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CONSTRUCTION HISTORY OF THE RIDEAU CANAL

by

KAREN PRICE

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CONSTRUCTION HISTORY OF THE RIDEAU CANAL
Parks Canada Manuscript Report 193 by Karen Price

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CREDITS

The concept to digitize several of the important Rideau Manuscript Reports was conceived in 2007 by Ken W. Watson, local Rideau author and historian and Chair of Friends of the Rideau’s Publication Committee, as a method to make these valuable research documents more accessible to the general public.

Mary Ann Stienberg of the Rideau Canal Office of Parks Canada, whose library holds these reports, generously offered to OCR (text scan) this manuscript report with the use of Katimavik students. Administration and supervision of the student scanning and proofing work was provided by Cheryl Gulseth. Mary Ann Stienberg was also instrumental in obtaining Parks Canada permission for Friends of the Rideau to make this digital document available to the general public.

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CITATION NOTES

The most heavily cited source is “PAC”, which is today’s “Library and Archives Canada” (LAC), which was previously the “National Archives of Canada” (NAC) and prior to that it was the “Public Archives of Canada” (PAC).

MANUSCRIPT REPORT SERIES

Shortly after Parks Canada took over the administration of the Rideau Canal in 1972 (previously under the jurisdiction of the Department of Transport) they tasked several of their high quality researchers and historians with detailing various historical/heritage aspects of the Rideau Canal. This resulted in a series of research reports on the Rideau Canal, produced from the mid-1970s through to the mid-1980s.

Intended mostly for internal use, these reports were produced in limited numbers with only a few receiving broader distribution through the History and Archaeology series of books published by the Ministry of Environment (National Historic Parks and Sites Branch of Parks Canada).

A few copies of the manuscript reports were also distributed to “various public repositories in Canada for use by interested individuals” – but today can generally only be found in the local Rideau region libraries of Parks Canada.



Construction History of the

Rideau Canal

by Karen Price

Manuscript Report Series is printed in a limited number of copies and is intended for internal use by the Department of Indian and Northern Affairs. Copies of each issue are distributed to various public repositories in Canada for use by interested individuals.

Many of these reports will be published in Canadian Historic Sites/Lieux historiques canadiens and may be altered during the publishing process by editing or by further research.

La Série intitulée Travail inédit est imprimée à tirage limité pour les besoins du ministère des Affaires indiennes et du Nord canadien. Des exemplaires de chaque rapport sont distribués à des archives publiques au Canada, où les intéressés peuvent les consulter.

Bon nombre de ces rapports paraîtront dans la revue intitulée Canadian Historic Sites/Lieux historiques canadiens, et pourront être remaniés ou mis à jour.

Construction History of the
Rideau Canal
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Preface

Throughout the years, many people have enjoyed their excursions along the Rideau Canal and have written copiously about their experiences on this waterway. Most are deeply impressed by the beauty and variety of the landscape for one passes from the St. Lawrence lowlands at Kingston to the Precambrian Shield and rough topography of the lake section of the waterway, to the tranquil pastoral county between Smiths Falls and Ottawa. Other travellers have noticed and commented upon the structure of some of the dams which can only be deemed exceptional engineering structures considering the era and environment in which they were built. Still others remark upon the route being so easy to follow and to navigate. Little do they realize that the countryside was not always as attractive. In the Cranberry Marsh area, we are told by the surveyors of the route that a heavy and foul-smelling air hung heavily over this area. Nor was the route always easy to follow and to navigate - it took John MacTaggart, one of Lieutenant Colonel John By's surveyors, five days to travel from the Ottawa River to

Dow's Lake for he had to pass through thick, virtually impenetrable bush. To have cut and built a canal from the Ottawa River to Kingston in less than six years, overcoming all the natural obstacles the route offered is certainly a credit to By and a great feat of engineering. The aim of this paper is to examine the Rideau Canal in the light of its construction between the years of 1826 and 1832.

For the purpose of this paper, I have moved from the general to the particular. In the first three chapters I have endeavoured to give an overall picture of the various facets of the canal's construction, stating who the workers were and how they were organized and supervised, what initial steps were taken in the canal's construction, where the supplies came from and how they were obtained, the difficulties that had to be surmounted, the administration of the canal works and (last but not least) the canal's completion. The second part of the paper is chronologically organized and is given over to detailed information on each of the sites of construction, starting with the first eight locks at Ottawa and ending with the works at Kingston Mills. For some of the works, such as those undertaken at Hogs Back there is much information, while for others, details are scant. I have tried to organize this section of the paper by using the same subject headings for each set of works and detail of the construction itself is given in strict chronological order. I felt that in this way detailed

information for each site was readily available, or, if the case should arise, comparisons and contrasts could be made more easily between the various work sites in a work organized along these lines.

The research for this paper was chiefly carried out at the Public Archives of Canada although the libraries of the Departments of National Defence, of Transport, and of Indian and Northern Affairs were also consulted. The Redpath Papers held by the McCord Museum of McGill University, Montreal, could also have been an important source for a paper of this kind, but unfortunately they were not available for consultation up to the time of writing.

It is my belief that much material of value for a detailed history of the construction of the Rideau Canal is in England. At the time of the canal's completion, Colonel By was recalled to England to face a parliamentary inquiry into the costs of the construction of the Rideau Canal. It is my contention that the materials supporting his claims and which could therefore be used as evidence in his defence were taken to England. Since he had to return so promptly, it is unlikely there was time for copies of these documents to be made. If the Rideau Canal is considered to be a top priority project, it might well be worthwhile to make inquiries about possible sources in Great Britain. Efforts made in this direction would certainly be rewarded.

Chapter One: The Rideau Canal

It has often been said that the military draw up their plans for the next war by examining and remedying the weak points of the last. This certainly was true of the British authorities in the years following the War of 1812, and it was this kind of thought that was in large part responsible for the interest in (and hence construction of) the Rideau Canal. The main communication and supply route between Montreal and Kingston, the chief British stronghold on the Great Lakes, had always been the St. Lawrence River. The river's proximity to the American frontier, its vulnerability to attack from the enemy, and the impossibility of defending such a boundary satisfactorily, were factors which became obvious during the conflict of 1812-14. During these years the British lived in constant fear that their line of communication and supply would be disrupted and the war lost. At the close of hostilities in 1815, an interior communications system between Montreal and Kingston was being discussed and attention was drawn to the rivers Ottawa and Rideau. "Every person who has looked at these Provinces in a military point of view, has immediately

perceived the importance of a communication being established in the direction of the rivers Ottawa and Rideau; were the latter made navigable, it would materially enhance the value of this communication."¹

The suggestion of a canal being built using the Ottawa-Rideau route was not a new idea. As early as 1790, plans and estimates were submitted to the imperial government for the construction of a military canal between Lake Ontario and the Ottawa River, but the troubled state of Europe, the inability of England to undertake the work, and the poverty of the colony forbade the beginning of so great an enterprise at that time. However, times had changed and by 1815 the establishment of an interior communications system was no longer viewed as a luxury but as a necessity. Colonel Nicolls, commanding officer of the Royal Engineers in Canada, was instructed to secure definite information regarding the feasibility of the Ottawa-Rideau route. Captain Joshua Jebb, Royal Engineer, was accordingly detailed for the duty and he received his instructions early in 1816.

You will then repair to Kingston where Captain Dixon will have directions to furnish you with such Instruments etc. - as you may require and are in the Office at that place, whence you will proceed to where the River Rideau falls into the Ottawa, where you are to make a Correct Survey

of the Ground and River at the mouth of the Rideau, showing by Plans and Sections, on a large scale, the obstacles to be overcome in forming a Communication for large Batteaux from the Ottawa towards Kingston, and to make a detailed Report thereon, stating the measures you would recommend as best to surmount those obstacles, also making an Estimate of the expense of carrying them into execution and stating the means to be found in the neighbourhood; the same is to be done at every point of the River, as far as you can proceed up Irish Creek, where there is not already a free passage for such Batteaux at all seasons of the year, except when prevented by the Ice: you will particularly note the difference in the Depth of Water in the dry Season.

It will not be necessary that your time should be taken up in surveying the parts of the River navigable for Batteaux, but you will set down the distance from one obstruction to another according to your own judgement, and the best information you can obtain on the spot.

You will forward your Report, Plans and Estimates of the expense of what is necessary to be done at the mouth of the River Rideau, as

soon as prepared without waiting for those of the other parts of the River.

...You will lay down and report upon such places on the Rideau as appear to you best adapted for Posts and Depots with a view to the forwarding and protecting the Communication between Montreal and Kingston by the Rideau and Ottawa; where the former River falls into the latter would naturally appear to be one of those.²

During the summer of 1816 Jebb carried out his surveys. He reported on two routes; the one using the Cataraqui River which was subsequently adopted, and the other diverging from the Rideau River at Irish Creek, a tributary of the Cataraqui River. Captain Jebb reported both routes as being practical, but he preferred the latter as "the distance is much less, the interruptions by water not so frequent, and the route lies through a more fertile and much better line of country."³ He also spoke of the necessity of wharves where boats could be tied up, for, as he warned, "on the Ottawa the wind occasions a heavy swell ice shored; and in the Rideau is a strong and swift current leading to the falls, the effects of both must be foreseen and guarded against."⁴ Jebb's reports were most detailed⁵ and reflect great credit on his ability as an engineer and as a topographical surveyor, but they were not acted upon.

Surveying parties continued to be sent out from England. In 1822, for example, three exploring parties traversed the country between Lake Ontario and the Ottawa River. One party started at Belleville and came out at Pembroke, while the others started at Kingston. Of these two parties, one came out at Hawkesbury and the other at the Chaudiere Falls.

Interest in a canal from the Ottawa River to Kingston was not limited to the British government; it was also of concern to the Provincial Legislatures. In 1821, a commission headed by John Macaulay of Kingston was set up, and Samuel Clowes, a civil engineer, was appointed to examine and report upon the best route for the canal. On 12 June 1823 he set out from Kingston to make a preliminary survey of the various proposed routes and in the spring of 1824, he completed his work.⁶ Among the recommendations made by Clowes was that the route by Irish Creek be abandoned, on account of the scarcity of the water supply and the depth of the requisite summit cutting, and that the route followed by the canal today, be chosen. Clowes' report also included plans for the construction of the canal on three different scales and dimensions and the estimated construction costs were given for each. His first estimate was for a canal 7 feet deep, 40 feet wide at bottom and 61 feet at the surface of the water, the banks to slope 1-1/2 to 1 foot perpendicular, with stone locks 100 feet

long by 21 feet wide, costing £230,500. The second estimated the canal at 5 feet deep, 28 feet wide at the bottom, and 48 feet at the surface, the slope of the bank 2 feet to 1 foot perpendicular, with stone locks 80 feet long, and 15 feet wide, and turning bridges 15 feet in the clear and 10 feet wide; the projected cost of £145,000. The third called for a canal 4 feet deep, 20 feet wide at bottom and 32 feet at top, the slope of bank 1-1/2 to 1 foot perpendicular, with wooden locks 75 feet in length, 10 feet in breadth and turning bridges 10 feet in the clear and 10 feet wide. This was to cost £62,000.

In 1825 the Clowes report was referred to a joint commission of the Provincial Legislatures of Upper and Lower Canada, which recommended the construction of a canal 5 feet deep and 48 feet wide at the top and 22 at the bottom. During this same year a commission of the Royal Engineer composed of Major General Sir James Carmichael Smyth, Major Sir George Charles Hoste, and Captain John B. Hams came out from England to study plans for the Welland, Ottawa and Rideau Canal systems to be based on the same scale as the Lachine Canal. On 9 September, they reported to the Duke of Wellington that

The mouth of the Rideau falls over a precipice of 30 feet high into the Ottawa, forming a very beautiful and regular Cascade, not unlike a Curtain, from whence it has derived its

name. This fall, may, however, be easily turned, and the mouth of the proposed Canal be made to enter by a small bay a few hundred yards lower down the Ottawa than the mouth of the Rideau.

There appears to be no difficulty whatever with respect to a Canal from the Ottawa to Kingston, by the Rideau River, the Rideau Lake, the Mud Lake, Cranberry Marsh and Kingston Mill Stream. The whole extent of the communication would be 132 miles. The Line has been carefully surveyed, and estimates of the Expense have been formed by order of the Provincial Government. The other line mentioned in your Grace's Instructions by Kyle's Bridge and the Irish Creek, although somewhat shorter, could not be undertaken for want of water.

Three different estimates have been formed for the proposed Canal, varying according to the dimensions that may be adopted. That which amounts to £145,000, corresponds, as to the size of the Canal, with those of Grenville and la Chine, and of course would be the one to be selected. The Locks are, however, only estimated at 15 feet broad by 80 feet in length. The length does not so much signify, but it is indispensable that they should have the same

breadth (namely 20 feet) as the Grenville and La Chine locks. It would be better indeed that they should agree exactly. This of course, would cause an additional Expense. We have estimated that £24,000 would cover this alteration: making a total for the Water communication between Kingston and the Ottawa of £169,000.⁷

Wellington was favourably impressed by the report of the commissioners, the imperial government approved and the legislatures of Upper Canada were most enthusiastic

The proposed Rideau Canal...if carried into execution, cannot fail of being productive of incalculable benefits to the Province: and we trust that these improvements will continue to receive the warm support and encouragement.⁸

Permission was granted for the construction of this waterway, and in April 1826, Lieutenant Colonel John By was appointed commanding Royal Engineer of the Rideau Canal.

In 1799 John By had entered the Royal Military Academy at Woolwich where he obtained his commission as a second lieutenant in the Royal Artillery. In December of that year he transferred to the Royal Engineers. His advancement in the British army was steady and he served in many places during his career. He was first ordered to Canada in 1802 and remained there until 1811 when he was recalled for service in the Peninsula War. He served with distinction in

Spain and Portugal and was later recalled to England where he was placed in charge of the works at the Royal Gunpowder Mills at Faversham Profleet and Waltham Abbey. These positions he occupied with great credit from January 1812 to August 1821. In 1821, owing to reductions in the strength of the British army as a part of national economy measures, he was placed on the unemployed list. Despite this fact, on 2 December 1824, he won his promotion to the rank of lieutenant colonel. In 1826 By came out of retirement and in April he was on his way to Canada,⁹ to design and complete a military canal having a uniform depth of 5 feet from the Ottawa River to Kingston along the route suggested by Samuel Clowes. The locks were to be the same size as those of the Lachine Canal and of the Ottawa canals and the waterway was to be free from obstruction and safe from attack by the United States.

By landed at Quebec on 30 May 1826 and immediately reported to his commandant, Colonel Durnford, the Commanding Royal Engineer in Canada. He spent the next few months in Quebec, gathering all the information he could about the Ottawa and Rideau rivers. By reached Montreal in August 1826 and made his plans to travel up

and examine the Ottawa for some distance below the outlet of the Rideau, to ascertain the best situation for the entrance of the proposed Canal, the judicious choice of which is an object of the

first importance and I shall therefore use the greatest exertions in examining well reflecting on all the advantages and disadvantages of the various situations that may present themselves before I decide.¹⁰

He also thought it necessary to

make several sections or minute inspections of the ground between the points...best adapted in all respects for the junction of the Canal with the Ottawa and the Black Rapid on the Rideau River, for there being a perpendicular rise of upwards of forty feet several Locks must be constructed, and I consider this the most expensive as well as the most important part of the whole line left for my consideration.¹¹

It was mid-September before By left Montreal and journeyed up the Ottawa; he arrived in Hull on 21 September. He wasted no time in carrying out his surveys, and within a week a place above the Rideau Falls had been selected as the entrance to the Rideau Canal. This site was examined and approved of by His Excellency the Earl of Dalhousie, Governor in Chief of British North America, who had joined By in Hull on 24 September. The choice of the site also met the approval of Colonel Durnford. One of By's objectives had therefore been met.

