

**SOCIETY FOR
INDUSTRIAL ARCHEOLOGY**

O C C A S I O N A L P U B L I C A T I O N S

Number One

April 1973

THE RIDEAU WATERWAY



William D. Naftel

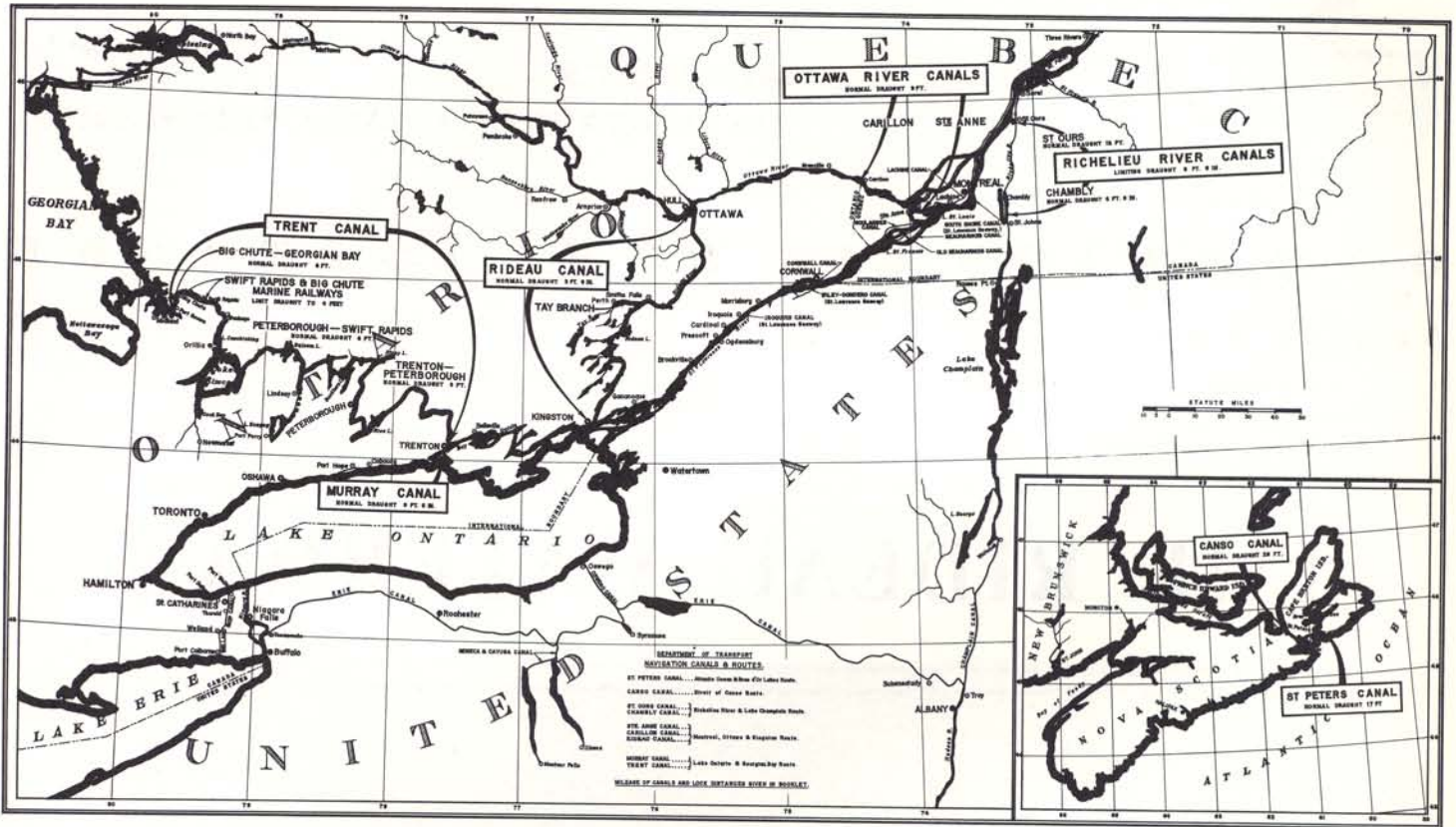


Figure 1. Department of Transport Map showing location of navigation canals under its jurisdiction, 1964.

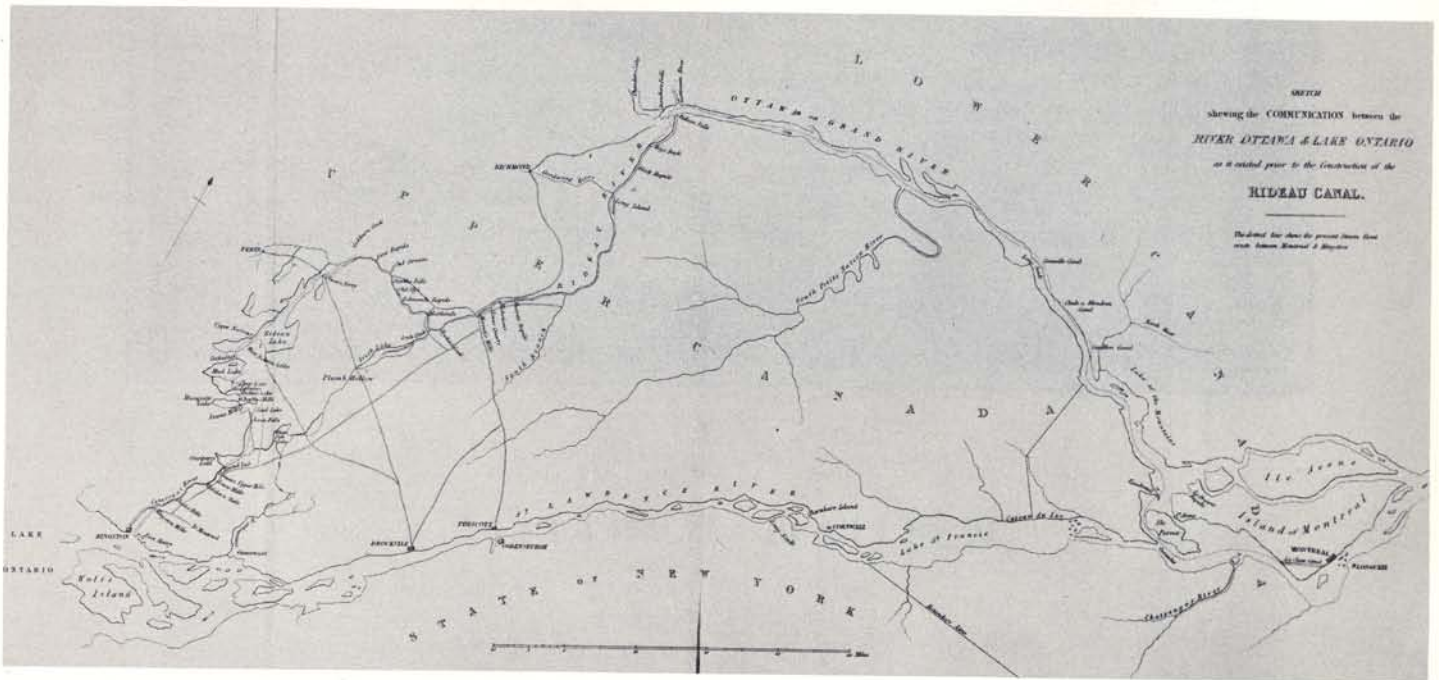


Figure 2. The water route between Kingston and Montreal as it existed prior to construction of the Rideau Canal. From the Royal Engineers Papers [Weale], volume I, 1844, plate IX.

