Crook's Rapids for five pounds a year. In 1853 William McDougall leased water rights at the Whitlas Rapids canal to drive his mill, promising to pay five pounds a year on a twenty-one-year lease. The government, however, did not guarantee that water would be available.⁷ This was essentially the pattern set for several decades. After 1867 the

5 Ibid., ARC-II/69-21, N.H. Baird to Mr Henry Trout, 4 December 1841; *ibid.*, Baird to Engineer's Office, 29 May 1843; *ibid.*, petition to Lord Elgin.

6 Ibid., RG 12, v. 3623, file 4256-90-30, Baird to the Commissioner of Public Works, December 1839; D. Daly to William Robinson, 17 September 1846; C. S. Gzowski to Thomas Begly, 20 September 1847; Edward Browne to Begly, 28 August 1857

7 Ibid., RG 11, v. 189, Timothy Coughlin to Begly, 24 September 1850; v. 68, ARC-11/68-23, Executive Council No 1213, 16 August 1853

Dominion was willing to lease surplus water as long as lessees did not interfere with navigation, the Department of Public Works' only priority in the area. The department did not interfere with the development of water-power nor did it encourage it.

By 1860 dams had become the subject of conflict between mill owners, lumbermen and the government. Most of these disputes arose from the physical state of some of the more important dams. A structure that leaked could still be satisfactory to a lumberman who wanted only enough water to float logs or to a miller who only needed a few feet of head. The Department of Public Works, however, was concerned with the long-term storage of water to allow boats to use various streams, rivers and canals throughout the warm months of the year. The spring was an especially contentious time as lumbermen then removed stop logs from their own dams, which in effect lowered them, to allow massive quantities of water to drive their timber downstream. Engineers with the Department of Public Works feared the practice would result in too little water being left to ensure navigation in the hot summer. Furthermore, high water often damaged dams lower down. At Buckhorn the superintending engineer complained of the dams in 1860 that 'they have repeatedly suffered injury, from the lawless proceedings of the lumbermen, and the recklessness and indifference of the Proprietor of the Mill at this Place.'⁸ He suggested that the dam be made watertight and that a supervisor be appointed to watch over the structure, measures which were important to maintain water deep enough for navigation in Buckhorn, Mud and Pigeon Lakes. He would continue to call for supervision in the years to follow.

At times Public Works was faced with exactly the opposite problem as millers or lumberers stored water for their own purposes. This could be especially harmful to boating in the middle of the summer when precipitation is insufficient to maintain water levels at the necessary depth. The department then wanted to release water from the upper reaches of the watershed to allow navigation below. At times this could be something of a problem if the privately-owned dams dotting the landscape kept their stop logs in place. Mossom Boyd, perhaps the biggest lumberer in the region, was ordered to remove his on at least one occasion.⁹

8 Ibid., Illegible to John Rose, Commissioner of Public Works, 18 July 1860

9 Ibid., H.M. Burnbury to M. Boyd, 31 July 1860

The dams were not always the centre of conflict. There were often attempts to cooperate, especially during periods of construction or maintenance. The Department of Public Works did its best to avoid inconveniencing those who relied on the area's water supply for their living. Unless repairs were critically needed, they were usually put off until the late fall or even the winter months when neither millers nor lumberers could use the low or frozen water in any case. When in 1860 the department asked G.W. Ranney to oversee repairs to a dam at Crook's Rapids (now Hastings), the engineer waited until the second week of September to start work so as not to interfere with those using the water in the summer and early fall.¹⁰ In 1861, Ranney investigated claims that the water above Buckhorn was too high. He ordered the stop logs removed from the dam and reported that the problem would not recur for he had established what Cottingham and Boyd, local entrepreneurs, required in the way of water and would have no difficulty fulfilling their needs.¹¹

Keeping the timber dams watertight was no easy feat. It was, in fact, impossible. When in 1860 Ranney set out to repair the dam at Crook's Rapids, he found that the face of the dam had lost most of its gravel through erosion. The department let out a contract for the work, but problems began immediately. The notice for tenders had not mentioned the necessity of treating the gravel by raking and screening it to make it effective as protection for the dam. The coarser grades had to be removed or the entire job would not have to be repeated within a few years. At Buckhorn, another contract, there were no problems with the contractor, but labour was scarce and expenses for boarding men and horses high. When work was completed, Ranney reported that only a little water filtered through the dam which was the best that could be achieved with timber construction.¹² Repair was not a matter of stopping leaks but rather of reducing them to manageable levels.