There were still many other preliminaries to be

considered before work on the canal itself could begin. Some better means of transport than a ferryboat service had to be established before supplies of food, fodder and equipment could be brought from Hull to the canal site. Furthermore, By was convinced that an improved mode of transportation (specifically a bridge) would enable persons willing to contract for the works of the Rideau to tender at much lower prices than they could otherwise have done, "Hull being an Old Settled Country, and from whence they had to look for many of their supplies particularly Forage."¹² In order to strengthen his argument, By included a "statement of Prices for Ferrying prior to the construction of the Chaudiere Bridge".

Load of Hay 7/6

Span of Horses 2/6 to 3/9

Yoke of Oxen 3/9

Load of Boards 7/6 to 10/

Single Persons 6/4¹³

By and Philemon Wright, the founder of Hull, suggested the bridging of the Ottawa River at the Chaudière Falls, a plan that was heartily endorsed by the Earl of Dalhousie.

I cannot but approve in the strongest terms of the suggestion you propose, of a bridge across at the broken rocks islands here. The advantages are obvious the expense a trifle, as preparatory to the great works, you are appointed to

superintend. If any sanction is thought necessary, I give it in the fullest manner.

As soon as permission had been granted for the construction of the bridge, work began. According to Thomas Burrowes' "Observations,"¹⁵ on Monday, 25 September 1826, in conjunction with Thomas McKay, he was

immediately ordered to measure the Gap or chasm at the north or Hull side of the River, and to draw a design for a bridge of rough stone to be thrown over the said chasm....According to the foregoing dimensions, a rough elevation was made by us -- in pencil, for want of better material and submitted to his Lordship, who approved of it, and gave orders to begin work that day at 1:00 p.m.¹⁶

On Thursday, 28 September,

the Foundation Stone was laid by Lord Dalhousie, Colonel Durnford, Lieut.-Col. By, Honourable Captain Byng, Royal Navy, Major Elliott, A.D.C., with Masonic Honours. Under the stone his lordship deposited several coins of the reign of George IV.¹⁷

Men worked on the bridge all that autumn and throughout the winter months, but because of several severe setbacks, the Chaudiere Bridge was not completed until September 1828.

Although the provincial legislatures were approached

about the financing of this project, they were not prepared to contribute to the bridge's cost. The costs were borne by the military who reasoned that "the Bridge...is decidedly connected with and necessarily preparatory to the great Work of the Rideau Canal".¹⁸ The sum of £2,000 was issued from the military chest to cover its cost in 1826, but this, amount later had to be supplemented, the total cost amounting to £3316 18s 3-1/2d.¹⁹

Routes for roads leading from the bridge to the various lock sites were laid down during the autumn of 1826, being a necessary prerequisite to canal construction. By November 1827, By was able to report to General Mann that

[I] have formed a road from the said Bridge to the Hog's Back and from thence to the Black Rapids and to the upper end of Long Island, a distance of 24 miles; also a road from the said Bridge; across the Gully at the head of Bellow's Bay to the first Eight Locks, a distance of about 2 miles, with a Bridge across the said Gully,... although this Bridge is extremely rough it is very strong and durable being formed of large Cedars. - Those Bridges and roads of 26 miles I found indispensably necessary to enable me to get provisions, tools, materials to the various works on the Rideau Canal, and...they are the cause of immense saving.²⁰

In addition to the building of bridges and roads, plans were made for the development of the construction site itself. In the early autumn of 1826 land was cleared on either side of the valley in which the entrance locks now lie and two wharves were built. Lands were also set aside for a workyard; the construction of the first workshops was started and sites for the barracks and the hospital were chosen. As the necessity arose, other buildings such as the guardhouse, bakehouses and a slaughterhouse were added. Surveys were also carried out and on Lord Dalhousie's recommendation,²¹ lots of 2 acres or so were plotted and were later granted to artificers working on the canal for rent of 2s. 6d. per annum.

Besides attending to all the aforementioned particulars, By had to choose and examine the route the canal was to follow. On 13 September 1826, By wrote to Colonel Durnford asking that Lieutenant Pooley, RE, join him. By stated that he had ordered, "Mr. John Mactaggart, the Clerk of Works, Mr. John Burnett, Overseer of Works, Mr. Henry Howard Burgess, the Assistant Overseer of Works to proceed to Hull, for by the instructions, the first thing to be done is to ascertain the quantity of land required for the service, that Sir P. Maitland may put me in possession of the said land."²² Initial surveys were carried out that autumn and early winter and John MacTaggart, in his *Three Years in Canada*, has left us with a vivid description of

this phase of the work. In the spring of 1827, survey parties were sent out again to examine the route²³ and By was able to report in July that he had

attentively examined the whole line of the proposed Rideau Canal, have laid out the various works necessary to complete this grand water communication from the Ottawa River to Kingston,...I found five feet depth of water, with the exception of the Rapids Portages, where cuts, Locks waste weirs, are proposed, to unite and retain the waters to their required levels; I beg to state that nature has so strongly marked the proper positions for these various works, that there can be but one opinion on that subject.²⁴

Throughout the summer of 1827, By himself visited the areas where difficulties with construction might arise, always considering the various alternatives open to him.

I am now examining the banks on each side of the River at Long Island for if they are not of sufficient height to retain the water when raised 24 feet, I shall be obliged to adopt Mr. Clowes plan at that place and have three dams instead of the one I propose.²⁵

And so the plans were perfected and drawn up.

The plans that By submitted in the late fall of 1827

called for a canal closely following the route proposed by Clowes. However, By abandoned Clowes' idea of making extensive excavations with a small canal prism. Rather he proposed to reduce the amount of excavation to a minimum by building dams and waste weirs at points where they would create stretches of navigable water. He also thought that the Rideau Canal should be built to handle steamboats and he argued his point adeptly on both military and commercial grounds²⁶ and drew up his plans calling for the larger locks. In November, By had his working plans and estimates completed, and, together with the following covering letter of explanation for the proposed changes, they were given to Lieutenant Pooley to take to England.

I have the honour to transmit, for the information of his Lordship the Master-General and Right Honourable and honourable Board, my Report and Estimate, with Plans of the various works indispensably necessary to form a Navigable Communication with five feet depth of water from the Ottawa to Kingston; and although I have commenced the building of three locks agreeable to my instructions, on the same scale as those of the Grenville and La Chine Canal, yet as these Canals have nothing to do with the down trade of the country, as already explained in former letters, I cannot refrain from hoping, that when

the Plans and Estimates are examined, and the nature of this Water Communication thoroughly understood, that I shall receive orders to construct the large lock of 150 feet long by 50 wide, with five feet depth of water; as these locks would pass steam-boats of sufficient size to navigate the lakes, and also the spars from 120 to 130 feet long required for the Royal Navy, which those of La Chine Canal cannot do, they being only 108 feet by twenty wide. I further beg to observe, that as the melting of the snow in the spring of the year rises the water in the Ottawa River from twenty-two to twenty-four feet perpendicular, and in the Rideau River from thirteen to fifteen feet, it is evident that these torrents must have washed away from the banks all substances that can be removed, and therefore the idea of the paddles of steam-boats injuring such banks is quite erroneous, particularly as the proposed Canal will only retain the water to the height of five feet.

The accompanying Plans will show the very little excavation required, and that being chiefly rock, there can be no part of the banks but what may be rendered perfectly secure from injury. His Excellency, the Earl of Dalhousie,

Commander of the Forces, having suggested the necessity of my sending an officer with my Plans and Estimate, to insure their arrival in time to lay before Parliament, I have ordered Lieutenant Pooley, Royal Engineers, to be the bearer of these Papers. He having been with me at the commencement of the work, and just returned with me from examining the various works on the whole line, can give the fullest information, and explain whatever I may in the hurry of business have omitted....I further-beg to state, that from the progress already made at the various works, I feel convinced that on the 12th of August, 1830, I shall have completed this magnificent Water Communication from the Ottawa to Kingston; but to enable me to do this, I shall require about £100,000 each year for positive disbursements on the spot, and have marked on the Plan where the four Companies of Royal Sappers and Miners could be employed to great advantage, should I be favoured with the assistance of two more Companies, in addition to the two already arrived.²⁷

By November 1827, the groundwork for the building of the canal had been laid and work had begun at various sites. The construction of an inland waterway from the Ottawa River

to Kingston using the Rideau and Cataraqui Rivers was no longer a dream, but was becoming a reality.

Chapter Two

The proposed Rideau Canal was to be 132 miles long passing through a line of country but little known. The difference in level from Kingston to the summit level was 154 feet 10-1/2 decimals while the descent from thence to the point of junction with the Ottawa River was calculated to be 268 feet 10-1/2 decimals. Lieutenant Colonel By believed that no fewer than 45 locks would be needed, and that at least ten weirs, with a total length of 4,050 feet, were necessary in order to raise the water to the proper levels and to protect the canal from being destroyed by floods. Such a plan called for four basic types of work: excavating earth, clay, rock and gravel; building and finishing the locks of heavy masonry; constructing heavy dams across the Rideau of rough rubble masonry and framing aqueducts and bridges of wood. In addition, By believed that his plans for the construction of the canal could best be realized if the work on the various sections was carried on simultaneously instead of consecutively, and as early as October 1826, he wrote Major General Darling of his intentions.

I have the honour to state, that from the

magnitude of the work to be performed next year on the Rideau Canal, I propose commencing work at three stations, viz. on the Ottawa, the summit level Kingston...and as it is probable I shall collect 2000 men at each station.¹

Among the duties assigned to By was that of gathering and organizing a work force for the Rideau Canal. He was authorized to "procure it, in concurrence with the Commanding Engineer and Respective Officers at Quebec, and...to discharge any of the persons employed, when from misconduct or otherwise their Service may no longer be required."² He started to hire men in 1826 and his establishment was composed of four different groups of workers: the civilian staff; members of the Corps of Royal Engineers; two companies of the Corps of Royal Sappers and Miners and, last, but not least, the day labourers. Each group had its own specific duties, but their interaction made the construction of the canal possible.

Let us first discuss the civilian staff who served Colonel By. Most of these men were resident in Canada and had gained valuable experience by working on previous construction projects such as the Lachine Canal. These men were recommended to By for positions on his staff and they served him in either a clerical or a technical capacity or in both. The main post, that of chief Clerk of Works, was filled until December 1829 by John MacTaggart. MacTaggart

was one of the few who came with By from England, and he was highly thought of by the authorities. He was responsible for making the initial surveys and charting out the route the canal was to follow. Once work had commenced on the canal, it was his responsibility to see that it all ran smoothly and on schedule. He was to examine the finished works and to ascertain whether they agreed with the required measurements. He was also responsible for the keeping of the accounts and reported on all these matters directly to By. MacTaggart was considered to be well paid, since he earned 14s. per day. Because of poor health, he returned to England in 1829, and his duties were assumed by Hugh Baird, a civil engineer.

Perhaps the next most important posts to be filled were those of Overseers of Works. Among their duties was the task of measuring the various works completed by the contractors and checking that all was built to the proper specifications and on time. In 1826, By hired John Burrit³ and Thomas Burrowes⁴ as overseers of works and H.H. Burgess⁵ as an assistant overseer of works. By asked for permission "to increase the number, of overseers, as the Service may require,"⁶ and the authority was granted. Among those that served By in this position, were H. Burnett, John Burrows, Joseph Charles, Alexander Gibbs, R. Johnson, Isaac McTaggart, Scott; A. Sherif and George Wishart. The pay for an assistant overseer of works was 5s. per day while an

overseer of works earned 7s. 6d. per day.

The position of Paymaster was held by William T. Clegg, while Angus McGillivray was appointed to the post of Clerk of Stores. The chief clerk in the Royal Engineers Office at Bytown until 1829 was Henry Howard Burgess. He had been highly recommended to By for employment by the Bishop of Quebec and he, during the first part of his term in office, did perform his duties well.⁷ He was in charge of quite a large staff among whom were a Mr. Sterling, Mr. Martin, Mr. Browne, Mr. Foy, Mr. Taylor, Mr. H. Burnett, and a Mr. Robins.

As far as the "technical" staff was concerned, By was served well. His master carpenter was James Fitzgibbon and his rate of pay was 7s. 6d. a day. Fitzgibbon was responsible for seeing that all the carpentry work so necessary to the proper functioning of the canal was done satisfactorily. In March of 1829, for example, By wrote that he was "constructing the pointed cills [sic] and Lock Gates at several of the Stations on the line of the Rideau Canal, and therefore find it necessary to send the Clerk of Works, and Master Carpenter from Section to Section, to superintend this particular part of the work."⁸ The authorities certainly seemed pleased with all that Fitzgibbon had accomplished, as can be seen in the reports and in the letter of recommendation that he received upon the completion of his work.⁹

The post of Master Smith was held by William Tormay. By wrote that,

it was owing to the high character I received from Mr. J. Fellowes the Master Smith who had the Contract for the iron work on the Lachine Canal, who had employed Mr. Tormay for 3 years during that work, and from Briggs and Bennett, proprietors of an extensive Steam Engine Manufactory at Montreal - that I was induced to offer him the Situation of Master Smith at the Rideau Canal - and I have the satisfaction of stating that Mr. Tormay has proved an excellent mechanic and Master Smith.¹⁰

Being paid at 7s. 6d. per diem, Tormay was responsible for all the iron work of the canal. The skill and experience which he brought to the job held him in good stead and his work was done to the complete satisfaction of Lieutenant Colonel By.

As far as the civilian staff was concerned, the only position that By had difficulty filling initially was that of master mason at 10s. per diem. Men with adequate training, experience and integrity - "Not one fit to be trusted in the Country"¹¹ - were difficult to find. For the first while By had to content himself with hiring masons who worked by measure and value. However, this situation was remedied in 1829, and "having reason to consider Mr. Scott

Overseer of Works, Competent to act as a master mason,...I have the honor to recommend him for that appointment."¹² William Honey was also employed as a master mason but he

was never on any of the works appointed to Superintend.
He being employed with his Brother Mr. John Burrows,
Overseer of Works all the time in assisting him with
taking copies of Plans etc. belonging to the board.¹³

Although the situation was far from satisfactory, it must have been accepted for there is very little reference to it as posing a serious problem.