The Rideau Waterway

From the foot of the Chaudiere Falls and the confluence of the Ottawa and Gatineau Rivers, the Rideau Canal hoists itself up a flight of eight locks over the edge of a limestone cliff and on to the broad flat farmlands of Carleton County. With the exception of the first four and a half miles of artificial channel the waterway follows the course of the Rideau River, its rapids and falls submerged by a series of dams which have made the river a placid pastoral stream. At Smith's Falls, fifty miles upstream, the scene changes; here a band of Pre-Cambrian rock thrusts its way south from the Canadian Shield, then broadens out to emerge south of the border as the Adirondack Mountains. In this rugged country the Rideau River finds its headwaters in a series of lakes, and through it the Rideau Waterway climbs until it reaches its summit at Upper Rideau Lake, about two hundred and seventy-seven feet and thirty-three locks above the Ottawa. From here it is but a relatively short drop, one hundred and sixty-two feet and fourteen locks, through the rest of the Shield country and its lakes, until the granite subsides once more under a cover of soil and the navigation again enters the confines of a river, the Cataraqui. By this route, the waterway reaches the edge of another limestone

cliff at Kingston Mills, and drops down, via a flight of four locks, to Cataraqui Bay and Lake Ontario.

Even today, this is unpromising country from any economic point of view except tourism, and that was not thought of in 1827. Why then, would a major public work have been built here? The clue is the Royal Engineers, under whose supervision the works were constructed. It then becomes evident that military strategy, rather than commerce played the leading role in selecting this unpromising route for a major public work.

What was to become the route of the Rideau was investigated as early as 1783 with an eye to settlement of the area by Loyalist refugees, but it was not until the War of 1812 that it came under serious scrutiny. Through an incredible oversight which left the British Command in North America aghast, but grateful, American forces never attempted to cut British communications on the St. Lawrence River which forms the International Boundary for over one hundred miles. This was the vital supply line linking the garrisons at Quebec and Montreal with the outposts in Upper Canada (now Ontario) at Kingston and York (Toronto); had it been broken, Upper Canada must have fallen.

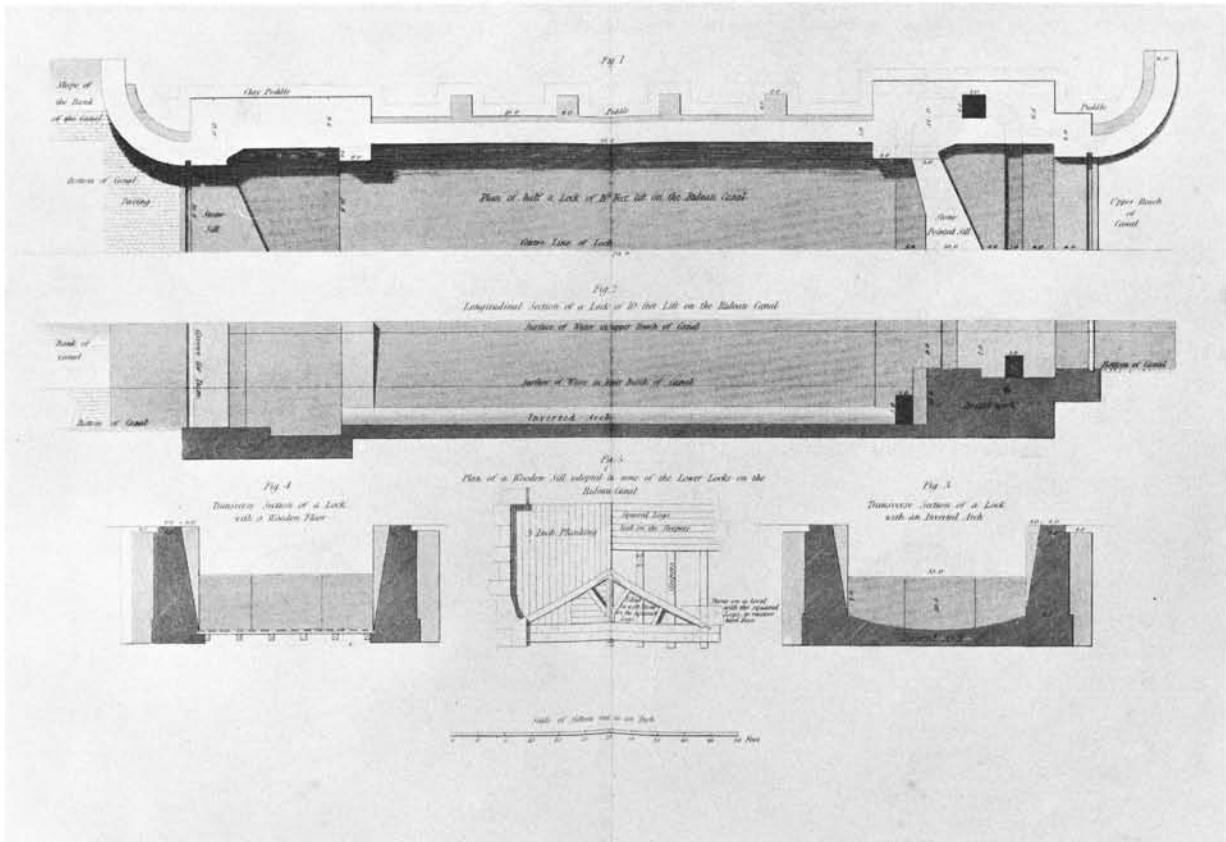


Figure 3. Details of the Canal's engineering drawings were reproduced by the London technical publisher, John Weale, in Papers on Subjects Connected with the Duties of the Corps of Royal Engineers. Shown here are details of locks with both masonry and wooden floors. From the Royal Engineers Papers, volume III, 1839, plate 19.