Since rock-filled timber dams relied on brute strength to hold back water, they could be overwhelmed if enough pressure was brought to bear. The spring freshet of 1861 proved disastrous to many of the dams under the

10 Ibid., John Page to Secretary, 7 August 1860

11 Ibid., G.W. Ranney to S. Keefer, 1 April 1861

12 Ibid., Ranney to T. Trudeau, 1 October 1860; *ibid.*, 2 October 1860; *ibid.*, 24 October 1860; *ibid.*, 29 November 1860; *ibid.*, 30 November 1860.

authority of the Department of Public Works as well as to those belonging to millers and lumbermen. The department first heard of its effects from Ranney: 'I beg to inform the Department that a portion of the Dam at Whitlas has gone.'¹³ The structure at Crook's Rapids, so recently repaired, lost its cap and most of the planking on its downstream side. Ranney estimated it would cost £300 to repair. A side dam at Whitlas had collapsed completely. Some 150 feet of the Rogers mill dam disappeared while Dickson's mill, only marginally more fortunate, saw 100 feet of dam wash downstream. Navigation was thus not the only enterprise to suffer. At Hastings, mill hands lost their jobs because there was no power to keep the mill in operation.¹⁴ In some areas the damage had been devastating, and repairs were slow. Chief engineer John Page found that early estimates of the damage at Hastings had been understated.¹⁵ Ranney agreed and calculated it would cost as much to repair the dam as to build a new one as 'there is scarcely anything to build to.'¹⁶ Even when completed the dams were not as watertight as they had been before the freshet, but there was little money in the department's budget to take care of such catastrophes.¹⁷

Some twenty years after the 1861 freshet, the newly-created federal Department of Railways and Canals set out to complete some of the canal work begun in the 1830s. Its policy, in determining who was to use the water, was to give priority to navigation. And, except for winter, all of the lock sites and dams would have surplus water available. The department had to be careful in some areas as millers had already built dams for their own purposes and these could not be destroyed or altered for the sake of barges and boats without causing serious legal difficulties. Although some millers had no dams, they did have plans to build them; and the department accommodated the latter whenever possible. In 1881 the Trent Valley Paper Mills, who already employed 125 workers, asked permission to

13 Ibid., Ranney to Trudeau, 23 April 1861

14 Ibid., Ranney to Trudeau, 7 May 1861; *ibid.*, 25 July 1861; Petition to the Commissioner of Public Works from the Inhabitants of Hastings

15 Ibid., John Page to Secretary, 26 September 1861

16 Ibid., Ranney to Trudeau, 3 September 1861

17 Ibid., Ranney to Trudeau, 15 November 1861

build a dam so they could expand operations. Thomas Rubidge inspected the site and found that it would not interfere with the department's proposed works.¹⁸ It is important to note that the mills would have had to forego expansion if their proposed dam promised to be a hindrance to the proposed canal.

Meanwhile, in 1882, the Department of Railways and Canals prepared to construct its own dams as part of a massive building project aimed at improving navigation throughout the Kawarthas. One of these, at Young's Point north of Lakefield, was typical. It regulated water levels in Clear and Stony Lakes to the foot of the Burleigh canal which was then under construction. The first dam on the site had been built by one Mr Young sometime before Baird's 1835 survey. In 1868 a new dam was constructed by Young and Burnham which underwent extensive repairs under the auspices of the Ontario Government. In early 1883 the dam was transferred to the jurisdiction of the federal department which called for tenders for its replacement before the end of the year. Work on a new dam began in June 1884 and was completed in May 1886. Built of timber like its predecessors, the Young's Point dam lasted just over thirty years, until 1922.¹⁹

The pattern of construction, maintenance and removal lasted until the end of the century. There were sources of conflict as well as cooperation between millers, lumberers and the Department of Railways and Canals. The department maintained a narrow definition of public interest restricted to navigation while lumbering interests turned to the provincial government for the works they needed. In most cases conflict could be resolved; the lumbermen wanted to use water only at certain times of the year while the millers for the most part required only small quantities. Navigation, lumbering and water-powered mills co-existed in the Kawartha lakes region from the 1830s to the end of the nineteenth century.