During the years of 1826 and 1832, several members of the Corps of Royal Engineers¹⁴ were assigned to By to assist him in the construction of the canal. These men were an essential part of By's working force, for not only did some of them help establish the canal's route, but they were responsible for seeing the plans for the canal developed. Each of these men was given rather large areas to superintend and each was in charge of all the facets of the canal's construction in his area. For example By "placed Lt. Colonel Boteler in charge of the various works extending from Kingston Mills, to the Narrows, Rideau Lake, inclusive, an extent of works which requires him to be constantly on the move."¹⁵ For their work, these men received 10s. By often requested an allowance for a horse and forage for each of them, but whether this demand was met or not is not

known. These Royal Engineers would report directly to By and, whenever there was a tour of inspection, they would accompany the authorities through their area, pointing out the difficulties that had been encountered and the progress that had been made.

The third group of workers that saw duty on the Rideau Canal were members of the 7th and 15th companies of the Corps of Royal Sappers and Miners, troops which had been especially raised for this assignment¹⁶ and were commanded by Captain H.J. Savage and Captain James C. Victor respectively. The 15th company arrived in Canada in June 1827 and were stationed in Bytown. For the first few weeks they lived in tents and roughly built shacks near Richmond Landing until the stone barracks, which were situated on the present site of the Parliament Buildings, were completed. The 7th company did not arrive in Canada until October 1827 and they spent their first winter at Bytown, but later were stationed at the Isthmus (Newboro). Most of these men were skilled labourers being carpenters, masons, bricklayers or smiths by trade, and Colonel By held them in high esteem.

He found "the greater part of Captⁿ. Victor's Company such intelligent and well instructed men, that they are of the greatest use to me."¹⁷ In many of his dispatches home, he requested another two corps be raised and he even specified what trades would be most advantageous.

With regard to the different trades of the

Sappers and miners, all kinds are useful in this wilderness; but the Cornish mason and Miner, accustomed to Dry keywork would be of the greatest value to me,...Smiths, stone cutters, masons, Carpenters, Wheelwrights are all equally valuable and much required.¹⁸

An additional two companies were never raised, but By did employ the 7th and 15th companies to advantage at Bytown and at the Isthmus and they were mainly responsible for the building of the lock gates, sluices, waste weirs, etc., of the canal in these areas. They also saw duty at the Hogs Back in 1828 for when Fenlon reneged on his contract and Messrs. P. Wright and Sons undertook this work, By felt that as many of the Royal Sappers and Miners as could be spared from the guards and other unavoidable duties should assist, for

until the late sudden rise of the Rideau River injured the Dam, I was not fully aware of the necessity of pressing that work...but I am now of opinion it will require great exertion during the whole of this winter to raise the arch Keywork to a sufficient height to resist the spring floods.¹⁹

Desertion from the ranks posed a great problem to the various military commanders throughout this period. However, the 7th and 15th companies of Royal Sappers and

Miners have a comparatively good record in this regard; between June 1827 and November 1828 only 16 men deserted, out of whom three were caught and sentenced by general court martial to be transported for seven years.²⁰ This low rate of desertions may in part be attributed to By's policy of placing the men in areas from which desertion would be difficult, and to his system of giving a land grant to those men wishing to settle in Canada upon completion of the works,²¹ an offer many of these men accepted in 1831-32.

The day labourers, the fourth group of workers involved in the canal's construction, were an essential part of By's work force. These men were generally immigrants who had just recently arrived in this country. Many of them had come on their own, hoping to improve their lot in life, while others had been sponsored and brought out to Canada by men such as Peter Robinson, whose concern it was to have these men settle the empty lands of south Ontario.

Secondary sources constantly imply that a majority of these men were Irish. Throughout my research, I have found this not to be the case. Certainly men of other nationalities were employed on the canal services, but they do not appear to have been as flamboyant as the Irish, and thus do not figure as prominently in the official reports. All these immigrants had endured great hardships, and, upon their arrival in Canada, often did not have the basic necessities for existence in such a harsh climate. Such conditions

disturbed and concerned By.

I...fear from the Wretched condition of most of the Emigrants, applying to me for work, that it will be indispensably necessary to issue bedding to prevent sickness, and most respectfully suggest for the consideration of His Lordship, that the Commissariat should send 1000 Sets of bedding, or at least that number of good Blankets up by the first Steam boat, which I understand will move from Lachine on the 23rd Instant for Hull; a price should be fixed for each article that will cover all expenses, to enable me to know what to charge the men, for it appears that most of them will take Blankets on equitable prices in preference to money, and the issuing of such articles will contribute much to their comfort; and thereby, facilitate the works; at present the poor fellows lay with nothing but their rags to cover them, and as their numbers are increasing and the rainy season coming on, I dread the effects of sickness, and feel convinced that the distributing of bedding will be of the greatest importance.²²

Their poverty also adversely affected their position on By's work force, as can be seen by this comment:

these men are poor Emigrants, not capable of giving security to enable them to take contracts and not sufficiently good labourers to be employed on the Cheque, wherefore they are allowed to work at lower prices than the Contractors receive for similar work.²³

These men were employed practically at every section and the tasks they were called upon to do varied greatly. For instance, By writes that

Whilst laying the sill of the waste weir at the entrance of Mud Creek, Long Island, it was necessary to employ men day and night bailing and pumping out the water; also that at Merrick's Mills, Nicholson's rapids, and Burritt's rapids, the Labourers were employed extra time in Keeping the several Lock Pits free of water.²⁴

The day labourers also worked on earth and rock excavation. After their work had been measured, they were paid by the cubic yard for it. By generally had at least 100 employed as day labourers and it was hoped by the authorities that they would eventually live in this area and become good settlers and loyal subjects.

At the time of By's appointment as engineer in charge of the construction of the Rideau Canal, it was suggested to him by General Mann that contract labour be used. The

advantages and disadvantages of contract labour had been outlined by Major General Sir James Carmichael Smyth in a memorandum which had been sent to General Mann in March of 1826 and which read in part:

I am of opinion that it will be found more economical and more expeditious to execute the greatest part, if not the whole, of the proposed Rideau Canal by contract. - There will be no difficulty in finding contractors for the excavation. - When the Line is once traced and decided upon the execution may be given out to contractors allotting different lengths to different Individuals according to their means what they may be willing to agree for. - I would even contract, under careful specifications, for the Locks, flood-Gates, and other particulars....Government would avoid the formation of an expensive establishment which otherwise will be required....Three or four additional Engineer Officers the same number of intelligent Clerks of Works will be all that will be required for the Rideau Canal whose services will be subsequently available for other operations; whereas if it is attempted to excavate the work by day-work, a large Establishment will, in the first instance,

require to be formed; the termination of the Canal at any given period cannot be looked forward to with the same certainty. - The only inconvenience attending the execution of the work by contract, that I am aware of, is that in that case the whole of the cost must be asked for from Parliament at once; as the contractors must be at liberty to commence as early in the Season as circumstances will permit without waiting for the passing of an annual grant. - He must be able to arrange for the feeding and lodging of his Work-People for one or two years beforehand which he would not do if a fresh contract is to be entered into each season.²⁵

There was opposition to such a scheme,²⁶ but the advantages seem to have outweighed the disadvantages, and contract labour became the accepted mode of the canal's construction.

As has been previously mentioned, one of By's first tasks upon his arrival in Canada, was to select the best route for the Rideau Canal. This he did in the autumn of 1826, and in December 1826 bids for tender for work on the Rideau Canal appeared in both American and Canadian papers. These advertisements were very detailed, giving the distances and work involved, the natural materials that the contractor could expect to use, and the basis upon which

payments would be made. Those interested were told that they could obtain more details from the newspaper office or could examine the plans and specifications themselves at By's office, No. 37 St. James Street, Montreal. Other stipulations were that the work tendered for was to be completed within two years of the signing of the agreement and that two responsible securities residing in Canada, whose signatures were to appear on the tenders, were required. The date and place were always given as to where the tender was to be sent to receive the proper consideration. As a further incentive to those men who were interested but not as yet committed to such a project, an offer such as this one could at times be found alongside the bid for tender:

Memorandum: Colonel By will leave Montreal on Monday, the 7th of January next and will proceed through the line of the Rideau Canal from By-town to Kingston, which will enable any person wishing to Contract for the Part of the Works above advertised to obtain from him on the Spot any further particulars they may require. - Royal Engineer Office, Rideau Canal, 26th December, 1827.²⁷

Many seem to have taken advantage of such an offer, for By wrote Colonel Durnford in May, 1827 that he had taken "six large canoes filled with persons wishing to become

contractors"²⁸ through the proposed system.

Competition for the various jobs seems to have been keen. Rumours as to who was interested in what and what the chances were of securing a contract abounded.²⁹

Furthermore, many Americans applied for positions. It is of interest to note that the problems born of nationalism were present even at this time, for By felt that he should request permission from the authorities before Americans were considered for employment:

And being given to understand that a number of Americans are examining the Route of the proposed Rideau Canal, and anxious to form Contracts for the various Works, as I pass through the said Line, I have to request His Lordship will be pleased to sanction my giving out such portion of the Work as they are willing to take within my Estimates.³⁰

By insisted that no man should be given more work than he was capable of completing within a two-year period and thus, for the most part, the canal route was divided into ten-mile stretches. The bids for tender were duly considered by the Commissary General's department based in Montreal, and early in 1827 the first of the contracts were being drawn up. One of the first to be processed was that of Fenlon. As the procedure used was fairly standard, it is

perhaps of interest and value to note the proceedings.

I have the honor to report that this morning I was present at the opening of tenders, for the five miles excavation of the canal, extending from the 8 Locks to the north side of Dowes Great Swamp, and for the excavation of the canal from Dowes Great Swamp to the Hog's Back, a farther distance of 1200 lineal feet, and for forming an aqueduct across Peter's Gulley; also for Constructing three Locks of 10 feet lift each, and the Dam of 45 feet at the Hog's back these Works I am happy to State were all tendered for by a variety of persons; but Mr. Walder Fenton's [sic] being much under all others, his tender has been accepted for all the said works, and he is to complete them in two years from the day of signing the Contract - this is the same person who offered to build the first 8 Locks at 11-1/2d per cube foot which is the price he has given in for the masonry of the three Locks at the Hog's back.³¹

The terms of a contract between the Commissary General's department and the contractor were specific and left very little room for misunderstanding.³² In short, the contractor was fully responsible for the completion of his

work to the satisfaction of the Commanding Royal Engineer within two years from the signing date. The contractor was in complete charge of hiring and directing his own staff and if he subcontracted any part of his work, he was completely responsible for this transaction. Although this contract system certainly had its difficulties and gave By more than his share of problems, for the most part the contractors did keep their word and honour their agreements.

As far as the materials used in the canal's construction were concerned, some, such as the stone, were found at the various work sites themselves. By thought that "from the masses of Blocks of hard grey Lime Stone, Granite and sandstone," he could erect "Works both durable and ornamental."³³ Furthermore, these natural materials were placed at the disposal of the various contractors and they were informed that "they were to take the materials required for the Rideau Service from the places most convenient to the Works, with the exception of Gardens, Orchards, or improved Lands of any kind, if it could be avoided."³⁴ The other materials needed were to be supplied by the contractors themselves, but, if the need arose, tools and provisions could be issued to the contractors from the government stores "their value being deducted from the Amount of the Contracts on the completion of the several services".³⁵

There were also a couple of items required for the

canal's construction which By procured in this country, for he believed them to be superior to their English counterparts. These items were cement and iron. The cement was obtained from Philemon Wright of Hull and, as was suggested, it was mixed with clean white washed sand in the proportion of one third of sand to the quantity of cement before its use. Of its properties and value, Lieutenant Frome wrote, "the cement (Hull cement) was made from a stone quarried on the opposite side of the Ottawa, which, being burnt and ground very fine, proved a better water-cement than some obtained from the States, and far superior to the Harwich cement, which was nearly spoilt before it reached the Canal"³⁶ Financially, it was also more sensible to obtain the cement from Hull since the price per bushel of local cement was lower than that from England, and all the high costs of packaging and freight were avoided.

The second item, iron for the gates and castings, was supplied from Bell's factory near Three Rivers. The reason for this was that

Experience has shown, that the Iron of this Country is much superior to the English...my preference arises from the Metal in this Country being melted with Charcoal, and absorbing a portion of Carbon, renders it tough and more malleable than the English Iron which is melted with Sea Coal.³⁷

By entered into a contract with Bell for all the iron castings at the price of £22 10s. currency per ton, a price considered to be fair for such a superior product.

Bids for tenders for supplies also appeared in the Montreal papers and were for both construction materials and tools. The tenders were to be examined by the Commissary department and were to include the cost of transportation in their price. An example of one of these bids for tenders reads:

Government Contract. The undermentioned
Articles being required for the service of the RIDEAU
CANAL, Tenders for them will be received at this Office
until TUESDAY the 9th of SEPTEMBER next, at
NOON.

English flat IRON,	240 cwt.
do. round do.	125 cwt.
do. square do.	75 cwt.
Swedish do. do.	70 cwt.
do. flat do.	30 cwt.
Nails,	72 M.
Nails Brad,	18 M.
do. Shingle,	40 M.
Screws,	83 gross
Shovels, long handles,	150
Spades, do.	200
Bellows, large for	

Smiths with Metal Backs

and Iron 1pn. 1 pair

Particulars of the several dimensions of Iron required may be obtained at this Office. Tenders must express the rates in Sterling Money, Dollars at 4s.4d. each, and payment will be made either in Bills on the Lords of the Treasury at 1-1/2 per cent, premium, or in British Silver, at the option of the Commissariat; and two respectable Sureties will be required.

Deputy Commissary General's Office,
Montreal, 21st August, 1828.³⁸

The rest of the supplies needed came from the Commissariat and Ordnance departments. The departments, prior to By's departure, had been instructed to issue "such Camp Equipage. Rations of Provisions or other supplies as may be found indispensable."³⁹ Orders and vouchers are found for rope, linseed oil, coal gas tar, gunpowder, parchment, ink, quills, tallow, blankets, cauldrons, flour, pork and rum, as well as many other commodities. Sometimes the requisition forms were not detailed enough and confusion arose over what was actually wanted,⁴⁰ and valuable time was lost until the matter could be straightened out.

Transportation difficulties also contributed to delays and

added to the costs. Navigation on the Ottawa was still slow, since the Grenville Canal was not yet completed and the fourteen-mile portage from Point Fortune to Hawkesbury was still necessary. When supplies finally reached the site of construction, their distribution and disbursement was supervised by the Royal Engineers Department and carried out by contracted help. During the winter sleighs were used, while during the summer boats plied up and down the river. By did suggest that the government authorize a steamboat to be built, arguing that "this boat would be of great use in carrying materials during the progress of the Works, would sell well at their completion, or soon repay its expenses by acting as a Tow boat when the works are open to the trade of the country."⁴¹

This suggestion fell on deaf ears and contracted labour continued to be used. The costs of the supplies continued to remain high and increased throughout the years of construction.

By 1827, the canal's route had been determined and lands had been obtained or were under consideration, a work force had been chosen and assembled, contracts had been awarded, and the ordered supplies were beginning to arrive at the site. The canal's construction could now be undertaken in earnest.