Clearly the Americans could not be expected to let such an opportunity slip in any future conflict, and indeed there is evidence that had the war continued much longer, the omission would have been speedily remedied. There was another reason as well, perhaps not far removed from the mundane concerns of merchants. The military authorities had found during the War that freight costs for hauling supplies up through the rapids of the St. Lawrence were astronomical. It cost about £4 (around \$20) to ship one ton of supplies from Montreal to Kingston and as much as \$1,000 to tranship one 24-pounder cannon from Quebec City to Kingston. Even an officer and a gentleman, normally above money matters, could wince at those figures.

The Ottawa/Rideau River systems were surveyed after the War, and in 1819 construction was begun on locks at Grenville on the Ottawa. A glance at the map makes it clear why this route would appeal to the military strategist. By proceeding up the Ottawa, then down the Rideau to Kingston, the exposed St. Lawrence frontier is entirely avoided, and at both ends were military strongholds, Montreal and Kingston. Post-war retrenchment prevented further action on the Rideau, but the Imperial Government took steps to prepare for future eventualities by sponsoring settlements of ex-soldiers at 3 Rideau district locations: March Township; and the future towns of Perth and Richmond. These settlers, under the leadership of retired officers, were expected to protect the territory behind the St. Lawrence and any contemplated canal.

These were years of great canal building activity: the Erie and Champlain were begun in 1817; the Lachine Canal in 1821; and

England was already netted with waterways. Not to be outdone, Upper Canada commissioned a survey of its needs in 1821 and the report, presented in 1825 to both the colonial and Imperial governments, brought the question of the Rideau to the fore once again. Despite attempts to persuade it otherwise, the Upper Canadian government preferred to concentrate its slim resources on improvements to the navigation of the St. Lawrence, and the Imperial Government determined to proceed on its own. After a further survey, and probably with some prodding from the Duke of Wellington, long a supporter of the project and shortly to become Prime Minister, the Imperial Government took action. Accordingly, in March 1826, a Peninsular veteran, Colonel John By, R.E., was selected by the Board of Ordnance to take charge of the works, and the scheme was fairly launched.

Colonel By wasted little time and early that autumn had established his headquarters at the junction of the Rideau and Ottawa Rivers at what was to become Bytown, then, in mid-century, Ottawa. Construction began the following summer. By soon realized that the original surveys contained serious deficiencies. For one thing he was forced to make a considerable upward revision of the estimates. Furthermore in contrast to most of his military contemporaries, he foresaw a commercial potential, and strongly advocated locks large enough for steamers. By's representations were partly successful, the size adopted, 133 x 34 x 5, being a compromise between his views and those of his more conservative superiors who had envisaged locks only large enough for military barges.

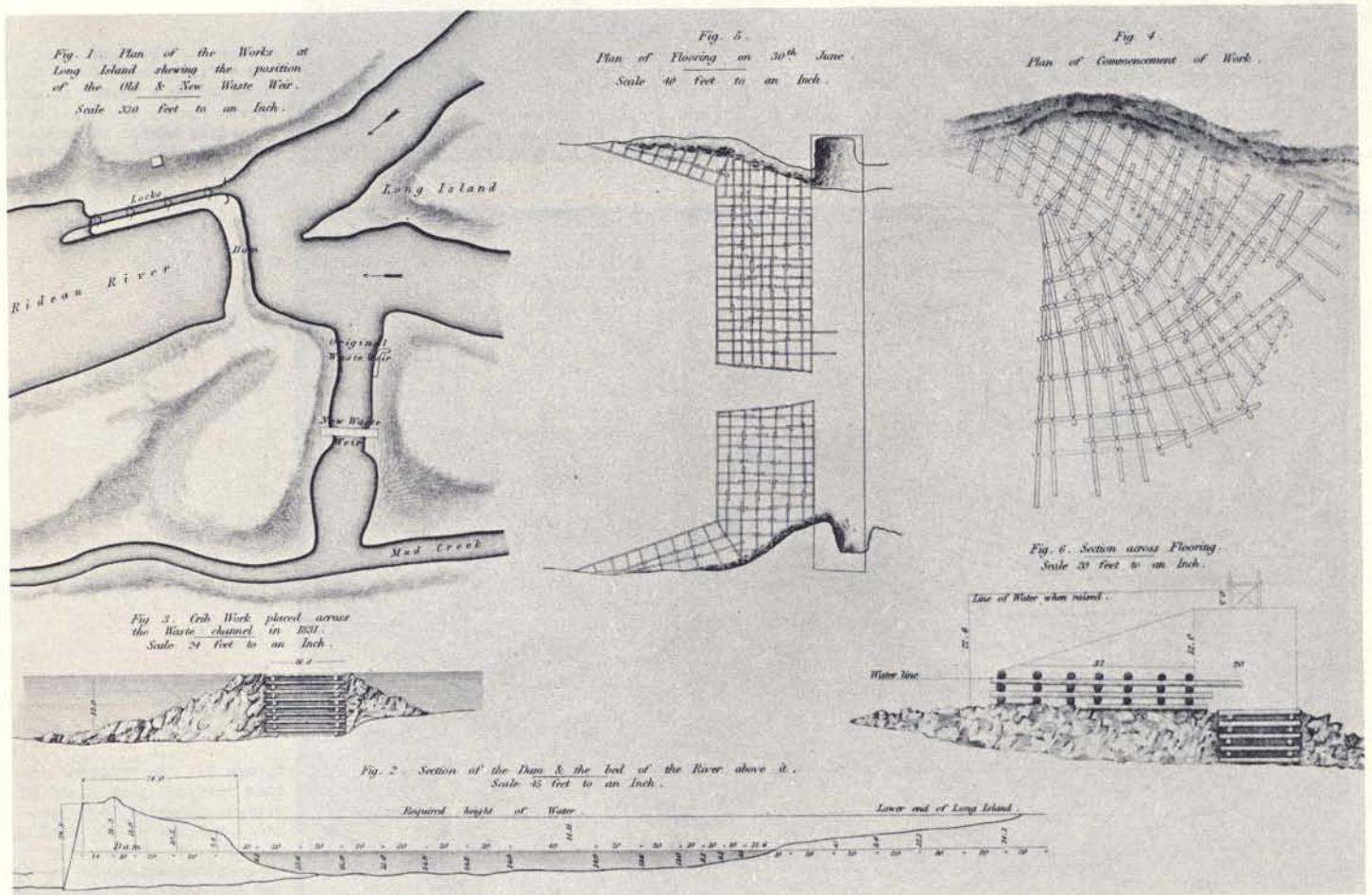
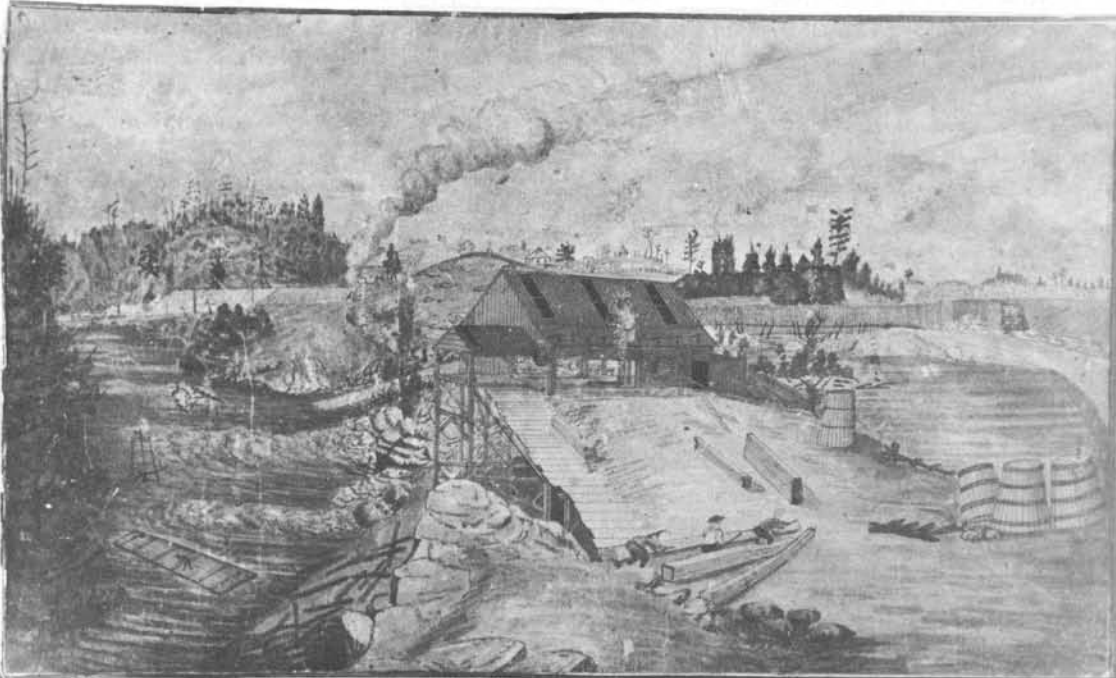