Hydroelectricity

The development of the transformer and the commercial introduction of single phase alternating current in 1887-1892 which allowed for the trans-

18 Ibid., RG 43, v. 1530, file 6650, Trent Valley Paper Mills to Sir Charles Tupper, 24 June 1881; T.S. Rubidge to F. Braun, 2 July 1881

19 Ibid., v. 1426, file 9600, Rubidge to A.P. Bradley, 4 December 1882; Tenders, December 1883; George Moshersill to Secretary, 17 October 1891; D.E. Eason to J.W. Pugsley, 26 June 1922

mission of power over long distances introduced a new factor. By the end of the next decade, gargantuan power-producing projects at Niagara Falls demonstrated the versatility of universal generators that were capable of creating electricity for domestic, commercial and industrial consumption. By 1905 the Trent District saw the completion of significant, privately-owned power projects. In 1906 when most of the dams in the Trent watershed were transferred from the province to the Dominion, water-power produced electricity for the communities of Peterborough, Lakefield, Fenelon Falls, Campbellford and Trenton. The revolution of 'white coal' had arrived.²⁰

It was not long before old and new technologies began to compete. Since electricity could be transmitted over long distances, a single dam could service many industries. This, however, was not the case with the old water-wheel technology. The Canadian General Electric Company fumed when the Lakefield Portland Cement Company placed stop logs on its private dam to increase the water supply for its water wheels. There was not enough water flowing downstream to allow GE to run its works at Peterborough. Since R.B. Rogers, superintending engineer for the Department of Railways and Canals on the Trent, had authorized the installation of the stop logs, the company complained to his superiors. The secretary assured GE that the superintending engineer would see that everyone's power rights would be maintained. In fact, the department had no authority over the cement company's dam. As the department's law clerk was quick to point out, Railways and Canals could intervene only in matters concerning navigation. Canadian General Electric, with many of its thousand workers laid off, had to take its problems elsewhere.²¹

One of the major issues in Ontario provincial politics at this time revolved around the ownership of water-power. Before 1898 there were, in effect, no regulations at all dealing with water-power as land patents included riparian rights. Tracing these rights was thus a matter of finding the original letters patent by which the Crown had sold or given the land to

20 C.A.S. Hall, 'Electrical Utilities in Ontario Under Private Ownership, 1890-1914,' (unpublished PhD dissertation, University of Toronto, 1968), 19, 34, 37, 40.

21 NAC, RG 43, v. 1352, file 2060, Davidson, Peterson and Grant to C. Schreiber, 21 January 1901; L.K. Jonesto Davidson et al., 27 January 1901; Canadian General Electric to W.S. Fielding, 23 October 1903; Office of the Law Clerk, 24 October 1903

individuals. This was not always a simple matter. A public servant with the Dominion government wrote:

It would now be difficult to ascertain the present owners, and the present terms of sale, or lease of water powers which were conveyed with the land prior to 1898, except by ascertaining the concession and lot numbers where any particular water power was situated, and then tracing the present owner through means of the local registry office, or by such other means as a knowledge of the circumstances in each case would suggest.²²

On 17 January 1898 the Ontario Legislature passed regulations giving itself the right to separate water-power from crown lands. Future leases or sale of land would not automatically convey riparian rights. On 21 June of that year the Legislature drew up a full set of regulations which were rescinded on 16 January 1907 when the HEPC expanded its newly-won jurisdiction over the transmission of electricity and took the first step towards becoming a government monopoly.²³

On the Trent-Severn Waterway, authority over water levels, navigation and eventually water-power lay with the Department of Railways and Canals. In this period anyone wishing to lease water for the purpose of producing electricity had to deal with the department's bureaucracy, not that of the Ontario Government. In the 1890s there was much competition between private and public interests striving to take advantage of the cheap power provided by dams built at government expense. Municipalities sought to gain sources of energy to light their streets and pump their water while manufacturers and speculators sought water-power to run their factories or to sell at a profit. Competition between and within the two groups often followed a tortuous path as formal proposals were accompanied by backroom lobbying and political influence-peddling.