Chapter Three

When we view the Rideau Canal today, passing through the city of Ottawa and winding its way through a cultivated and settled countryside to the city of Kingston, we tend to be lulled into the belief that conditions have changed only slightly during the past century and a half; the very real and pressing problems which beset Colonel By are very far removed from our minds. We are therefore jarred and brought back to reality by statements such as that of Sir Richard Bonnycastle's which remind us that By had "to cut his way through a country where fogs and flood, silence and shadow, had before reigned undisturbed; a country the seat of pestilential fever and ague, of watersnakes and reptiles, of mud and marshes."¹ Not only did By have to contend with these climatic and natural conditions, but man-made problems were put in his path as well and had to be solved. It is only by an examination of these difficulties that one can hope to put the construction of the Rideau Canal into its proper perspective and give its builder his due.

The first of these man-made problems was that of land acquisition. As has been stated previously, the land

required for the entrance of the canal had been procured by Lord Dalhousie on behalf of the British government several years before the actual construction of the canal was begun. However, other lands along the route of the canal had to be acquired. Sometimes individuals such as Nicholas Sparks gave lands to the government for its use, but only under certain conditions. The terms of Spark's agreement were:

I hereby authorize Lieut. Col. By commanding Royal Engineers on the Rideau Canal to take such part of my Land (being Lot C in Concession C in the Township of Nepean) gratis, as may be required for the purpose of constructing the Rideau Canal it being clearly understood that not more than 200 feet in breadth on each side of the Canal and parallel to it is to be taken, and that such parts as may not be required for His Majesty's Service shall be restored when the Canal is completed.²

Men such as Nicholas Sparks were few and far between, and most of the landowners demanded compensation for their losses. Agreements with these men were carried out under the terms of the Rideau Canal Lands Act which was passed by the Legislature of Upper Canada in 1826. Unfortunately equitable terms could not always be arrived at; complaints were lodged against By and the British government and at times litigation proceedings were commenced.

Fortunately, J. Hagerman acted as the solicitor for the government in these cases and By was spared from having to make court appearances. But the fact remained that By had to write lengthy letters defending his stand, the lands in question had to be examined and surveyed and the claims had to be studied. All this required time and acted as a deterrent in some cases to the canal's construction. Most certainly it posed problems for Colonel By.

Most of the lands bordering the Rideau Canal eventually became the property of the Ordnance department, but as late as 1831 the control of the water supply for certain parts of the canal was still in private hands.³ This made for difficulties and posed yet more problems for By.

After exciting myself with the hope of opening the Rideau Canal on 21st inst. from Bytown to Burritts and having everything ready to pass Steam Boats I find the navigation impeded by the supply of water being cut off by Mr. Merrick having dammed up the River to enable him to perform repairs to this Mill.⁴

By was incensed that this should be allowed to have happened and continued

I therefore respectfully beg to observe that if individuals are allowed to control the waters of the Rideau Canal, the great expenditure that has taken place already will be rendered of little

value; consequently it appears indispensably necessary that Mr. Merrick should be written to, on the subject and that the Law Offices of the Crown should be authorized to take such steps as will effectually prevent such interruptions in future, waiting for instructions.⁵

We have evidence that some of the higher military authorities were notified of this matter,⁶ but if By was ever given a clearly defined policy as to what action might be taken in situations such as this, no record of it has been found.

The second problem with which By had to deal was that of the contract system. The contract system as a method of the Rideau Canal's construction has already been discussed. Although it would seem that its merits far outweighed its weaknesses, the contract system posed major problems for By. A contemporary writer explained the situation in this way.

The eminent scientific characters engaged in planning the work have been dashed into it with too much precipitating [sic] [to] allow them investigating or appreciating the immense scale on which nature works on this great continent in the rise and fall of her waters. The operation men have been deceived and dragged into a situation where their skill and faithful performance of duty has no fair play; but

stands in competition with the lazy, idle and indolent....An ignorant contractor comes forward and gives in his tender...he obtains it at so low a rate as to preclude the practicality of a faithful discharge of his duty or a correct fulfillment of his contract. The honest and intelligent contractor who would have tendered for the same work is deterred from the most honourable feelings from doing so the skillful and intelligent operator is prevented from working under an employer who he knows cannot pay for his labours and leaves the place in disgust. The precipitancy of proceeding has compelled them to engage the lazy and profligate (of which there has been a plentiful store on the Rideau Canal) those indifferent to the success of the work, and equally indifferent to their own reputationsNow finding that they can no longer be retained in a state of idle indifference (for under contractors or at work by the price they must exert themselves) they are leaving the works in disgust.⁷

This indeed appeared to be the situation at many of the stations, and, needless to say, caused By worry and anxiety. Perhaps the case of W.W. Fenlon could best illustrate this

point. W.W. Fenlon had contracted to excavate the canal from the first eight locks to the Hogs Back and to build a dam and three locks at the latter site. His price was low as compared to other bidders', and his proposals were accepted. Fenlon, unfortunately, lacked the required experience and ran into financial difficulties. As he explained to By,

I find that I cannot possibly continue the work at the prices that I am at present getting according to my contract and I am the looser to a great amount on what I have already done.

My humble prayer at this time is that Govt w^d would take the job and release me from all claims on the Contract.

I trust I shall be allowed an Estimate on what I have done in preparation for carrying on the work and my losses I submit to the consideration and discretion of the Commanding Officer.⁸

His work was carefully measured by Captain Victor and Lieutenant Denison and he was released from his contract and given a most generous settlement with which, at the time, he was pleased. However, as time passed Fenlon went to Quebec City and complained to the authorities about the unfair treatment he had received; he later entered an action against By to recover £25,000. An additional problem also arose.

As his dam at the Hogs Back was so ill-constructed that the Government have been put to a very great expense in taking down and rebuilding a very considerable part of it, he cannot expect me to recommend him to the consideration of His Excellency.⁹

Unfortunately, Fenlon's was not an isolated case and throughout the canal's construction situations such as this arose. The extra costs incurred, the inadequate quality of construction and the loss of time on projects were all arguments used by some of the authorities who were beginning to question By's policy. No doubt this lack of confidence in his work upset By, but he countered these men's objection with this argument.

With regard to the policy of compelling contractors to complete the works they are not capable of executing, for want of ability or capital, I am most respectfully of opinion that were we to come on their securities to complete such works it would create a great difficulty in procuring contractors, and much higher prices would be tendered than ought to be accepted. I am therefore convinced that the liberal policy of releasing the contractors from his engagement when it is evident that he

has failed for want of experience, or that he has undertaken the work at a lower price than it can be executed for, is the best mode of securing the performance of the work at moderate prices.¹⁰

Most were persuaded, and By continued to be in command of the projects.

On a cursory examination of the problems facing By during the construction period, one tends to see each as a separate entity rather than seeing them as they truly existed, as sets, having serious implications for one another. The next series of problems - the changes made in the mode of construction, the failure of certain parts of the canal to operate satisfactorily and the illness which plagued the workers all through this period - will be discussed in this light.

As By certainly realized, it was difficult to ascertain in 1826 with any exactitude what would be required and what plans would have to be adopted to complete a canal from the Ottawa River to Kingston. Much would have to be decided upon as the work progressed and the necessary changes would have to be made then. Of this he warned his superiors. If all the alterations are examined, perhaps the two greatest modifications made to the original plans were the enlargement of the locks and the construction of waste weirs at each dam site. As far as the enlargement of the

locks was, concerned, the first intention was to have the locks built of the same size as those of the Lachine Canal, 100 feet long by 20 feet wide. After due consideration and the recommendations of a commission of enquiry, it was decided that it would be wiser and more advantageous to have them 140 feet long by 33 feet wide. This did necessitate the rebuilding of some of the locks (a subject which will be discussed more fully in Part 2, below). With respect to the causes which led to the alteration in the use of the dams and the construction of waste weirs,

It was considered, that, if allowed to serve as Waste Weirs, as well as Dams, as was first intended, they would from their perpendicular construction in front, be liable, at any height, to have their foundations washed away, and further, that their tops would also be liable to be injured by the drift wood constantly passing over them, which must be expected in great quantities for many years, particularly during the rushes in the Spring, and therefore, that it was advisable to construct a waste channel at each Dam.¹¹

The necessity of changing one's thinking and altering construction plans was brought to a head by the failure of certain sections of the canal to operate satisfactorily. Perhaps one of the best examples of this was the Hogs Back

Dam, which collapsed in April 1829.¹² A contemporary reported the incident in this way: "The great Dam at the Hogs Back has given way the centre extending about 100 feet at Bottom, and more at top, with all the Arch Key work was built by the Royal Sappers and Miners had entirely vanished."¹³ By was naturally disappointed over the failure of the dam, but he was confident of his ability to achieve the required results.

I do not entertain the least doubt of being able to establish the Dam; but that to prevent a recurrence of a similar event to that which has just taken place; it appears evident that the whole of this work must be carried to its required heights in one summer, but as the prevailing sickness renders all operations uncertain, before I recommence re-constructing the dam, I propose again exploring the wilderness to the right and left, and taking fresh Sections with the hope of finding some way by which this bold undertaking may be avoided, although from the many examinations I have already given the country, I feel there is but little hope of finding a better route for the canal at this place, in which case I shall commence reconstructing the Dam the moment the Spring floods have passed and you may rely on my using every possible exertion to complete

the works before the frost sets in.¹⁴

This he did, and finding the original location to be the best, he commenced building. The new plan called for additional height and thickness to the dam and it was to be built entirely of large stones. The new plans also called for two waste weirs on the right bank to carry off the excess water, preventing it flowing over the dam itself. In this case the factor, of accidents and the adoption of new plans are obviously interrelated.

The third facet which is an integral part of this set of problems is that of the illness which plagued the workers on the canal throughout its construction period. The illness was described as ague, lake fever and smallpox. It would appear from the records that certain areas were worse than others, the Isthmus (Newboro) being the worst of all. In addition the illness was more acute during some years than others. The year of 1828 was by far the worst in this regard,¹⁵ and Captain Savage's letter, written on 6 September 1828 to By, indicates the extent and the spread of the illness and the effects it all had on the project.

At Kingston Mills, Lieut. Briscoe Royl Engr, the asst. Overseer, the Contractor, his Clerk and 12 men have died, Lieut. Briscoe still continues extremely ill with the lake fever. At Brewer's Mills the works are entirely stopped; at Chaffey's the Contractor, Mr. Haggart is

very ill, and many of the workmen at that Station and Davis' Mills are also sick. The works at Jones' Falls are almost at a stop with the exception of a few men employed at the Quarry, the Contractor, asst. Overseer, two Clerks and nearly all the workmen are laid up with the fever and ague. At the Isthmuses [sic] the two Contractors have only four men at work, several have died and the remainder are too ill to work. Mr. Stephenson one of the Contractors is very bad with the fever himself. On this side the Rideau Lake there is much less sickness, altho' three of the Contractors are ill and also many of the workmen. The works are consequently much checked even in the two lower Districts, but some good progress has been made at many of the Stations.

From all the accounts I received the sickness appears to be decreasing, and I trust it will disappear as the weather gets cool but from its unprecedented severity this year, the works have been most materially retarded, so much so, that little progress can now be expected to be made in them this season.¹⁶

Besides retarding the canal works, the outbreak of the lake fever on such a scale forced By in some cases to draw up a

new construction schedule and to adapt his master plan. The best example of this was the work being carried out at the Isthmus. Despite By's attempt to create a free circulation of air by clearing the land on each side of the canal between Mud and Rideau lakes, the lake fever broke out regularly every summer. Needless to say, labourers were extremely difficult to procure for this site during these months, and in 1829 By was forced to carry on the works during September, October, November and December and into the first part of January. At this time he sent an officer, an overseer of works and 300 labourers to complete the task.¹⁷ He also changed the working plans for this area.

I have...increased the height of the dam and lock at Davis' Mills to lessen the excavation necessary to form a good entrance into the locks at Chaffies; and I have ordered a lock at the Isthmus, between Mud and Rideau Lakes; these two latter works enable me to raise the Upper Rideau Lake four feet above the proposed summit level and do away with the necessity of taking out the lower four feet of the cut across the Isthmus, which is about a mile and a half long. This is a great point gained; for such are the dreadful effects of the lake fever, that it is impossible to calculate the expense that would otherwise have been incurred

in removing this four feet; and I trust that these alterations will be the means of great saving in both life and money.¹⁸

The outbreak of the lake fever also had a decided psychological effect upon the canal workers. They lived in dire fear that they might be the next ones to succumb to the illness. Besides this, the fever had also caused an increase of expenses for the contractors, who were therefore only too anxious to complete their work in the shortest possible time. This created a number of financial problems for By. He was only allocated a certain sum of money per year, yet the terms of each contract stipulated that the men could demand payment as the works progressed. This was one of the major financial difficulties which beset By throughout the years.

The financial difficulties that By incurred during the Rideau Canal's construction were onerous. In general, one could state that they arose from two sources: first, a decided underestimate of the cost of building such a canal, and, second, the way in which the money was collected and allocated to the project. The intricacies and complexities of the financial system, the various interpretations of the many financial policies and statements, the arid charges and countercharges over the administration of the funds - these are all well documented. This information would, I think, be the basis of an extremely valuable study if it was

viewed as a whole. For the purpose of this paper, perhaps the best way to show the extent of the problem of finance is to cite the "Statement to the 31st March 1831. Showing the Total Amount of Works on each Section as Approved of by the Committee the Expenditure up to the 31st March 1831 and the Sum still required to complete."¹⁹

It was Colonel By's hope to have the canal completed within a four-year period. Construction was started in September 1826 but, as we have seen, many problems arose causing serious delays, and the completion date for the canal kept on being advanced. All the stations on the canal were not totally finished until 31 August 1832, but the various sections of the canal were opened for navigation upon their completion. As early as September 1830, the first 50 miles from the first eight locks were open to steamboat navigation. Only Mr. Merrick's actions prevented the canal from being navigable up to Burritt's Rapids in August 1831. Hopes were that the canal would be finished and officially opened in the early spring of 1832, and throughout the winter of 1831-32 arrangements were being made to this end. Preparations for the discharge of some of the officers of the Royal Engineers were made, and on 24 December 1831, By received the official discharge for the 7th and 15th companies of Royal Sappers and Miners.²⁰ By also attended to various administrative details among which was writing Lieutenant Colonel Glegg, the Military

Secretary, reminding him that

the time is...now approaching when His Lordship may probably think it advisable to cause to be advertised such Duties, and the mode of collecting them, as His Lordship may decide upon.²¹

The hope for a spring opening became a reality on 29 May 1832. Colonel By, accompanied by his wife and two daughters, two of his assistant officers, Robert Drummond (who was one of the major contractors on the Rideau Canal) and Surgeon Major Henry Briscoe, passed through the canal on the steamer *Pumper* [renamed *Rideau* for the occasion] from Kingston to Ottawa. The official opening was simple in all its aspects and completely devoid of all the extravaganza to which we have become accustomed, but somehow it seemed completely appropriate. Unfortunately there do not seem to be any drawings of the proceedings, but they have been described as follows:

The *Pumper* was originally a scow or float fitted with machinery which had been used for clearing the locks or coffer dams of water. She was equipped with paddle wheels for purposes of locomotion and her hold, scarcely worthy of being dignified a cabin, was divided into two compartments by a canvas screen. In the foremost compartment mattresses were spread on the floor for the accommodation of Col. By

and his family while the gentlemen who occupied the other half, slept as they could on the bare boards. Thus was accomplished, without any ceremony whatever, the first passage of the Rideau Canal. But the people of Bytown celebrated the completion of the locks at that place by a barbecue at which an ox was roasted whole and left standing in a field before being eaten and at which there was dining, wining and speech-making.²²

By was well pleased with his work, and it was with pride and pleasure that he wrote Colonel Nicholls "that on the morning of the 28 Instant Thirty-five Cribs of Timber, each containing upwards of 2000 cubic feet passed the Locks at Long Island, with the greatest facility."²³ The newspaper articles of the time also highly praised Lt. Col. By's achievement.