Figure 6. "Plans & Sections of the Waste Weir at Long Island..." Weale's Papers, volume IV, 1840, plate XIII.

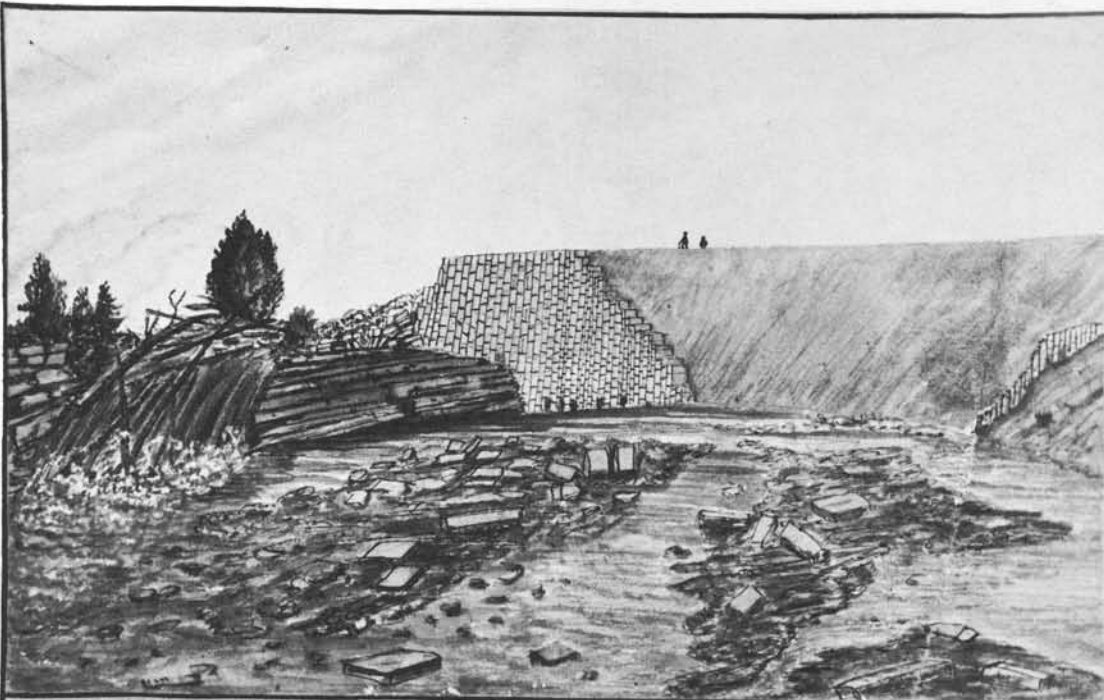
The BURROWES

Thomas Burrowes (b. Worcester, England 1796, d. Kingston Mills, c1846), a topographical artist, joined Col. By's staff in 1826 as a clerk-of-the-works. During the Rideau's construction and afterward he produced—apparently for his own pleasure—a series of about sixty watercolor sketches of the Canal and nearby towns.



Old Saw Mill &c at Kingston Mills; Locks in progress of Construction. 1830.

Figure 7. The sawmill at Kingston Mills antedated the Rideau Waterway by a number of years. It was run by the Royal Navy to supply timber for its yards near Kingston. (Sketch No. 71)



Dam at the "Hogs Back", shearing the Ditch in the Stone-work in 1830. Sketch'd in July 1845, from the Deal of the River

Figure 8. The construction at this station, just south of Ottawa, produced major problems because of the difficulty of the site. Eventually masonry was abandoned for the dam in favor of stone-filled cribs and earth fill. (Sketch No. 15)