One of the earliest examples of water-power competition occurred in the area around Peterborough in the mid- to late 1890s. The Department of

22 Ibid., RG 11, v. 3802, *Water Powers of the Province of Ontario* (1910)

23 Ibid., 126-30

Railways and Canals had issued contracts for the construction of dams and locks in the area to improve navigation. The example of Niagara Falls had made an impact across the province and many saw the potential for increased power production the new dams could offer. The first actor to enter the scene was the town of Peterborough whose mayor in 1896 sent a deputation to the Minister of Railways and Canals to request the right to use surplus water not needed for the canal. This water could be used to produce electricity, thus encouraging growth in an area that 'has become one of the foremost and most prosperous manufacturing centres in the dominion.'²⁴ In late summer the petition was refused without explanation.²⁵ Three years later Peterborough tried again, the town clerk stating that the mayor 'thinks the people should have the opportunity of receiving the benefits of such advantage that are connected with these public works.'²⁶ The department saw no obstacles to granting the town's request, but the price of four dollars per horsepower was more than Peterborough could afford and it dropped the matter.²⁷ The second actor to arrive on the scene was R.R. Hall who in 1901 applied to lease surplus water at dams 4 and 5, six miles north of Peterborough, on behalf of a consortium. J.H. McClellan, a future superintending engineer of the Trent-Severn, allied himself with Hall and his associates and suggested that producing electricity was in the best interests of the country as a

24 *ibid.*, RG 43, v. 1298, file 373, Mayor, Town of Peterborough to John Haggart, 14 March 1896

25 *Ibid.*, Chief Engineer to Secretary, 23 July 1898; Mayor of Peterborough to Chief Engineer, 29 July 1896; J.H. Balderson to Town Clerk, Peterborough, 29 August 1896

26 *Ibid.*, S.R. Armstrong to A.G. Blair, 28 December 1898

27 *Ibid.*, L.K. Jones to Armstrong, 30 January 1899

whole.²⁸ After a barrage of letters and well-placed applications of political pressure, the company managed to get an Order in Council by which it would pay no rent during the first year of its lease and a bulk sum of \$1250 in each subsequent year.²⁹

Protests reached the department within days. A third actor, the Peterborough Light and Power Company, was furious. It had been unable to pay the government's price of four dollars per horsepower in 1899 and now saw a rival getting the same lease at less than a quarter of the original price. Another firm, the Central Ontario Power Company, faced total oblivion as the Hall concern was now in a position to undercut all its contracts.³⁰ Hall reacted to the protests by lining up his supporters, who were considerable, while his opponents attacked him in the press.³¹ The battle continued into the fall of 1901 with Hall outlasting his opponents. The town of Peterborough, in a meeting held on 14 September, could only muster two of twelve council votes in favour of applying for a lease. R.S. Hudson of the Central Ontario Power Company proposed an amalgamation.³² Otonabee Power, Hall's company, emerged from the fight not only victorious but unscarred.

Having settled the matter of surplus water of dam number 5, the various actors in the drama could concentrate on the nearby dam number 4.

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- 28 Ibid., R.R. Hall to Blair, 15 February 1901; Secretary to Stratton and Hall, 6 March 1901; Hall to Blair, 24 April 1901; Secretary to Hall, 29 April 1901; Robert E. Douglas to Railways and Canals, 6 May 1901; J.H. McClellan to Blair, 9 May 1901
- 29 Ibid., Stratton and Hall to Blair, 28 May 1901; 1 June 1901; 4 June 1901; 5 June 1901; 6 June 1901; Report to Council, 6 June 1901; Meldrum, Stratton and Hall to James Sutherland, 2 July 1901; Report to Council, 10 July 1901
- 30 Ibid., Peterborough Light and Power Company to Minister, Railways and Canals, 12 July 1901; 24 July 1901; illegible, Blackstock, Nesbitt et al. to Blair, 21 August 1901
- 31 Ibid., Canadian Cordage and Manufacturing Company to Blair, 4 September 1901; Hall to Blair, 5 September 1901; Joseph Batten to Blair, 6 September 1901; John Dryden to Blair, 12 September 1901.
- 32 Ibid., R.F.M. McGregor to Blair, 14 September 1901; Clerk of Peterborough, Extract of a Town Meeting, 14 September 1901; R.S. Hudson to Blair, 16 September 1901.