The Rideau Canal has been completed by the exertions and perseverance of the Officers who had charge of that great national work. The Chief advantages of this navigation, cannot be attained while the unfinished works on the River Ottawa obstruct the passage into the St. Lawrence; but with reference to the degree of improvement, - which the colony has reached, and the interests of the parent State; it must

be obvious to you who are acquainted with the districts intersected by the Rideau and adjoining Lakes, and with the avenues to internal commerce recently opened, that the expenditure incurred in thus accelerating the development of your resources, will produce in every respect a profitable return.²⁴

The canal promised to be of great use to both commercial and military interests. Moreover it had been completed within a five-year period, an assurance By had given to the Duke of Wellington before the inception of the undertaking.

The canal was now placed under the control of the Ordnance department.²⁵ Following By's recommendations as to the staff that should be hired and the maintenance and repairs to the canal that would be required, Major Bolton took charge of the administration of the canal during the next few years. It was unfortunate that By was given such little opportunity to see the canal in full operation. He was recalled to England to answer to charges of extravagance and of exceeding his authority before a Parliamentary committee which had been set up to investigate the causes for the increase in construction costs. It is of interest to note that not one word of disapproval came from the Board of Ordnance under which By carried out the work, and the evidence taken was in reality a tribute to the skill and

resourcefulness of By and his assistants. By handled his case well, but for political reasons, the Committee saw fit to include in its report an expression of regret that By had not more carefully controlled his expenditures. The honour that might have been his was never given him. Colonel By retired to his estate in Sussex a disappointed and disillusioned man and one, it would appear, who could never quite understand the reason for the criticism that he had invoked. As he wrote Col. Durnford,

The present Government throw blame on me for not waiting for the Parliamentary Grants, forgetting that it was ordered by His Grace, the Master General, and Board that I was not to wait for Parliamentary Grants but to proceed with all dispatch consistent with economy, accordingly, the contracts were formed by the Commissary-General at Montreal; by which the Engineering Department was bound to pay for the works as they proceeded, which precluded the possibility of stopping the work and thus laying the Government open for heavy damages. I was never ordered to stop the works until I was so unjustly recalled; when, thank God, they were all finished, and the Canal had been open to the Public for some months, or I should have been robbed of the honour of building the magnificent erection.

By's pride in his achievement never waned, and up until the time of his death he had a lasting interest in the affairs of the Rideau Canal. Fortunately the experience he had gained in building such a canal was not lost, for he was consulted from time to time on problems that had arisen about this waterway. It is a measure of the man that he was always willing to give freely of his time and advice in these matters.

By died on the 1st February, 1836 "after suffering from a long and painful illness brought on by his indefatigable zeal and devotion in the service of his King and Country in Upper Canada"²⁷ and he was buried in Frant, Sussex, England. Although John By's name perhaps is but little known in England, in Canada it is irrevocably linked with the Rideau Canal, a waterway in which we all take pride.

Part 2. Construction History of the Rideau Canal.

Name of Canal Section

Entrance Valley - First Eight Locks.

Interest Shown, Advertisements and Application for Contracts

1. I have just arrived in town this Evening, had an interview with Mr. Mears and Standely Bag will have proposed taking a gala[?] of the Excervation [sic] of the line of Canal from the Ottawa River to the Rideau in partnership to Gother if it meets your approbation...I wish you to try Col. By for the warf and Excavation for the locks as soon as I arrive, I will collect what information I can and will write you.

PAC, MG24, D8, Vol. 15, pp. 5406-08. Letter to Tiberius Wright from Ruggles Wright, Montreal, 5th October, 1826.

2. I have proposed the excavation of the locks...the job will amount to about five thousand pounds - wish that you would came home so that we cold git on with our affairs [sic]. I wish yo to see Col. By and gut his Opinion on the subject of the excavation.

PAC, MG24, D8, p. 5550. Letter to Ruggles Wright from Tiberius Wright, Hull, 21st Dec. 1826.

3. The most active preparations appear to be making for carrying on the works at the Rideau Canal. - We mentioned last week that notices for Contracts were given in the Montreal papers for part of these works - the following is a list of the Advertisements.

For excavating 1200 feet of the Canal.

For 744 pieces of timber from 15 to 60 feet long.

For constructing the first 8 Locks.

United Empire Loyalist, Sat. Mar. 3rd, 1827, p. 319.

4. Contracts are offered in the Montreal papers by Colonel By, for the construction of the first eight locks of the Rideau Canal, and for about 750 Tons of Timber for the works. It is stated that in the ensuing season, as many as 1000 Masons and 4000 Labourers, will be employed on the Canal.

United Empire Loyalist, Sat. Feb. 24th, 1827, p.312.

5. The Tenders for the Masonry of the said Eight Locks are to be opened on the 16th Instant.

PAC, RG8, Vol. 43, p. 212. Letter to Maj. Gen. Darling from John By, Royal Engineers Office, Rideau Canal, 12th April, 1827.

6. I take the liberty of sending Mr. MacKay to plead his own cause with Your Excellency and Colonel Durnford. His present offer is to build the eight first locks of the Rideau Canal at is/1-1/2 per foot cube, which is 1-1/2d

higher than Colonel Durnford and myself have estimated the work at, and 2d above Mr. Fenlon an American, but from the calculations I have been making with different practical men, I am inclined to think our Estimate lower than it can be executed for, and as I understand the American is an excavator, and not a mason, I respectfully recommend the accepting of Mr. MacKay's last offer of is/1-1/2d per foot cube, in preference to commencing the work with a man whose ability, I know nothing of.

PAC, RG8, C43, p. 224. Letter from John By to His Excellency the Commander of the Forces, Montreal, 20th April, 1827.

Contractors

1. dated 2nd. April, 1827: Agreement with John Pennefather for excavating the 1st 8 Lock Pits.

PAC, W055, Reel-B 2811, Vol. 865, pp. 377-80. List of Contracts for Work at the Rideau Canal accompanying Gen. Mann's Note to Mr. Byham dated 19th November, 1828.

2. References are also made to Mr. Pennefather's acceptance of this contract in these following works:

PAC, W055, Reel B-2811, Vol. 865, pp. 210-11. List of the Various Contractors on the line of the Rideau Canal.

PAC, MG29, A24, Vol. 1. History and Construction - Col. By. Founding of City of Ottawa. Ottawa by Andrew Drummond, Ottawa 1890-1893, p. 125.

PAC, MG30, H32, p. 34539. "*The Irish Settlers of Bytown and Early Ottawa.*" December, 1941. *Ottawa Past and Present*, Ross, A.D.H., p. 56-57.

1. dated 14th May, 1827: McKay and Redpath for 1st 8 Locks.

PAC, W055, Reel B 2811, Vol. 865, p. 377. List of Contracts for Work at the Rideau Canal accompanying Gen. Mann's Note to Mr. Byham dated 19th November, 1828.

2. References are also made to McKay and Redpath's acceptance of this contract in the following works:

PAC, W055, Reel B 2811, Vol. 865, pp. 210-11. List of the Various Contractors on the line of the Rideau Canal. Opus cit: Ross, A.D.H., Ottawa, Past and Present, p. 56-57.

Terms of the Various Contracts

Excerpts from McKay and Redpath's Contract for the Building of the First Eight Locks.

1. The Ashlar Stones for Side Walls of the said Eight Locks to be not less than two feet six inches long, nor less than twenty inches breadth of bed, and from nine and a half inches to sixteen inches thick - the beds to be done in the very best manner with header and stretcher alternately; - the face to be cut with good fair chisel draughts, and hammer picked between these draughts - the beds to be

levelled off the face with the levels furnished for the purpose by the Commandg R1 Engineer, Lt. Colonel By, superintending said Works, with good Chisel draughts all round and rough hammer picked between, and the front draughts to be three inches broad, the joints to be squared at least ten inches back - the hollow quoins to be three feet eight inches on the face, and two feet eight inches breadth of bed and from nine and a half inches to sixteen inches thick, done in the same manner as the Ashlar, only the beds to be square off the face, and the hollow for receiving the Heel Post of the Gate is to be as fair and clean chiseled out as possible and cut to a mould to be furnished by the said Commg Royal Engineer - The beds of the hollow quoins to be square off the face with chiseled draughts all round and hammer picked between both beaks to have the front draughts three inches broad with the joints to square back full - the inverted Arch stones to be two feet long by two feet deep, if required, and from nine and a half inches to sixteen inches in thickness - to be cut to a mould furnished by the said Comm^g R1 Engineer or his Representative in Office. One edge of the Stones to be clean chiseled - the sides to be draughted all round and hammer picked out between, with the front draughts three inches broad - the joints are to be squared full back, the whole breadth of the Stone - the Ashlar for the back of the Lock Gates etc. not to be less than two feet length of face, two feet eight inches breadth of bed and from nine and a half inches to sixteen inches thick to be cut in the same manner as the Ashlar for the side walls of the Locks, only the beds to be cut to the square, and the joints squared back at least fifteen inches. The Coping Stones for the Walls not be less than two feet six inches length of face, and two feet eight inches in breadth, to be cut the perpendicular face, the same as the Ashlar, the horizontal face or upper bed to have good draughts round and picked out between, with the front Arris rounded off, and made to a level furnished by the said Commandg R1 Engr as aforesaid, the lower beds with draughts round and hammer picked between.- The Headers are not to be less than three feet depth in bed.

PAC, MG24, 19, Vol. 21, pp. 5422-24. Extract from Messrs. Mackay and Redpath's Contract shewing the dimensions and manner of working the Stones required for the Locks of the Rideau Canal.

After the Committee had inspected the Rideau Canal site and the alterations which By suggested should be made had been adopted, a few of the locks which comprised the first section of the canal had to be dismantled. Thomas McKay applied for the contract and was awarded it.

2. We offer to clear away the Stone from the Locks now to be taken down in Entrance Valley for the Materials.

PAC, W044, Vol. 20, Reel B-1295, p.376. Also:

PAC, W044, Vol. 18, Reel B-1294, p.221.

3. Proceedings of a Committee assembled by order of Lt. Col. By, Commanding Engineer, for the purpose of taking into consideration the proposal of Messrs. McKay and Redpath to remove the masonry of the small Locks in the Entrance Valley.

...The Committee having assembled and duly considered the circumstances of the case are of opinion that the proposal of Messrs McKay and Redpath should be acceded to viz. - to remove the Masonry of the two small Locks, provided the materials are left at their disposal afterwards.

The Committee have formed their opinion in consideration that the expense of removing these Locks would be very great, and without any chance of re-embursement by sale or appropriation of the materials to any ulterior purpose.

PAC, W044, Vol. 20, Reel B-1295, p.376.

also:

PAC, W044, Vol. 18, Reel B-1294, p.221.

Supervisors

Lt. Col. John By.

Progress Made During 1826

1. Another Burrowes memorandum reads, "In the latter part of September 1826, the land of Mr. Sparks through which the canal had to be made, was in a state of nature. The Swamp, generally called the Beaver Meadow, at the head of the Entrance Valley, afforded much facility for forming the proposed works, and was selected as a proper site for a Basin, or Reservoir, at the head of the projected Eight Locks. In October, 1826, the elevations of this Swamp and other Levels required for the Works, were ascertained by Mr. John McTaggart, Clerk of Works; Mr. John Burrows, a Provincial Surveyor in the employ of Lt. Col. By; and myself as Asst. Overseer of Works."

Ross, A.D.H. op. cit., p. 59-60.

2. ...tho great exertions made by myself and Lt. Pooley it was late in September before I had ascertained the spot best adapted in every respect, for the junction of the Rideau Canal with the Ottawa River, and as the waters of that river rise at this period of the year, there was no time to advertise for contractors, but fortunately I had brought with me Mr. McKay to examine the quarries, and as he had gained much nadir in forming the Locks on the Lachine Canal, I offered him such work as required immediate performance which he undertook to do at the prices he had received for similar work on the Lachine Canal and as the work can only be executed during the time the water is low, which is in the Autumn I conceive his terms remarkably reasonable and authorized him to return to Montreal and collect Masons and Labourers, and commence work with the utmost dispatch,

knowing that every day was of the greatest consequence; by the promptitude of decision I have gained one season.

PAC, W055, Reel B-2809, Vol. 863, p. 69.

3. The works at the Rideau Canal are going on well, the Gully is cleaned of timber to the extent of Government Land, which brings me to a level of 80 feet perpendicular from the low water of the Ottawa which is the level of the Beaver Meadow; and from the rough Sections I have already made, believe it to be the general level of all the swamps from the Beaver Meadow to Capt. Wilson's, a distance of about 7 miles which will only require another nest of three Locks to raise me into the still water of the Rideau of Capt. Wilson's; from thence I have no doubt the Canal will follow very closely the line laid down by Mr. Clowes who...described the ground on the north side of the Rideau as best adapted for the Canal; I am therefore now penetrating through the swamps on that side of the river, and have no doubt in my mind that in January I shall be able to send you a sketch and sections of the first seven miles of the Canal, which rising about 100 feet above the Ottawa may be considered a great portion of the whole work, although not of great extent.

PAC, RG8, Vol. 43, p.12, 13, 14. Letter from By, Royal Engineer Office, Rideau Canal, 22 November, 1826, to Col. Durnford.

Progress Made in 1827

1. I have the satisfaction of stating that the excavation of the first 1200 lineal feet, containing the first 8 Locks in the Canal, are contracted for at Moderate prices, and to be completed by the end of August next. The Masonry for the said eight Locks is contracted for at 1/1-1/2d per cube foot and is to be completed in three years from the date of signing the contract.

PAC, W044, Vol. 19, Reel B-1294, p. 96. Letter from John By, 15th May 1827, Kingston, to His Excellency Sir P. Maitland.

the Canal Valley is now completely cleared as high up as the Beaver Meadow, and the excavation for the lower locks in progress, which, with...and the opening of several excellent quarries along its steep banks, has altered the entrance considerably.

PAC, MG24, A12, Vol. 24, Letter from Mr. Pooley, Inver-Rideau, June 10th, 1827 to the Earl of Dalhousie.

Work mentioned as being completed between 21st September 1826 and 30th June 1827.

1. For excavating 7728 cubic yards of Blue clay out of the Lock Pits in Entrance valley, and wheeling the same into the Ottawa River for the Dam. £257/12/0

For preparing 2372 cubic feet of cut stone for building the Locks. £118/13/0.

PAC, RG8, Vol. 44, p. 92i, 92k.

2. Mr. McKay (the practical mason who built the Locks in the Lachine Canal) contracts to build the masonry of the first eight locks, and to complete them in two years from the date of signing the contract, but he will be prevented finishing them in that period by the same unavoidable cause as Mr. Pennyfeather.