S K E T C H E S

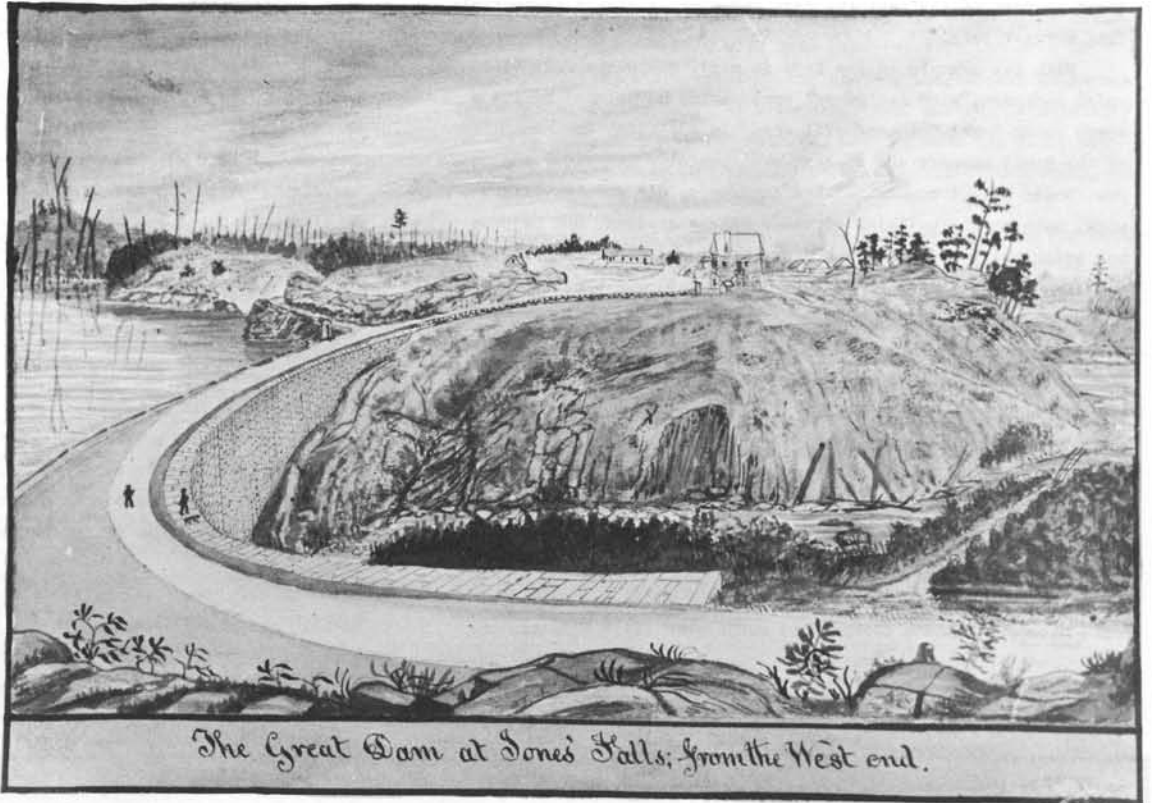


Figure 9. (Sketch No. 53)



Figure 10. (Sketch No. 57)

Although simple in concept, the scheme adopted by Colonel By was a daring one. With a series of strategically placed dams, the Rideau River, the Rideau Lakes, and the Cataraqui River were transformed from untamed wilderness waterways into a series of serene, easily navigable levels. This proved so successful not only for navigation, but also for flood control, that proposals to dismantle the system during the depression of the 1930s were abandoned because of the part the dams and sluices played in controlling water levels.

With the example of the Erie in mind, the works were built under contract, with design and supervision by Colonel By and a dozen young Royal Engineer officers. In addition, two companies of the Royal Sappers and Miners were specially recruited and these men, under direct command of the Engineers, did some auxiliary work, such as the building of waste weirs, sluices, and bridges but principally performed guard duty. In order to discourage desertion, always a problem in Army units stationed close to the United States, the Sappers were offered their discharge and a grant of land effective on completion of the works. The bribe was successful and although the number who took advantage of it was small, there were no desertions after it was made. No doubt the authorities also considered the fact that loyal settlers with military training would prove useful if the canal was ever attacked.

The main contracts were let in the spring of 1827 and were of two types, excavation and masonry. In the latter, Colonel By was fortunate in his choice of principal contractors—Thomas McKay, Robert Drummond, John Redpath and Thomas Phillips. These four men were not only capable contractors whose work still endures, but after completion of the canal each became prominent in the life of the Canadas and made distinct contributions to the economic development of the colony. Unfortunately, the excavation contracts

attracted a less reliable type of entrepreneur, the prevailing idea being that nothing more was required than a number of labourers with picks, shovels and wheelbarrows. Swamps, malaria, Pre-Cambrian rock, unstable clay, and any number of geographical, geological and climatic features showed the folly of that idea at a cost of a number of bankruptcies and abandoned contracts.

Owing to the absence of settlement, horses and oxen were almost unobtainable. Hence virtually every shovel-full excavated from lock pits, or fill carted for dams was hauled by wheelbarrow. It was, indeed, easier to get men than draught animals, and Irish labourers were brought out by the shipload specifically for work on the canal.

Where there was bedrock, the lock pits were blasted out with "Merchants' blasting powder," or gunpowder, tamped into holes drilled by a three man team using a rock chisel and a heavy sledge hammer. It is probable too, that use was made of the expansive power of wetted wooden plugs in the summer, and in the winter, of ice. The spoil was then hauled away by the labourers, who (it should be noted) were required to supply their own shovels and wheelbarrows.

The stone for the masonry was, in most cases, obtained at or near the site of the work. It is a matter of some interest that the contractor for the works at Hog's Back, near Ottawa, built a small tramway from the nearby quarry to the site. By stretching definitions this could be considered the first railway in Upper Canada.

The original plans called for dry masonry throughout, and initially the works were constructed this way. Problems developed when water forced its way between the joints and caused lock walls to bulge. Accordingly, the walls were then grouted by means of a slurry forced into the joints with long tin tubes, a system which