A.W. Fraser of Ottawa submitted a bid and then disappeared. Peterborough then submitted its offer. Hall, fearing profits from dam number 5 might suffer, counterattacked with financial offers and political pressure. The American Cereal Company then entered the fray, wishing to provide power for a factory it was building at Peterborough. A.W. Fraser then muddied the waters by reappearing.³³ Peterborough soon pulled out of the race, having no money left over for such ventures after spending \$230,000 to take over its waterworks. The government set a minimum rental of two dollars per horsepower and opened the site for bidding.³⁴ By 1904 there were two contenders left, Hall's Otonabee Power and the American Cereal Company who now owned the Peterborough street railway and worked through an ally, the Peterborough Hydro Power Commission. The government, now thoroughly confused, decided not to lease the surplus water at dam number 4 at all. Hall continued to apply pressure until 1911 when he satisfied himself with developing dam number 5.³⁵

The controversy over water-power at dams number 4 and 5 was repeated, with variations elsewhere. In the fall of 1905, Joseph Bigelow of Port Perry area, applied to lease waterpower at dam number 2. He received the full support of the Corporation of Port Perry and the town's Board of Trade. All argued that the electricity produced at the dam would service some two thousand people and alleviate the area's dependence on coal. Bigelow promised that his works would not interfere with the Trent Canal.

33 Ibid., RG 43, v. 1317, vile 1130, A.W. Fraser to Minister of Railways and Canals, 14 March 1900; Mayor of Peterborough to C. Schreiber, 2 December 1901; Blair to Schreiber, 6 December 1901; Hall to Blair, 29 April 1902; L.K. Jones to Peterborough, 17 May 1902; American Cereal Company to Minister of Railways and Canals, 4 June 1902; Fraser to Schreiber, 2 July 1902.

34 Ibid., Jones to Fraser, 14 July 1902; Peterborough to Blair, 14 July 1902; Conditions Referred to in Tender for Water Power - Draft, 18 August 1902.

35 Ibid., L.H. Keefer to Secretary, 20 September 1902; Hall to Minister, 19 September 1902; American Cereal Company to R.R. Emmerson, 13 October 1904; 25 April 1904; Railways and Canals to American Cereal Company, 29 April 1905; Chrysler and Bethune to Emmerson, July 1905; Jones to Peterborough Hydro Power Commission, 12 July 1905; Otonabee Power to M.J. Butler, 8 January 1907; Mayor of Peterborough to Butler, 5 March 1907; Superintending Engineer to Jones, 19 March 1923.

By the summer of 1906, the American Cereal Company was also placing bids for this dam. J.H. McClellan, now superintending engineer, was unsympathetic to both parties. The dam at lock number 2 had already caused some flooding and the department faced a suit filed by the Dickson Company. The potential for future problems was simply too high.³⁶ The Department of Railways and Canals was interested in only one form of development - navigation. Hydroelectricity did not appear on its list of priorities, and so development of water-power sites could be allowed only if the department was certain they would not interfere, either directly or indirectly, with its canal system.

Individuals and municipalities continued to press for the right to convert water flow into electricity in spite of the department's lack of interest in 'white coal.' In 1908 the village of Stirling requested the right to draw electric power from some of the department's new works in terms that should have gained some sympathy. A resolution passed on 16 July stated:

That whereas, work is already in progress at Chisholm's Rapids in Connection with the Trent Valley Canal system, which will result when completed in a power development considerably in excess of that required for canal purposes, and whereas the Village of Stirling is the nearest Incorporated Village Municipality thereto, and is without adequate power for electric lighting and general power purposes, and is earnestly desirous of securing the same, therefor [sic], be it resolved that the Council of the Village hereby desire to set before the Honourable Minister of Railways and Canals their desires and requests in the matter and to ask that when the time comes for the disposal of said power and privilege that this Corporation may receive the first and earliest opportunity to participate in such power distribution.³⁷

The department acknowledged the municipality's letter in polite terms but gave no indication as to how the petition had been received. Hydroelectricity was simply not an important issue in the construction of the Trent Canal.