PAC, RG8, Vol. 44, pp. 83-4.

3. I have great pleasure in informing you of the arrival of Capt. Franklin and Dr. Richardson here last evening about six o'clock - they landed at the entrance of the Canal where we all assembled to receive them, and were fortunate enough to prevail on him to accept of our invitation to sleep and spend a day among us. ...We have this morning taken them round all the works etc. from the Bridge to Rideau Falls and shown them the Plans of the route to Kingston and explained the Nature of the Works as they are at present projected - with which they seem much pleased and Col. By has availed himself of their presence to request Capt. Franklin will perform the ceremony of laying the first stone of the Locks. PAC, MG24, A12, Vol. 25. Letter from Lt. Pooley, Rideau Canal, 16th August, 1827 to the Earl of Dalhousie.

...and on the 16th of August 1827, Sir John Franklin, the famous Arctic explorer, laid the foundation stone of the third lock with masonic honours.

Ross, A.D.H. op. cit., p. 58.

5. ...On the day subsequent to his arrival, His Lordship proceeded up the line of the Rideau Canal as far as the Hog's Back, to view the unrivalled progress which had been made in that section of this great work within the short elapse of time since its commencement; and we understand he was pleased to express himself in the highest terms of approbation of its advancement. On Saturday, by previous arrangement, it was decided that His Lordship should lay the foundation stone of the great water lock at the debouchment of the Canal. Every requisite preparation was soon made under the direction of Mr. Thomas McKay, the contractor - and the huge mass of solid stone, weighing nearly two tons, was, at ten minutes past three o'clock p.m., lowered from the sheer poles into its bed, amidst the acclamations of the surrounding multitude whom the novelty and interest of the spectacle had assembled. His Lordship, after examining if it was right, gave it the three mystic blows with the hammer, which concluded the ceremony. Among the accompaniments to this proceeding was the broaching a puncheon of rum, which was given to the workmen, and which they enjoyed with the usual glee attendant on such an event....A number of mines had been prepared in the quarries on the surrounding heights, and at the moment the stone was lowering in its beds these were discharged with the utmost precision, so as to imitate a salute from the park of artillery, but with far greater effect.

PAC, MG24, A12, Vol. 26. Newspaper Cutting. The Earl of Dalhousie Chaudiere Kettle, Oct. 3rd. 1827.

6. ...On the 29th Ultimo His Excellency honored me by laying the first stone of the outer Pier of the river Lock in the Ottawa. I have therefore the 1st, 2nd, and 3rd Locks in rapid progress the masonry of which I have the satisfaction to report has been examined by the Hon. John Richardson, and W.G. Grant, two of the Commissioners of the Lachine Canal and I am authorized by them to state that they are of opinion my masonry superior to that of the La Chine Canal the workmanship being equally good and the stones of much larger dimensions, these gentlemen were perfectly astonished when I explained to them my contract price of 1/1 - 1/2 per cube foot for this masonry; and assured me that the masonry at the La Chine Canal had cost more than three times that sum the cube foot.

PAC, W044, Vol. 19, pp. 198-199. Letter from John By, Rideau Canal, October 4th, 1827 to Gen. Mann.

also:

PAC, W044, Vol. 19, p. 67. Letter from Gother Mann, 84 Pall Mall, 15th December, 1827 to R. Byham.

Work mentioned as being in progress between the 21st September, 1826 and the 31st October, 1827.

7. Chopping and clearing 5 acres at £4"0"0" per Acre and grubbing 3 Acres at £15"15 per Acre. Completed.

Removing Boulders or rude masses of stone out of the way of excavation of Basin and Lock Pits, proposed to be placed in the same Valley 3200 Ton at £4/per Ton. In Progress.

Removing Earth to form breast work to the Coffe Dam. - In progress;

Constructing Coffe Dam at the entrance of the River Lock, pumps pump well. pumping out the water, deeping entrance to River Lock and Clearing away Coffe Dam when the works are finished. The Dam is made, the Water pumped out and the excavation and Locks commenced. The pumps are kept going night and day, this being found necessary from the Springs and running Sands at the bottom of the Excavations; Excavation of Eight Lock Pits and the Basin in the ground entrance Valley Ottawa River. In progress;

Constructing the first eight Locks of the Rideau Canal (masonry locks, wing walls etc..) In Progress;

Retaining Walls of the Bason. In Progress;

Backing of the Locks wing walls etc., In Progress; Gates for the Locks, including Iron work and all other Materials. In Progress;

Pointed Cills for the Gates of the Lock made of Oak with copper bolts. In Progress;

Sluice Gates with racks and pinions. Complete;

Captain's chains etc., for the Gates of river Lock;

Two ringing Pile Engines. Stop Gates for the first eight Locks and sheeting piles for breastworks;

Making Moulds, Bevels, Levels etc., and fixing up profiles, central posts etc., to guide the masons in the construction of the first eight Locks.

Completed.

PAC, RG8, Vol. 44, pp. 159-164. Progress Report of Works at the Rideau Canal from the 21st September 1826 to the 31st October, 1827, for His Excellency the Earl of Dalhousie.

8. Entrance Valley, Ottawa River. [Comment on the side of this reference reads: "All these Works contracted for and in progress and not one word of the Exceeding on the Original Estimate of £169,000"].

Excavation for the first 8 Locks of 10 feet lifts each - 2/3rds finished.

A Dam formed at the mouth of the first Lock in the Ottawa River, about 200 feet long and in 10 feet of water, on an average - pumps fixed and water cleared out to enable the excavations for this Lock to be carried on; - this excavation has not been quite completed, owing to heavy rains in the latter part of the Season, which caused continual labours and expense to keep the Lock Pit clear. Three Inverted Arches for foundations of first Locks nearly completed and an average of 5 feet of Sidewalls finished. ...Several extensive quarries on both banks of entrance valley and opposite side of River Ottawa have been well opened and it is presumed a very large proportion of the Cut Stone required for the first 8 Locks will be prepared this Winter. ...

PAC, W044, Vol. 19, Reel B-1294, p. 70. General Outline of the Works Performed on the Rideau Canal from the Commencement of the Service, and now in progress upon which the sum of £32,621, 13, 5-1/4 has been expended as per Abstract referred to in General Mann's Letters to the Board dated 15th December, 1827.

Progress Made During 1828

1. Section 1. First Eight Locks of 10 feet lift each contracted for by Messrs, McKay and Redpath, all the stone is quarried and the greater part required for the Locks are cut, three of the locks are commenced.

Section 1. Excavating the first 8 Locks and forming a basin between the 4th and 5th Lock, contracted for by Mr. Penneyfeather this work is nearly completed by the Frost occasions the sand and clay to cave in, which will require to be removed.

I propose employing the two companies of Royl Sappers and Miners in constructing Lock Gates, sluices, waste weirs etc., and as this will give them ample employment on the spot....

2. ...The expenditure for this season will be greater than that of last year, and on a much more extended scale. As the outlay will be principally devoted to the northern end of the Canal, now mostly finished, it will materially contribute to facilitate the construction of the works in

the more interior part of the line.

Messrs. McKay and Redpath commenced last week, the laying of the flooring of the new locks at Bytown, which, it is now finally decided, are to be 134 feet in length and 33 feet in breadth, and will enable steamboats of considerable tonnage to pass through without inconvenience;...

The Loyalist, August 7th, 1828, p. 71.

Progress Made in 1829

1. Entrance Valley: Chopping, clearing and grubbing completed; excavations about four-fifths finished; masonry of the three upper locks nearly finished; inverted arch and foundation of side walls of lower lock laid; about three-eighths of the whole masonry is built, and nearly a sufficient quantity of cut and rough stone prepared for the ensuing season; the backing and puddling behind the walls of the three upper locks are raised as high as the masonry; the gates for the locks with sluice gates etc., are in progress, as well as the iron work for ditto, about one-fourth done; pointed sills for lower lock gates completed; sheeting piles driven in the three upper breast works and lower pointed sill.

PAC, W044, Vol. 19, Reel B-1294, p. 64, No. 83. (p. 64 is the number of the original manuscript not the PAC number in the upper right corner of the page).

ABRIDGED STATEMENT of the PROGRESS OF THE WORKS OF THE RIDEAU NAVIGATION, under the superintendence of Lieutenant - Colonel By, Royal Engineers, taken 1st March 1829.

also:

PAC, RG8, Vol. 47, p. 244.

also:

PAC, W055, B2811, Vol. 866, p. 168-171.

2. I have the honor to report for the information of His Excellency, the Commander of the Forces, that every possible exertion is making to prosecute the various works (where the water has sufficiently subsided) throughout the whole line of Canal; there is, however, some complaint of wanting workmen. ...3. The Upper Lock, at the Entrance of the Rideau Canal from the Ottawa River, is very nearly completed, and in readiness to receive the Sluice Gates, and at other Stations Locks are almost in equal forwardness. ...

PAC, RG8, Vol. 48, pp. 246-247. Letter from E.M. Durnford, Commander Royal Engineers, Corps, Royal Engineers Office, By Town, Upper Canada, 25th May 1829, to Lt. Colonel Couper, Military Secretary.

also:

PAC, W055, B-2812, Vol. 866, p. 262.

3. He (Sir James Kempt) does not visit the Rideau this year, having deputed me to do so for him. ...I have seldom seen anything finer than the view of Entrance Valley, with the immense mass of Masonry which those eight magnificent locks present to the view, bounded by a very handsome stone bridge....

PAC, MG24, A12, Vol. 34. Extract from Letter, Lt. Col. Couper to Lord Dalhousie, Quebec, August 20th, 1829.

4. About the middle of August, 1830, the foundation stone of the eastern pier of the first, the lower or river lock, was laid in the presence of Lord and Lady Aylmer, and the staff, Lady Aylmer officiating, with all due ceremony....

E. Billings, "The Rideau Canal," in Transactions of the Women's Canadian Historical Society of Ottawa, Vol. II. The Waterways of Canada, Progress Made in 1830: Ottawa, 1909, The Esdale Press, p. 50.

1. There was an increase in the expense "In consequence Of the foundation turning out bad, Constructing Drains etc., PAC, RG8, Vol. 50, p. 131. Abridged Abstract Report of the State of the Works on the Line of the Rideau Canal showing Amount of Original Estimate, Sums Expended, required to complete, amount when completed, amount of additional works amount of additional work, amount saved and excess. also:

PAC, W055, B2812, Vol. 867, p. 193. Abridged Abstract Report of the Works on the Line of the Rideau Canal showing amount of Original Estimate Sums Expended and amount when Completed, March 25th, 1830.

also:

PAC, RG8, Vol. 51, p. 32. Abridged Abstract Report of the Works on the Line of the Rideau Canal shewing amount of Original Estimate Sums Expended and Amount when completed. From September 21st, 1826 to June 30th, 1830.

2. Excavations: Sandy Loam etc., This Excavation has been done at prices from 3d to 3/ per cubic yard...

From the nature of the Excavations of the Deep Cuts, a greater slope than originally provided for, had to be given to the Banks of the same, the Expense of this Service has also been considerably increased, in consequence of the Banks on each side, caving in at the same moment, on the 6th August, 1830, for a distance of 300 feet, this took place between the hours of 12 and 1 at noon, which was a fortunate circumstance, the men being then absent from work, otherwise many of them might have been severely injured, there being no indications of any description, which could possibly have led to the supposition that such an occurrence might instantaneously take place, what effect the present Winter may have upon these Slopes it is impossible to form a decided judgement, [this phrase not on reel] probable phrase is "but the weather, or by the wash occasioned by Steam Boat paddles"...I have lined the Slopes with Hemlock Logs, to a height of 8 feet from the Bottom of the Canal, which I hope will have the desired effect, the length of the cut is 1053 yards....

PAC, W044, Reel B-1294, Vol. 18, p. 223.

Progress Made in 1831

1. Detailed study of the Entrance Valley and the First Eight Lock's construction.

Works approved of by the Committee decided upon, it was impracticable without incurring a very heavy and unnecessary expense, to have a Basin as proposed in the plan of the small locks; the Committee therefore approved of Eight Locks of Ten feet lift each, being, placed in connection and that the Chamber Walls of the River Lock should be raised to such a height, as could prevent the flood water, which occasions in some seasons a rise in the Ottawa River of 24 feet, from flowing over them, and at the same time to guard against a possible diminution of water in very dry seasons; the sill of the River Lock was to be placed so as to have six feet depth of water over it, during the summer months, thus allowing one foot for fluctuations; in consequence of this arrangement, the Breast Work connecting the first and second Locks was to be 11 feet in height instead of 10 feet.

Deviations from the Plan approved of by the Committee and Extra Works:

In the original Estimate of the No. 1 small locks, it was proposed to have cut stone steps on each side of the River Lock, and that retaining Walls were to be carried from them to the natural Banks on each side of the Entrance; it was not proposed to alter this plan in consequence of the enlargement of the Locks, but it being proved that the ground was so unsound, that the Excavations for the foundations of the Stairs and Walls would have to be sunk to a greater depth and that the keeping the Same free from water whilst building the foundations, would be attended with a very heavy expense, in addition to the extra quantity of masonry required in them; I considered it indispensably necessary to alter my original design, and from the extremity of the semi-circular piers, to carry retaining Walls 4 feet in thickness, parallel to, and thirty feet distant from the Chamber Walls of the Lock, as far as the commencement of the Upper Sluices Piers forming the Banks on each side of the same into a slope towards the River, of four feet horizontal to one perpendicular.

...In order to lessen the great and heavy expense of taking out the last two feet of Excavation through the Deep Cut and Notch of the Mountain, I have increased the height of the Chamber Walls of the Upper or 8th Lock two feet, this gives 7 feet of water upon the Gates which have also two feet additional height.

In consequence of the unsound nature of the Rock at the head of the First Eight Locks, which turned out full in seams, in order to prevent the water of the Canal finding its way through the Bank, in rear of the Chamber Walls of the Locks, thereby endangering the same, I considered it indispensably necessary to extend the Wing Walls of the Upper Lock.

With respect to the puddle Wall and piling in front of the

pointed Sills, finding in the first instance that Piles could not be used with any advantage from the circumstance of the foundations being full of large Boulders, I directed their disuse accordingly, and where it was necessary to carry the Masonry in front of the Breast Work to the Invert of the Lock in connection, I did not consider the puddle wall of any Service, but rather a defect, as it broke solid masonry which from its thickness ought to retain water even if it found its way through the adjoining Invert; the puddle in front of the Sills, has therefore been done away with, in the cases above stated.

Works at First Eight Locks

...Grubbing: Provided for in the Estimates given to the Committee, and will be completed by the 30th June next.

Removing Boulders

Boulders were upon the surface of the Valley in which it was proposed to place the First Eight Locks, their removal was necessary preparatory to commencing the Excavations, and in dressing off the ground and will be completed by the 30th June next.

Increase Expense

In enlarging the Lock Pits, a greater number of Boulders had to be removed than provided for in the Estimate for the Small Locks, to which no additional sum was added to meet the alteration adopted.

Breast Works and Dam

These Works being indispensably necessary whilst constructing the River Lock, ...are completed.

Increase of Expense arose from the following circumstances which it was impossible to have foreseen at the period of forming the Estimate given to the Committee.