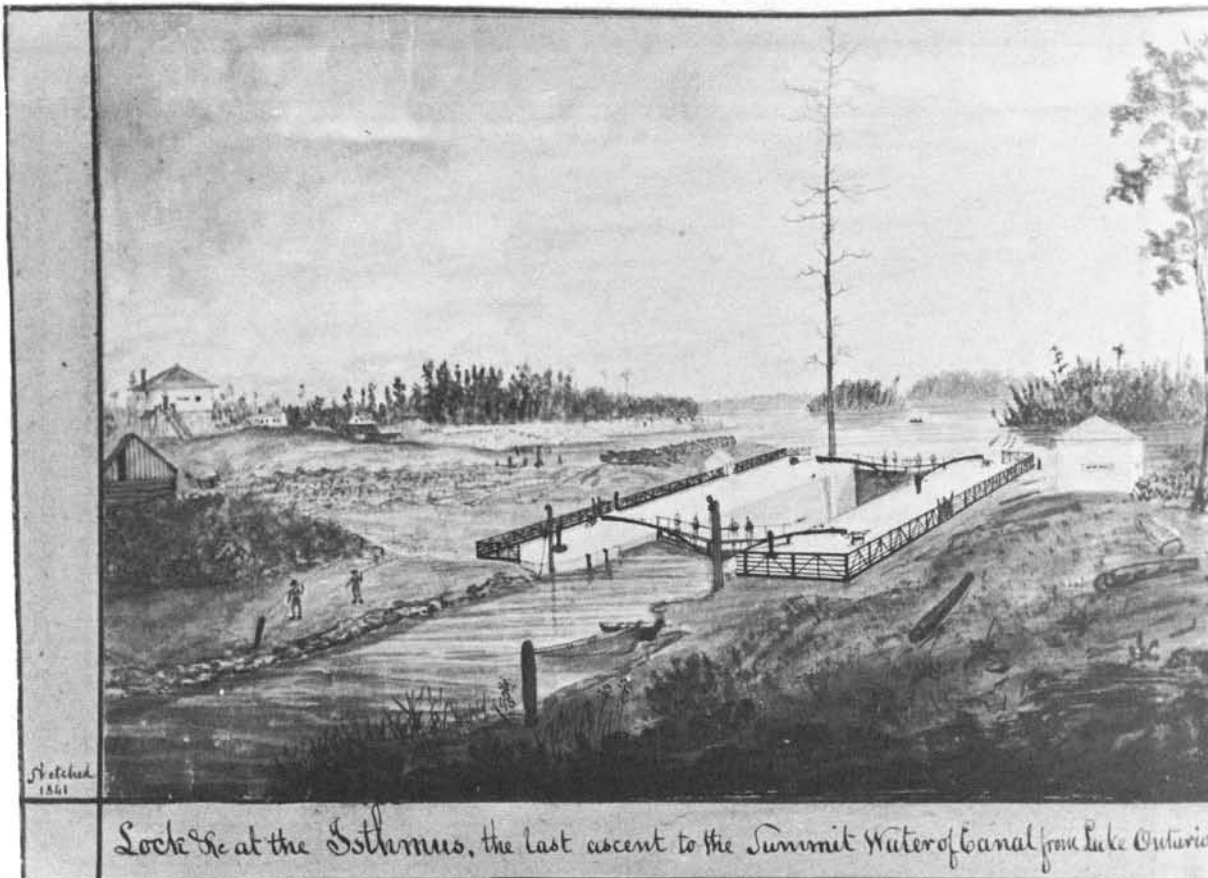


Figure 11. Burrows' sketch of the Isthmus (Newborough) Lock. (Sketch No. 36)

Figure 12. "Narrows Lock Station, Upper & Lower Rideau Lake, 1828 to 1832. Station No 15— 83 1/4 miles from Bytown [Ottawa]. Floating Islands Staked down." An interesting feature of the Rideau system is this artificial embankment, guarded by a blockhouse, raising the level of the upper half of Rideau Lake, to avoid excavation at the Isthmus. Wash drawing by J. William Clegg (see page 12).

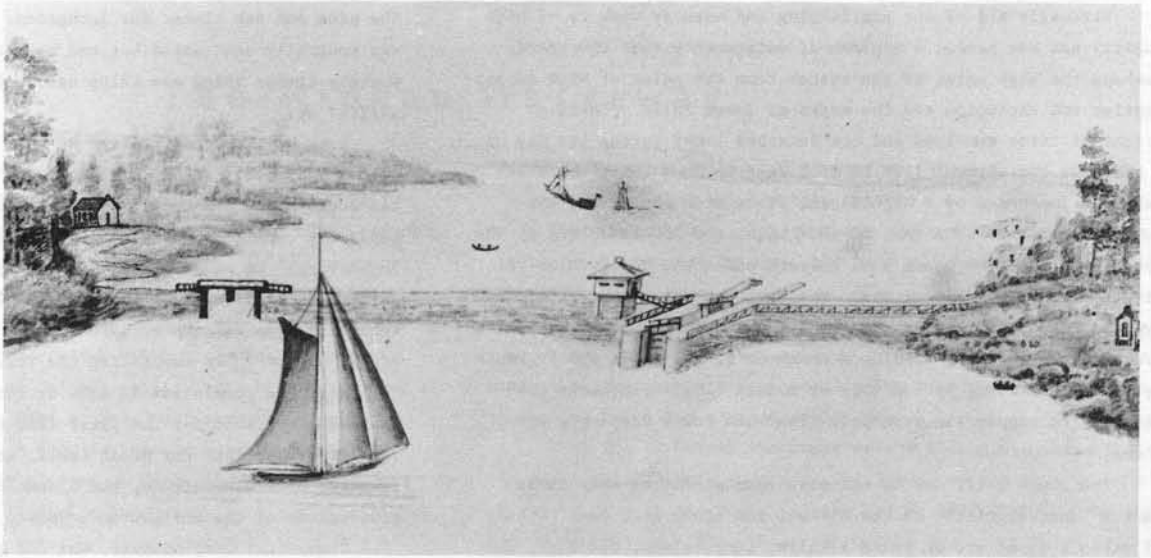


Figure 13. "Long Island. 1823 to 32. Station No 5- 14 3/4 miles from Bytown." A classic Rideau lock station with arch-key masonry dam swinging around to form one wall of the lock. Wash drawing by Clegg.

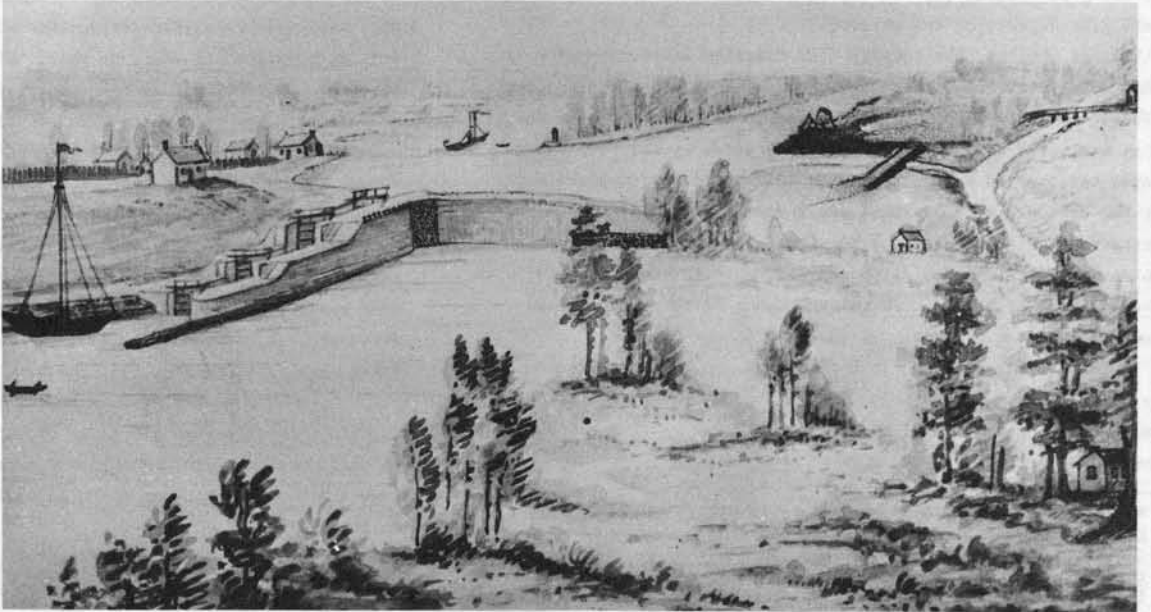


Figure 14. "Edmon's 1832" A typical lock station of the second type, with an overflow dam. Sketch by Capt. John Burrows (see page 12).



proved highly successful.