36 Ibid., RG 43, v. 1386, file 4265, Joseph Bigelow to Emmerson, 29 September 1905; 31 October 1905; 20 January 1906; Memorial of Corporation of Port Perry, 30 January 1906; Memorial of Port Perry Board of Trade, 30 January 1906; Bigelow to Emmerson, 9 February 1906; J.H. McClellan to L.K. Jones, 13 March 1906; illegible, Medd and Davidson to Emmerson, 2 June 1906.

37 Ibid., RG 43, v. 1533, file 6872, Incorporated Village of Stirling to G.P. Graham, 16 July 1908.

When the department built dams then, they were designed exclusively to maintain water needed to operate the locks of the system or to preserve water higher up in the watershed. Construction was a complicated business, or must have been, for there are few examples of dams having been built on schedule. One of the many dams built on the Otonabee near Peterborough was typical. The department received five tenders for the work by 5 October 1901. Some of the contractors, such as Corry and Laverdure and D. Conroy, were familiar because they had done much canal work in previous years. As was usual, the contract went to the lowest bidder who was Hugh Burnet who, on 9 October, agreed to perform the work. The contractor began to deliver materials and to prepare the site before the contract was even signed in order to take advantage of good weather. In November the contract was made official and all seemed to be going well.³⁸

Burnet's encouraging progress soon came to an end. His contract called for him to complete the work by 1 May 1902 at a cost of \$17,590.00. In March he requested a one-year extension. The plans the government had given him to use as a basis for his estimates were incorrect. The river bottom which needed dredging before the dam could be built upon it was made of boulders which the government dredge could not remove. Burnet had to call in divers to help take them out. Finally, the winter had been particularly severe and hampered work usually done during the cold, dry months. An Order in Council granted Burnet an extension to 1 November 1902. Further orders in council in the months that followed allowed extensions to 15 March and to 31 July 1903 due to problems with flooding.³⁹ In early 1904 Burnet was still working on the dam, and he demanded payment for extra work that had not been included in the original estimates. The project faced more excavation of the river bottom, more pumping from a greater depth, more lumber, repairs to the works after three floods, rises in wage rates, the extra cost of excavating material, extra puddle clay for coffer dams and the extra cost for divers. The government handed over part of Burnet's 10 percent drawback so he

38 *Ibid.*, v. 1311, file 943, Tenders, 5 October 1901; R.B. Rogers to C. Schreiber, 28 October 1901; Rogers to Jones, 8 November 1901.

39 *Ibid.*, H. Burnet to Jones, ca. 29 March 1902.

could pay his workers. In the summer of 1904 the dam was as good as completed, but Burnet himself faced the claims of his sub-contractors.⁴⁰

While contractors struggled with the problems of building dams for the Department of Railways and Canals, the latter had to contend with a serious maintenance problem. In 1908 it began to replace many of the timber structures under its jurisdiction with concrete dams. The dam at Lindsay was one of them. In the summer of 1907 R.J. McLaughlin informed the department that the dam at Lindsay leaked like a sieve. After investigation, J.H. McClelland concurred and placed \$80,000 in the estimates to repair the dam and the adjoining locks. Both had been built by the Ontario Government some fifty years before to replace a dam constructed in the 1840s. Water levels on both sides of the dam were about the same. Tests showed that the structure allowed an inch of water to pass through it every thirty-six hours when completely sealed.⁴¹

There was little doubt that the dam served only one purpose. Its only contribution to the local supply of power was to operate a small tramway which crossed the canal at the railway tracks. In the fall of 1908 design for a new dam was complete, for the old structure was too far gone to be repaired. The new dam would encompass a spillway 238 feet long and two stop log sluices, each fifteen feet wide.⁴² It would be built of concrete, like almost all the others the department had reconstructed after 1908. This would make it far more watertight than its predecessor and far less likely to disintegrate in any spring freshet. The department was prepared to receive tenders and the plans were left at Peterborough so contractors could inspect them. Those wishing to bid on a contract had to pick up the estimates in person since they were expected to inspect the site in any case. Contractors also submitted a fair wages' schedule which was supposed to guarantee that contractors, many of whom were from other

40 Ibid., Burnet to Department of Railways and Canals, 25 February 1904; W.F. to J.B. McColl, 20 August 1903; Burnet to Department, 1 October 1903.