1st. The Floods of the Ottawa each season carried off a portion of the work forming the Breast Works and Dam which had of necessity to be replaced.

2nd. In the year 1828 the waters of the Ottawa continued so unusually high that in order not to lose the Season, the Breast Works and Dam, had to be raised and consequently the volume also increased.

3rd. It was found necessary to extend the Breast Works in order to stop the water of the River from breaking through the natural Banks into the Lock Pit, this arose in consequence of the increase in the width of the Locks as in excavating for the same, seams were met with, which it was necessary to choke if possible, in order to lessen the great expense of pumping by diminishing the leakage and the mode adopted was considered the most advisable.

Wooden Pumps, Planking and Panlling [sic] for Do? Wells for Pumps, pumping Water.

These several materials and services were intimately connected with the construction of the First Eight Locks, and indispensably necessary....

Increase of Expense: arose 1st From the number of Springs which were met with in consequence of enlarging the Locks; prior to the arrival of the Committee the Excavations for the small Locks were nearly completed and few or no Springs had been met with, it was therefore impossible to have anticipated the great increase in the expense of pumping which has unavoidably taken place; could it have been foreseen, it would necessarily have been particularly Estimated for.

2nd. The natural Banks on each side of the River Lock proved so porous on widening the Lock Pits, that although every precaution was taken to prevent the water from entering the same by wheeling earth in front of the natural Banks, the full effect desired could not permanently be obtained; often would the River water burst through in large streams requiring great exertion to master, and at one time it was feared that Mr. McKay would have been compelled, by the rapid rise of the Ottawa, and the bursting in of the banks, undermined by the pressure occasioned by a great additional head of water, to have relinquished working at the 2nd Lock, until the Autumn of 1830, which would have postponed the completion of the First Eight Locks until the Autumn of the ensuing year, but by dint of the greatest perseverance and exertion, the water was stopped and by forming a Clay Dam faced with wood across the lower end of the Invert Arch of the 2nd Lock, the First Eight Locks are now completed with the exception of pointing.

3rd. In consequence of the quantity of water, it was found necessary to erect a Horse Pump, which was the means of a great ultimate saving, for in consequence of the height of the lift, if men had been employed, they must have been in two tiers, one above the other, which would have greatly added to the expense; the Chamber Walls of the River Lock having been raised in the year 1829 above the effects of the floods and backed the water being then confined within a small space; the horse pump was not used during last year, in consequence of its being out of order, and, from the consideration that the expence of the necessary repairs consequent upon its re-erection, would more than counter-balance the advantages to be derived from it. Furthermore Mr. McKay prices did not include Contingent Expenses, men were constantly employed with hand pumps and baling in the several Locks, although every means were used to lessen this expense as much as possible by making drains, using wooden spouts to carry the water to the main well of the horse pump, and when possible into the river

Deepening Entrance required to ensure Six Feet of water over the pointed Sill of the River Lock and was provided for in the Estimate given to the Committee, and will be completed by the 31st August next.

Masonry of the Locks ... will be completed by the 30th June next.

Backing of Side Walls ... will be completed by 30th June next.

Lock Gates, Oak Sills, Sluices, Crabs and Chains, Stop Gates, Piles and Pile Engines etc....will be completed by the 30th June next. ...The workmanship, Labor, Material Purchased and carriage of the latter from Quebec, Three Rivers and Montreal to By Town and from thence to the several points required on the line of Canal, have been unavoidably so blended together that it is not practicable to state the exact cost of the Lock Gates, Sluices, Oak Sills etc. at each section, but, it is expected that the total amount provided for those services in the estimate approved of by the committee, will prove fully ample to cover all expenses attendant upon the alterations adopted, and the substituting Cast Iron Valves for Wood and Crabs and Chains for Racks and Pinions.

Removing Coffer Dam ... will be completed by the 31st Aug next.

Constructing Drains, Wells, removing loose Foundations, Excavating Extra Slope etc., ... their necessity could not have been foreseen and occurred principally in consequence of the increase in the width of the excavations of the Lock Pits; Springs, running sand, and loose soil being met with, it was necessary to overcome the difficulties these occasioned. The Drains were made not only to conduct the water arising from heavy rains, and surface Springs to the River, to prevent their flowing into the Lock pits, which would have retarded the Works and occasioned a great additional increase to the Estimate for pumping, but also in rear of the puddle of the Chamber Walls of the Locks, to carry the water from the Masonry, and by giving it vent, prevented the possibility of its working its way below the puddle and forcing itself either through the Masonry whilst green or Invert Arches. The Wells were temporary, built of rough dry Masonry, at the back of the Locks, puddled on the outside, in order to raise the water of Springs, which impeded the Masons to such height as enabled its being carried off by Spouts either to the River or the Wells made for the pumps. These services will be completed by the 30th June next.

Spouts, Scoops etc., ... their necessity could not have been foreseen; they were required to carry the water to the River or pumps Wells, in order that it might not impede the Workmen, and was considered the most economical mode which could be adopted and are completed

Substructure occasioned by Alteration of Locks. The

Excavations for the small Locks were nearly completed to the several depths required, prior to the arrival of the Committee, in consequence of the alteration in the length of the Locks, a portion of Lock Pits Nos. 7 and 8 was on too low a level for the Inverts and side Walls of those Locks, these spaces had necessarily to be built up to their respective levels....

Paving at head of Locks. ...it was considered advisable as the rush of water occasioned by the filling of the Upper Lock, might therwise have endangered the pavement immediately in front of the Upper Sill by undermining it, and is now completed.

Sloping Drywall at backing. The Excavations of the 3rd and 4th Lock Pits proving very treacherous, running sand having been unexpectedly met with, which threatened to undermine and endanger the Engineer and Commissariat Storehouses, I directed a thick dry Stone Wall in the first instance to be built with all possible despatch, as the only mode of preventing the earth in front of the Storehouses in question being thrown into the Lock Pits by the action of the frost during the Winter of 1829, and the rains of the following Spring...and is completed.

Allowances for Extra Work on Inverts, Sluices and man holes occasioned by Alteration of Locks...The general section of the Large Locks gives much less backing in proportion to the front or cut Stone, than that of the Small Locks, and the foundation of the Invert Arches, being only six or twelve Inches, it was considered but just, those an allowance should be granted for the Increase in the length and breadth of the Inverts. The Man Holes and Sluices of the Small Locks, were of much less dimensions than those provided for the Large Locks, and as the thickness of the Sluice piers of the latter was not increased in proportion, it was also considered just that an allowance should be made upon the additional Cut Stones in the Sluice and Man Holes of the Large Locks....

PAC, W044, Reel B-1295, Vol. 20, pp. 367-378. Letter from John By, Commanding Royal Engineer Office, Rideau Canal, 14th Jan. 1831 to Col. Durnford, Commanding Royal Engineer Corps.

also:

1044, Vol. 18, Reel B-1294, pp. 218-221.

2. I have the honour to report that on the 12th Inst. I again tried the first eight Locks, and have the satisfaction to state that every part of their works stood the highest pressure that can be given them.

The filling the Locks, opening the Gates and passing the Moat, occupied seven and half minutes: This I tried twice, I 'have no doubt that when the Men have more practice, a boat I will pass each Lock in seven minutes or less. ...

PAC, RG8, Vol. 441, p. 278.

Progress Made in 1832

1. The Locks at the Entrance Valley...have been completed...

PAC, Report on Canals in Canada, Mem. 3rd February, 1832, pp.- 6-7, in British Parliamentary Papers, Reports, Correspondence and Papers Relating to Canada 1825-32, Colonies Canada, Vol.

Projected Cost of the Works

Section No. 1. Entrance Bay and Canal Valley, Ottawa River. £58, 889, 4, 8.

PAC, W044, Vol. 19, Reel B-1294, p. 29. (source not on p.29]

Probable Amount of Each Section when Completed

Section 1. First Eight Locks, £70,643,,3,,9-1/2

PAC, RG8, Vol. 52, pp. 229-230.

Excerpts from Lieutenant Frome's Report

At the entrance from the Ottawa, eight locks, built on invert arches, are placed in succession, the breastwork of the river lock (allowing 7-foot water over the floor) being 11 feet high, and each of the others 10 feet. There being also 7 feet on the upper sill of the upper lock, the total lift is 81 feet from the surface of the average lowest water in the Ottawa. The soil in which the lock-pits were excavated is rather a stiff clay, mixed with a few boulders, and loose veins of sand were met with near the centre. Immediately above the locks, the canal for a short distance is cut through rock. The material of which the locks are built is a compact limestone, and was quarried on the cliffs on each side of the excavation, - Nearly the same species of stone is used for all the locks as far as the Rideau Lake...

These locks were among the first that were tried, and the water forced its way through the breastworks; in many instances, moving the large stones which formed the sills. These were afterwards secured with a number of fox-wedge bolts, 5 or 6 feet long, and heavy iron straps connecting them at the angle. A quantity of cement, of which none had- been used in building, was forced into the breasts, sides walls, and floors, in the shape of grout, by means of long tin tubes; and being allowed time to consolidate, it has rendered them nearly water-tight. This same expedient has been followed in almost all the works, particularly those which were not founded on rock, and has every where been found to answer. ...

PAC, Library, U.G.7, G72, Vol. I. *Professional Papers of the Corps of Royal Engineers*, Lieutenant Frome's Report, pp. 79-80.

Miscellaneous Information

A Description of the Canal by a Traveller:

...The Outlet of the Rideau Canal where it enters the Ottawa River has been termed in the Official Reports Entrance Valley. Here Nature has done perhaps more to form a grand scene when ended by the efforts of Art in constructing the canal than in any other scene through the whole line. Entrance valley is a deep gully which has at some distant period been the outlet a stream of waste perhaps the Rideau River which now disembagues into the Ottawa about two miles below the Banks parting the Ottawa on both sides of the valley rise high and precipitous, forming two imposing promonteries flowing as it were in terrific grandure on the Chasm below where the Canal enters. On progressing up the valley [sic] we rise by a gentle ascent for about 1300 yards till which includes a rise in that distance of about 81 feet till we reach the level or table land. This acclivity is surmounted by eight [sic] locks, placed all together [sic] and at the top of the highest lock there is a handsome stone arch thrown across the Canal which terminates the view as seen from the River. These Locks are building by Messrs McKay & Redpath and form a fine specimen of strong masonry in aspect and in fact well adapted to the strength and magnitude of the works. Owing to the rise and fall of the River Ottawa which here averages about 25 feet perpendicular between its highest and lowest water, it was necessary to build the walls of the water lock very high say 30 feet of course the guard gate requiring a corresponding height this extensive piece of art harmonising with the high capes or headlands rising abruptly on each side will present a grand scene to the eye of the painter when the Canal is in operation. Every description of building material is, found here on the spot. Two hills on each side afford excellent quarries of fine grey limestone fit for building or bring into line sand suitable for making mortar is also found on the spot even clay for puddle lies close at hand and from sides of the valley there are living springs which afford a sufficient supply of water. In every respect as far as regards the propinquity of their materials the contractors have been fortunate; with the exception of their being circumscribed in room for their operations. In this respect they have been liable to a considerable addition of expense. The stones have to be transported from the quarry to be cut and thence brought back near where they are to be used; and from the narrowness of the valley, many of them cannot be laid upon the spot hence they are liable to accident from a larger transport after being cut or to a second carriage to which many of them have to undergo. Notwithstanding the works here are in such a state of progress that they will be completed in the fall of 1830.

PAC, MG24, 19, pp. 2058-2059. Memoranda of a journey from Kingston to Bytown made along the Route of the Rideau Canal, in February, 1830.

Name of Canal Section

Head of First Eight Locks to Dow's Great Swamp.

Number of Canal Section: 1.

Interest Shown, Advertisements and Application for Contracts

1. ...they wish very much to contract with me for the excavation of the-Canall [sic] from the Ottawa to the Redo [sic] River not including TE-J locks. I told them that we wold [sic] take it at affair [sic] price on your Return. PAC, MG24, D8, Vol. 15, p. 5454, Letter from Tiberius Wright to his brother Ruggles Wright, Hull, 30th Oct. 1826.

2. Persons desirous to contract to execute the undermentioned portions of the intended Rideau Canal, in Upper Canada, are requested to send Tenders stating the terms on which they are willing to undertake the same, to this office, until noon on Friday the 4th of May next. 1st. For excavating and forming of the necessary embankments from the head of the first eight locks to the north side of Peter's Gully, being a distance of about five miles. The reates per cubic yard for earth, or clay; for rock, and for puddling to be stated....

Further specifications of the above mentioned works may be seen at the Albion Office, New York; and Plans, Sections, etc., at the office of Lieut. Col. By, No. 37, St. James St. Montreal.

The whole to be finished in a workman-like masterly manner, in the space of two years from the date of the contract.

Tools and provisions will be furnished, if required, from the Government stores, the value of which will be deducted from the total amount of the contract: and it is requested Tenders may express the number and description which may be probably required.

Two responsible securities, residing in Canada, whose signatures must appear upon the tenders, will be required for the due fulfilment of such contracts as may be entered into; and payments will be made as the respective works advance.

PAC, MG24, 19, pp. 5538-5539. Deputy Commissary General's Office, Montreal, 28th March, 1827. *The Albion* Vol. 5, No. 43, p. 343, New York, April 7th, 1827.

Contractors

1. Dated the 7th May, 1827, agreement with W. Fenton [Fenlon] for work on Section 1, the first 5 Miles of Canal. PAC, W055, B. 2811, Vol. 865, p. 210. List of the Various Contractors on the line of the Rideau Canal.

...Mr. Fenlon contracts for clearing and excavating the Canal from the first eight Locks to the north side of Dows great swamp, a distance of five miles.

PAC, RG8, Vol. 44, p. 84. Letter from John By, Rideau Canal, 6th July, 1827, to General Mann.

Section 1. Clearing and grubbing excavating and forming the Canal from Dow's Great Swamp to the 1st 8 Locks contracted for by Mr. Fenlon, this work is proceeding rapidly.

2. Mr. Henderson contracts to cut a drain from the Beaver Meadow to the Rideau River, to drain the swamps through which the Canal has to pass; this work will be completed in August next.

Mr. Henderson also contracts to form a mound of earth across Dow's great swamp being 1128 feet long and to construct the Canal on the top of the said Mound.

PAC, RG8, Vol. 44, p. 84. - Letter to General Mann from John By, Rideau Canal, 6th July, 1827.

3. Dated the 12th September, 1827, agreement with P. Wright & Sons for work on Section 1, Dow's Great Swamp.

PAC, W055, Reel B 2188, Vol. 865, p. 210. List of the Various Contractors on the line of the Rideau Canal.

Section 1. Dow's Great Swamp. Contracted for by Messrs. Philemon Wrigt and Sons, this work is a mound of earth across the swamp and it is proceedingly rapid.

I have been in search of T.W. this evening to consult your letter of last mail but not finding him I say nothing of Business only he has contracted to build the dam across the Dow's Swamp and he is now with the Engineer Department for that purpose.