Virtually all of the engineering and masonry work is of high quality and has needed a minimum of maintenance over the years. Perhaps the high point of the system from the point of view of conception and execution are the works at Jones Falls. There a flight of three combined and one detached locks curves its way up a hillside for a total lift of 58.5 feet to Sand Lake, whose waters are impounded by a magnificent stone arch dam across the original channel. The dam, 62 feet high, and 350 feet long at the crest, was built by young John Redpath under the supervision of Lieutenant Henry Briscoe, R.E. The dam, the third largest of its type in the world at that time, and constructed in the middle of a trackless wilderness, remains a monument to the skill and ingenuity of its builders, marred only by modern (1947) penstocks constructed to supply the Gananoque Light and Power Company powerhouse. *

The Jones Falls dam is the most spectacular of what is in fact a characteristic of the Rideau, the stone arch dam. Others of various sizes are at Smith's Falls, Long Island, Old Slys, and Kingston Mills. More modest in size, but with the added advantage of being picturesque, are a series of stone overflow dams in the more placid parts of the waterway.

Less obvious, but equally fine examples of civil engineering and masonry are found elsewhere, such as, for example, the Ottawa locks. Eight in number, with a total lift of seventy-nine feet, they are built as a series of inverted stone arches, the basins keyed together in a complex system of interlocking masonry work. At the Narrows, an embankment was thrown across Rideau Lake creating Upper Rideau Lake, the summit level, raising the level only three feet, but thereby saving an enormous amount of excavation in the one mile artificial cut through the granite of the Isthmus at Newboro, the south end of the lake.

The fittings for the lock gates and sluices were made on site by blacksmiths from flat iron imported from England. Iron castings for winches and similar items were obtained from foundries in Lower Canada (Quebec).

*A full description of the Jones Falls Dam is given by Robert F. Legget in "The Jones Falls Dam on the Rideau Canal, Ontario, Canada," *Transactions of the Newcomen Society for the Study of the History of Engineering and Technology*, Vol XXXI, 1957-58 and 1958-59, pages 205-218. (Originally read at the Science Museum, London, 19 November 1958.)

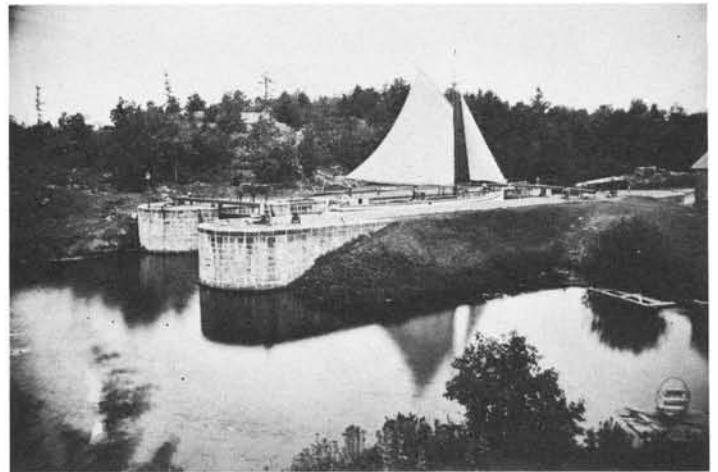
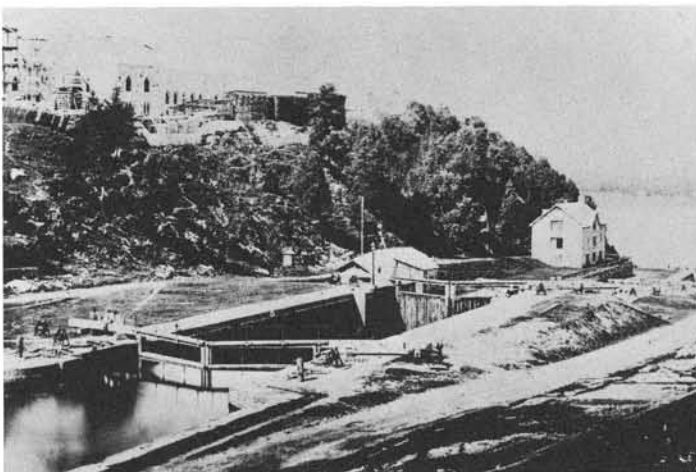
One material that was available on site in any quantity was the pine and oak timber for lockgates. The building of the gates was generally contracted out and here there were no difficulties - working timber being one thing native Canadians were generally skilled at.

Work on the canal started at both ends, Bytown and Kingston Mills, and moved inland, with Engineer officers stationed at the key works along the route. By the autumn of 1831 the waterway was generally complete, but the opening was postponed until the following spring. On 24 May 1832, Colonel By, his family and an official party set out from Kingston on Robert Drummond's steamer *Pumper*, renamed *Rideau* for the occasion; on 29 May they docked at the head of the Ottawa locks completing the first through voyage.

With the completion in 1834 of the three Ottawa River locks, it became possible for the first time to travel, in a small vessel, from tidewater into the Great Lakes, and for about the first twenty years of its existence, the Rideau Waterway functioned as a predecessor of the St. Lawrence Seaway.

Commercial use, however, was not the *raison d'être* for the building of the canal, and the presence of blockhouses and loop-holed and fortified lockmaster's houses all along the waterway provides evidence of the seriousness with which the Imperial authorities regarded its military role. While commercial activity was something that Colonel By had advocated, he never ceased to urge the military authorities to make proper provision for defence. In appropriating land along the route, he was careful to acquire enough at key points so that, for instance, there would remain a clear field of fire around the dams and locks. The defensive works were never as complete as Colonel By had envisioned, but in the years immediately following the canal's opening blockhouses were built at Merrickville, Narrows, Newboro and Kingston Mills of which that at Merrickville (1832-33) is the most impressive. Other lock stations acquired "defensible" lock houses, most of which survive in one form or another. Even more impressive are the truly massive fortifications of Fort Henry at Kingston begun, in their present form, in 1836 and supplemented by four martello towers around the harbour mouth after the Oregon Boundary Dispute in 1846.