41 Ibid., v. 1394, file 4768, William Cottingham to Zacheus Burnham et al., 19 June 1837; R.J. McLaughlin to M.J. Butler, 31 August 1907; J.H. McClelland to Butler, 7 September 1907; Secretary to McClelland, January 1908; McClelland to L.K. Jones, 4 January 1907.

42 Ibid., McClelland to M.J. Butler, 31 August 1908; Alex J. Grant to Butler, 14 October 1908.

provinces or the United States, would not lower local wage scales. The superintending engineer had estimated the work would cost \$53,212.00. Eleven contractors sent in their bids which ranged from \$37,426.75 to \$74,098.00. Such a spread was typical. In accordance with policy, the contract was awarded to the lowest bidder, John Ritchie and Company. The contract was signed on 20 January 1909 for completion on 31 March 1910.⁴³

The new dam did not escape controversy. Nearby, in the township of Ops, the municipality had constructed an extensive system of drains in the early 1880s to draw water out of the swamp. The township feared that a concrete dam, being far more watertight than one made of timber, would back water up Stoney Creek which was the outlet for the swamp drains. Farmers were afraid of losing their land and added their voices to those of local politicians. The department instructed Alex Grant, superintending engineer, to investigate the matter and he found that the new dam would be slightly lower than its predecessor. Construction continued and the township's letters to the department bordered on the hysterical. Grant dove into the old records of the Department of Public Works and could find nothing to contradict his earlier findings. In the spring of 1909 all sides were placated and the dam was completed before the following year.⁴⁴

In 1908 the department was still uninterested in the promise of hydroelectricity. This did not prevent Railways and Canals from achieving a certain popularity with the proponents of 'white coal' for at least the department built dams. When in 1905 the Province of Ontario began to transfer dams to the Dominion, many municipalities gave their whole-

43 Ibid., Department to Frank Simpson, 23 October 1908; Grant to Butler, 16 November 1908; George Graham, Tenders, 21 November 1908; Jones to John Ritchie and Company, 9 January 1909; Grant to Jones, 22 January 1909.

44 Ibid., George Smith to Grant, 14 October 1908; Petition, Municipal Council of the Township of Ops to G.P. Graham, 15 February 1909; N. Boyle to Graham, 18 February 1909; Grant to Butler, 18 March 1909; Butler to Grant, 21 April 1909; Grant to Butler, 15 May 1909; Grant to Jones, 10 March 1910; For the correspondence which Grant found from the 1837-1843 period, see TSWO file 340.2, Lindsay, old reports and letters, vol. 1, fiche 317.

hearted support. The area of the Gull River was especially hopeful that a new administration would see to the development of that part of the watershed. The village of Bobcaygeon and other municipal bodies approved in advance any work the government might carry out, especially in dam construction.⁴⁵ A few years later, some were disillusioned when the department was incapable of offering any assistance to those who sought to develop water-power resources at the same dams the government used to control water levels for navigation. William Welch was sorely disappointed when he asked for any information the department could make available pertaining to water-power on Gull River. The department's legal department drafted a reply:

...can only advise on law dealing specifically with Department Works.... Might inform the applicant that the Department cannot assume the attitude of advising generally in such cases and therefore must respectfully decline to meet his request in the matter.⁴⁶

Though the department did nothing actively to discourage the development of hydroelectricity on the waters under its jurisdiction, it did nothing to help either.

In 1908 the Manufacturers' Association of Peterborough also interpreted the department's neutral attitude as benign. The association tried to spur the department on to even greater efforts, congratulating the government on the manner in which it regulated water levels above Peterborough. Since any surplus water could be used to provide power and as it happened to be in abundance, power companies and the manufacturers they supplied with electricity were elated. Though obtaining a lease on surplus water could be frustrating in the extreme, once the red tape had been wrapped up companies were almost guaranteed uninterrupted water-power for twenty-one years. It is not surprising, then, that the Peterborough Manufacturers' Association approved of the government's policy to build new dams and rebuild old ones on Gull River, Burnt River, Mississauga Creek and elsewhere.⁴⁷

45 *Ibid.*, George Byng to Minister of Railways and Canals, 18 August 1905; Alfred Taylor to R.R. Emmerson, 23 August 1905.