This concern for the canal's defensive role had another aspect, in that it remained under the administration of the Board of Ordnance and the Royal Engineers until mid-century. By 1848, how-



Figures 15 and 16. Left: Rideau Locks, Ottawa, c1862; Parliament Buildings under construction in the background. E. Spencer photo. Right: Davis' Lock, once known as Foster's, has changed little, except for the disappearance of the sailing barges. W. J. Topley photo, c1880.

ever, the Imperial authorities evidently began to tire of juggling the often opposing requirements of the Army and the forwarding companies. The government of United Canada (a product of the 1841 union of Upper and Lower Canada) was distinctly unenthusiastic about assuming responsibility for a system, whose revenues had never been high enough to meet expenses. Eventually, a compromise was worked out, and in January 1856, the Governor General accepted the transfer of the canals to Canadian jurisdiction. In 1867, with the creation of the Dominion of Canada, the Rideau became a responsibility of the Dominion Department of Public Works where it remained until 1879. In that year it was transferred to the Department of Railways and Canals which became, in 1935, the Department of Transport. In the spring of 1972, it was transferred to the jurisdiction of the National and Historic Parks Branch, Department of Indian Affairs and Northern Development.

Throughout its history, the Rideau waterway has been a charge on the public purse, and until this became accepted as a fact of life it was continually subject to financial crises. Upon completion, a British Parliamentary investigation of the excess of costs over estimates cast a cloud over what might otherwise have been a triumph for Colonel By. Rather than a promotion, the Colonel was summoned to London to appear at the inquiry. Although he was fully exonerated, this rather cavalier treatment left a bitter aftertaste. Time had no chance to apply its healing balm for he died in February 1836 after a long illness, at his family home to which he had retired after the inquiry.

Many who had supported the building of the Rideau for commercial as opposed to military reasons, had fondly hoped that it would become the chief route for the transport of the produce of Canada West, and even the rapidly developing American mid-west. Alas for these expectations, the Erie Canal and the ice free port of New York proved too attractive, even for Canadian shippers. Revenue fell off after completion of the St. Lawrence locks in mid-century and at the same time the British government, then in an "anti-imperial" mood, undertook to disentangle Britain from some of her overseas obligations. The result was a decision to dispose of the system to the local government. As noted, the government of the Canadas was not particularly interested in a losing proposition, and it was not until the Imperial Government sweetened the pot by throwing in the extensive canal lands that the colonial government could be persuaded to accept.



Figures 17 and 18. Steam comes to the Rideau. Left: The Kingston Mills Lock Station, c1880, with one of the lightly-constructed propeller-driven barge-tugs then coming into use. The locks here were constructed along the wall of a narrow gorge. Right: The flight of seven locks at Ottawa, the final descent of the Rideau into the Ottawa River, 1912. Ottawa Forwarding Co. Steamer, Ottawan; Hull Electric and Canadian Pacific Railway tracks in the foreground. W. J. Topley photos.

One effect of the new administration was a concentrated effort to develop income through leasing of water rights, of which there were nineteen by 1867. Grist mills, flour mills, saw mills and shingle mills all came into operation, with water rentals varying from \$1.00 to \$360.00 per annum.

Following the Confederation of British North America the authorities accepted the fact that the canal had no commercial future as a transportation artery. Nonetheless the route remained sufficiently viable for local trade to warrant construction, or rather, extensive reconstruction of the Tay Branch to Perth. Wooden locks had been constructed along the Tay River between 1831 and 1834 but they soon fell into disrepair. Finally, after years of local agitation, the Department of Railways and Canals (in 1886) completed the rebuilding of the branch with stone locks and a deepened channel.

Following this last burst of vitality the Rideau Waterway sank slowly but surely into tranquil obscurity, untroubled by schemes for modernization and updating or even, as the years passed, by much traffic. Through the appointment of employees to the many posts necessary for maintenance and operation it remained a useful source of political patronage. Beginning about the mid-nineteenth century, it also became increasingly popular for recreation. Steamers, which had once carried passengers because the only other means of transport meant submitting one's self to the execrable roads, evolved into well equipped excursion vessels. In the 1880s and 1890s summer hotels appeared, encouraged by the completion of the Brockville, Westport and Sault Ste Marie Railway and the Rideau Ferry Regatta began to establish itself as an institution as the number of private pleasure boats on the Waterway increased.

It was this aspect of the Rideau, no doubt quite unforeseen by its builders, that has provided its *raison d'être* in the latter half of the twentieth century. The last passenger steamer tied up in 1935, but since World War II private boating has increased by leaps and bounds. The Waterway now enjoys an undreamed of popularity, but this very popularity carries with it the seeds of destruction. This superb example of nineteenth century technology, preserved like a fly in amber by the benign neglect of successive governments, is now reeling from the effects of the affectionate attentions bestowed on it by those who have become aware of its new economic importance to an area which has not shared in the



general prosperity of Ontario. Most of the locks retain their original hand-operated machinery and massive wooden gates still pivot on wrought-iron heel posts. Two locks, however, have been electrified and steel gates installed, and construction has begun on a massive concrete lock at Smith's Falls in order to speed up lockages and increase the number of boats put through. Unfor-

tunately still other "bottlenecks" prevent quick passage.

Accordingly, the Rideau Canal now faces a point of no return. If it must be adapted to an unsympathetic age, sensitivity and imagination will be required lest Canada's only monument to the Canal Age disappear beneath a mass of fresh concrete, hydraulic piping and efficient steel gates.

THE AUTHOR—William D. Naftel is a research historian for the National Historic Sites Service, Department of Indian Affairs & Northern Development, of the Canadian Government. He is currently conducting research on a group of eight historic canals which, because of their declining commercial and increasing recreational usage, were recently transferred from the jurisdiction of the Department of Transport to the Canals Branch of the government's Conservation Program (which includes also the National & Historic Parks Branch). In addition to the Rideau, are the Trent-Severn and Murray canals in Ontario; the Carillon and St. Anne canals on the Ottawa River and the St. Ours and Chambly canals on the Richelieu River in Quebec; the St. Peter's canal in Nova Scotia; and the St. Andrews Lock on the Red River, north of Winnipeg.

THE COVER—"Brewer's Lower Mill: Masonry of the Lock nearly complete, Excavation for Canal in progress 1831-2." Sketch (No. 68) by Thomas Burrowes.

THE OTHER ILLUSTRATORS—J. William Clegg was a clerk-of-check (accountant) on the Canal, and occasional topographic artist. He did a series of watercolor views of the Ottawa section. Capt. John Burrows (not to be confused with Thomas Burrowes) (1789-1848) was also a clerk-of-the-works on the Canal, and became its Superintendent upon its completion.

CREDITS— The cover and Figures 7 - 11: Ontario Archives, Toronto.
Figures 12 - 18: The Public Archives of Canada, Ottawa.

— —

This monograph was prepared especially for the field trip along the Rideau Canal from Ottawa to Kingston, 22 and 23 September 1973, sponsored jointly by the SOCIETY FOR INDUSTRIAL ARCHEOLOGY and the AMERICAN CANAL SOCIETY.

Price (Canada and U. S.): \$.50