46 *Ibid.*, v. 1386, file 4265, William A. Welch to Minister of Railways and Canals, 10 May 1911; Reply.

47 *Ibid.*, v. 1409, file 6387, Manufacturers' Association of Peterborough, 25 January 1908.

The water commissioners of Peterborough were just as satisfied as the manufacturers. The department had ensured the pumping station for their waterworks had an uninterrupted supply of electricity. The town had never found it necessary to change the stop logs in the waterworks dam. The Peterborough Board of Trade, the City Council of Peterborough and the town of Fenelon Falls expressed similar feelings of gratitude. These were not misplaced. Not only were many dams built between Peterborough and Lakefield ostensibly for navigation but useful for supplying

power, but also from 1908 to the summer of 1911 the department had built conservation dams on many of the feeders between Peterborough and Lindsay. An eight-foot high dam at Jacks' Creek had cost \$8,200 while another one placed to conserve the waters of the Mississauga cost only \$636.63. Another dam at Eel's Creek cost \$842 while three small structures to hold back the waters of Deer Bay cost \$4,678. None had a head of more than eight feet, but between them they preserved 10,249 acres of water.⁴⁸

In constructing dams throughout the Trent watershed and rebuilding old ones in concrete, the department had to make allowances for old and new economic endeavours. Though by 1911 the lumber industry was a mere shadow of the great strength and promise it showed in the 1880s, there were still many lumberers in operation and the annual timber drive had not yet died out. In 1908 McBurney Lumber was shocked to find that the dam being built above Campbellford had no specific provision for driving logs, such as a timber slide. The company had recently acquired timber rights that would furnish it with logs for some years to come and did not want to see its investment come to naught. The department secretary instructed Alex Grant to make whatever provisions were necessary. These were little indeed. None of the dams on the Lake Ontario-Rice Lake Division had been built with timber slides as lumbering in the area was

48 Ibid., Water Commissioners of Peterborough, 30 January 1908; Board of Trade - Peterborough, 30 January 1908; City Council of Peterborough, 3 February 1908; Town of Fenelon Falls; J.H. McClellan to L.K. Jones, 25 July 1911; McClellan to Jones, 26 July 1911.

practically at an end. McBurney Lumber, however, could drive its logs through one of the 25-foot inclines that all of these dams incorporated to regulate water levels and provide flow. The lumber company seemed satisfied.⁴⁹ Power lines crossing the canal were a different problem but were solved just as easily. Regulations determining how this could be done were easy to find as the department simply dusted off those that had been developed to deal with bridges in the 1880s phase of construction. In essence, if a power company could guarantee that its transmission lines would be high enough off the water so as not to impede navigation, the department gave it permission to cross.⁵⁰

By 1911, as the Liberal Party gave up fifteen years of federal dominance to the Conservatives, economic endeavour in central Ontario was in transition. The massive construction and reconstruction projects the Department of Railways and Canals undertook in 1908 were petering out, leaving behind them concrete dams with great potential for producing electricity. In 1910 Adam Beck's crusade to place electrical power in the hands of the people had led to the completion of the Hydro-Electric Power Commission's first transmission lines. Meanwhile, the Trent-Severn waterway was still under construction, and it was left up to the future to determine whether the dams of central Ontario would serve navigation or electricity. For the time being they served both, although at every one of the dams operated by the Department of Railways and Canals, the promise of power had to wait in line behind the requirements of boats and barges.

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49 Ibid., v. 1548, file 7291, McBurney Lumber to G.P. Graham, 23 June 1908; Jones to Grant, 27 June 1908; Grant to Jones, 30 June 1908; Jones to McBurney Lumber, 24 July 1908.

50 Ibid., v. 1546, file 7225, Jones to John S. Fielding, Consulting Engineer, 12 November 1908.