PAC, MG24, D8, Vol. 19, p. 5983. Letter from Thomas Brigham dated Hull, 16th September, 1827 to Ruggles Wright Esq.,

4. Mr. St. Louis - second mound or embankment of Dow's Swamp

PAC, MG24, 19, p. 2066. Memoranda of Journey from Kingston to Bytown made along the Route of the Rideau Canal in February, 1830.

Terms of the Various Contracts

1. Mr. Fenlon's Contract in part.

Before the undersigned J.M. Monditel Esquire His Majesty's Notary for the district of Montreal and his colleague Notary Public for the province of Lower Canada both residing in the city of Montreal.

Appeared Charles John Forbes Esq., Deputy Commissary General, residing in the city of Montreal acting for and in behalf of our Sovereign Lord the King of the one part. And Walter Welsh Fenlon of Montisuma in the state of New York, Civil Engineer, of the part, which said parties have made and entered into the following agreement, to wit, the said Walter Welsh Fenlon for the several considerations herin-after mentioned hath covenanted contracted, and agreed, and by these presents doth covenant, contract, agree and undertake, bind, and oblige himself to do, execute, perform, and complete within the space of time of two years, reckoned from and after the day of the date of these presents, in a good substantial master and workmanlike

manner, the works hereoften mentioned and specified to wit...4th To excavate a part of the Rideau Canal and form the necessary embankments to the same from the Head of the first eight locks to entrance Bay on the Ottawa River to the North side of Peter's Gully being a distance of about five miles...which said works are to be done and completed within the time aforesaid, in conformity to specifications thereof arrived to those presents, signed by the said contracting parties with the said notaries, and according to plans thereof lodged in the office of the Commanding Royal Eng^f Lieut Col. By....

PAC, RG8, Vol. 48, pp. 104-105, 7th May 1827.

Progress Made during 1826.

None reported.

Progress Made during 1827.

1. Another Burrowes memorandum reads, "...the land of Mr. Sparks through which the Canal had to be made, was in a state of nature. The Swamp, generally called the Beaver Meadow, at the head of the Entrance Valley, afforded much facility for forming the proposed works, and was selected as a proper site for a Basin, or Reservoir, at the head of the projected Eight Locks. ...the elevations of this Swamp, and other Levels required for the Works, were ascertained by Mr. John McTaggart, Clerk of Works; Mr. John Burrows, a Provincial Surveyor in the employ of Lt. Col. By; and myself, as Assistant Overseer of Works. In the Spring of 1827, extensive drains were cut through a part of Mr. Sparks' land and the Ordnance Lands adjoining, for the purpose of draining said land, so as to enable us to make the necessary excavations for the Canal. These drains were subsequently enlarged and deepened; for the most part under my superintendence, up to the latter part of June 1832. While inspecting the ground near the line of division between the Ordnance Lands and those of Mr. Sparks, in March 1827, Lt. Col. By observed these trenches, and questioned me as to who cut them, etc. He then carefully examined the contours of the Land west of the proposed line of the Canal, and south of the Government Road, which he was enabled to do because of the absence of leaves on the brushwood, and observed that it formed a fine natural Glade....Of the clearing draining and fencing of this portion I have little knowledge..." ...At the east side of the Lay By, a "Bywash," consisting of a wooden lock, and waste weir, was constructed; the overflow going down Mosgrove Street, across Rideau to George Street, along George to Dalhousie Street, diagonally across to the corner of York and Cumberland Streets, along York to King Edward Avenue, and northward along King Edward Avenue (the accounting for the extra width of this area) to St. Andrew Street, and thence down a small gully into Rafting Bay, in the Rideau River. ...

From the basin at the head of the First eight Locks to what is now known as the intersection of Gladstone Avenue,

and the southward prolongation of Cumberland Street an excavation known as "The Deep Cut" had to be made.

...At the south end of the cut much water flowed down a creek entering the Rideau River at the eastern end of Somerset Street, so an earthen dam was built here to maintain the proper level. From this dam the creek was deepened for 1400 yards southward, and the excavation carried on in the same direction to the present Exhibition Grounds, where the canal turns west as far as Dow's Lake. ...

Ross, A.D.H., op. cit., p. 59-61.

2. I have the honor to report that this morning I was present at the opening of tenders, for the five miles excavation of the canal, extending from the 8 Locks to the north side of Dowes Great Swamp...these works I am happy to state were all tendered for by a variety of persons; but Mr. Walter Fenton's being much under all others, his tender has been accepted for all the said works, and he is to complete them in two years from the day of signing the contract - this is the same person who offered to build the first eight locks at 11-1/2d per cube foot which is the price he has given in for the masonry....

PAC, W055, Reel B 2810, Vol. 864, p. 162 Extract of a letter from Lt. Col. By, dated Rideau Canal Office, 4th May, 1827 to Col. Durnford, Commg R. Eng, Canada.

3. I have also to state that Tenders were accepted on the 4th Inst. at moderate prices for the first five miles of excavation of the Canal, extending from the eight locks, to the north side of Dow's Great Swamp....

PAC, W044, Vol. 19, B-1294, pp. 96-97. Letter from John By, Kingston, 15th May, 1827 to His Excellency Sir P. Maitland.

4. We shall proceed immediately to mark out the line of Canal between this place and the Hog's Back, and the Contractors are preparing to break ground -

PAC, MG24, A12, Vol. 24. Letter from Lieut. H. Pooley to the Earl of Dalhousie, Inverrideau, 10 June, 1827.

5. Excavation in great progress about 600 yards in advance of 8th Lock and at several intermediate places between this and the Hog's Back. The Mound across Dow's Great Swamp commenced.

PAC, W044, Vol. 19, p. 70.

Progress Made During 1827.

6. Chopping, burning, clearing and grubbing from the head of Entrance Valley to Dow's great Swamp. - In progress. Excavation in the above distance. - In progress.

Beaver Meadow Drains. - In Progress.

Embankments in the above distance. - In Progress.

Waste Weir at the head of Ditto from the Canal in the Beaver Meadow with small wooden Bridge for towing path. - In Progress.

To clearing 120 acres of Dow's great Swamp and forming a mound therein.

The trees on 105 acres cut down and mound commenced. - In

Progress.

PAC, RG8, Vol. 44, p. 163-166. Progress Report of Works at the Rideau Canal from the 21st September 1826 to the 31st October, 1827. For His Excellency The Earl of Dalhousie.

4. The mound over Dow's Great Swamp contracted for by Mr. Wright is rapidly approaching to completion....

The Loyalist, August 7, 1828, p. 71.

5. I have succeeded in making the mound across Dow's great Swamp, watertight; which places beyond all doubt the practicability of converting that unhealthy swamp into a fine sheet of water, and does away with the original idea of forming an aqueduct in the centre of the said mound; and a considerable saving will be made in consequence. ...

PAC, RG8, Vol. 46, pp. 132-133. Letter from John By, Royal Engineers Office, Rideau Canal, 20th November, 1828 to Lt. Col. Cowper, Military Secretary.

Progress Made During 1829.

1. Messrs. Wright and Sons are requested to stop working at Dow's Great Swamp.

PAC, MG24, D8, Vol. 33, p. 14828. Letter to Col. By, dated Hull, 27th January, 1829.

2. Excavations from first eight locks to Dow's Great Swamp. - Rock excavation, near Stone Bridge, about three-fourths finished; earth in Beaver Meadows and Deep Cut about one-fourth completed; embankment, lower end of Natural Gulley, completed; grubbing on the foregoing completed; grubbing in the Natural Gulley about two-thirds finished; excavations from upper end of Natural Gulley to Dow's Great Swamp about one-fourth finished; grubbing about three-fourths done; clearing on the whole of the foregoing nearly completed. Dow's Great Swamp, - Large mound nearly completed, say 24-25ths; site of smaller mound about half cleared.

PAC, W044, Vol. 19, Reel B-1294, p. 40, No. 83 - ABRIDGED STATEMENT of the Progress of the Works of the Rideau Navigation, under the superintendence of Lieutenant-Colonel By, Royal Engineers, taken 1st March, 1829.

also:

PAC, W044, Reel B-2811, Vol. 866, pp. 168-169. Abridged Statement of the Progress of the works of the Rideau Canal taken 1st March, 1829.

also:

PAC, RG8, Vol. 47, Abridged Statement of the Progress of the Works of the Rideau Navigation under the superintendence of Lieutenant Colonel By, Royal Engineers taken in 1st March 1829.

Progress Made During 1830

1. ...Beaver Meadow Drains, Earth: Increase of expense occasioned by meeting with a Bed of Rock not anticipated, under a strata of Gravel, but above the level required to carry off the Water from the Works, and consequently

indispensably necessary to be removed, and as it was necessary to provide against accidents which might occur at the Deep Cut, by being able to lay the Canal dry; the Rock in front of the proposed waste weir at the Beaver Meadow has also to be excavated to the proper level. The Drain in Rear of the Waste Weir, has only been excavated Ten feet wide, and Ten feet in depth, should these dimensions not be found sufficient to carry off the superabundant water of the canal, an additional expense will necessarily be incurred. In my original Plan, I have provided against this casualty, by supposing that the Water could be let off through the small Locks, but on further reflection, I conceived that the allowing so large a quantity of Water, as that which is contained between the head of the First Eight Locks and Hartwells, to the depth of five feet; to pass freely through the same, might be attended with serious injury to the Works, and therefore considered it indispensably necessary, to deviate from the original Plan, and to provide for the laying of the Canal dry, by other means.

Increase of Expense. In consequence of the Spongy nature of the Swamp, the Eastern Mound has settled considerably more than was anticipated or provided for; this settling still continues, and consequently more material will be required, the amount to complete can only thereupon be considered as the probable one, estimated.

Extra Works Dressing Slopes of Deep Cut: Dressing Slopes of Deep Cut. It was originally intended to have left the Banks in a rough state, but finding that the first had in that state a great effect upon them, I considered it indispensably necessary to dress them off, in order to prevent their crumbling into the Canal, and causing an ultimate expense, which would necessarily be incurred in clearing out the same; the necessity of this Service was not foreseen when forming the Estimate of Works given to the Committee.

PAC, W044, Vol. 18, Reel B-1294, pp. 224-225.

2. First 8 Locks to Hog's Back: In consequence of extra masonry in Breast Work from bad foundation, construction Waste Weir etc....

PAC, W055, Reel B-2812, Vol. 867, p. 193. Abridged Abstract Report of the Works on the Line of the Rideau, Canal showing amount of Original Estimate, Sums Expended and amount when Completed. March 25th, 1830.

Progress Made During 1831

Detailed study of the Canal from the First Eight Locks to Dow's Great Swamp.

1. ...The Canal from the First Eight Locks to a Swamp called the Beaver Meadow a distance of 440 yards had to be in part cut through Lime Stone, the Meadow in question which in the

direction of the Canal is 360 yards in breadth, and length from East to West 333 yards, was to be formed into a Bason, having at its North East extremity a Waste Weir and Channel, leading into the Rideau River, to provide an outlet for the Waste water of the Canal, supplied by tributary streams, or arising from rains and melting of the snow in the Spring of the Year, which must otherwise have passed through the Locks, and might have been attended with injurious results to those works.

From the Beaver Meadow to the Natural Gully a distance of 1053 yards, the Excavation was through clay and from its great depth is termed the Deep Cut; at the North Entrance of Natural Gully, a Mound of Earth or Dam of 15 feet in height and 315 feet in length was to be constructed to prevent the water escaping down a Ravine; the Gully in question [sic] is 3300 yards in length, and average breadth 83 yards, from its south entrance to the Notch of the Mountain, a break in an extensive low ridge or rise of ground, a distance of 763 yards, the excavation was ascertained to be Gravel, soft blue clay and boulders; the Canal crossing a public road at this place, a Bridge was required and provided for accordingly from the Notch of the Mountain to Dow's Swamp, a distance of 345 yards, the Excavation was similar to that last described. Dow's Swamp which extends between the Rideau and the Ottawa, a distance of 4 miles, is 473 yards in breadth, and average depth below the surface water of the Canal 26 feet; two plans were proposed for crossing the Swamp, the one by a mound aqueduct, the other, by constructing two mounds of earth at a distance of 880 yards from each other, the intervening space forming a Bason, and as the latter made was considered to be the more preferable, the Committee directed that it should be adopted, although from the nature of the foundation, it was impossible to state decidedly if the water could be retained to the required level in the Bason, or whether it might not escape by forcing its way under the Eastern Mound, but there was every reason for supposing that the Mound in question would settle, until it arrived at a hard bottom and finally became water tight.

Deviations from the Plan approved of by the Committee and Extra Works

The Line of Canal between the head of the First Eight Locks and Sappers Bridge, was subsequently altered to render the entrance to the Locks more direct; this alteration arose from the increase in the size of the Locks and had occasioned a trifling increase upon the Estimate of Rock Excavation, and its necessity was not ascertained at the period of forming the Estimate given to the Committee.

Beaver Meadow a Dam faced with Stone to serve as a Waste Weir, was provided for in the Estimate given to the

Committee, but on reflecting that if any accident occurred to that work from the effects of floods, or other unforeseen causes, the Canal would for a period be rendered useless for a distance of four miles, and that the proposed plan did not provide for laying the canal dry, which might be required in order to repair the Banks, particularly at the Deep Cut, which might again cave in, or to clear out the bottom. I considered the same defective, and that a deviation therefrom was indispensably necessary, in consequence, the Waste Weir at present in progress, is to be constructed with Gates and Sluices, which will obviate the defect above stated, and prevent the necessity of passing the water through the Locks whenever it may be requisite to lay the Canal dry, to execute repairs, and which might have occasioned great injury to the Masonry.

PAC, W044, Vol. 20, Reel B-1295, pp. 378-381. Letter from John By Commanding Royal Engineer Office, Rideau Canal, 14th Jan. 1831 to Col. Durnford, Commanding Royal Engineer Corps.

Progress Made During 1832

The Canal proceeds without interruption, in a direct line till it meets what is termed Dow's Great Swamp, at a distance of about three miles. The nature of the works in this portion of the route is an entirely simple level excavation through the sandy loam, rock or swamps that are to be met with. A natural gully is met with on this route, about 11.4 miles in length, which will save considerable excavation, as by the proposed erection of a dam of clay with side embankments, at its termination, and at the head of the gully, of other embankments, thrown up to narrow the channel, the waters will be sufficient dammed back, for the requisite depth of the Canal. The Canal is also carried through a singular break in the ridge of land, which generally averaged about 35 feet in height, and extends across the country for several miles. This place, known by the name of the "Notch of the Mountain" will also save the excavation that would otherwise have become necessary and as through it the country road from the Rideau River to the Ottawa passes, a bridge is required and will be erected over the land. A beaver meadow is also met with, which will require to be drained and embankments erected across it. A waste weir is also formed here, with an outlet to the Rideau. The estimates for these works amount to about £22,300. Beyond this the Canal crosses Dow's Great Swamp, which is 467 yards wide and will average about 30 feet in depth. Its soil is pitmoss and blue clay, and it extends from the Rideau River to the Ottawa, a distance of about 4 miles. ...The bottom of its greatest height is 45 feet above the waters in Entance Bay. ...To enable the Canal to cross this swamp, it is found necessary to form a mound of earth, over which the waters may freely run. The mound will contain 130,760 cubic feet of clayey earth, which may

chiefly be obtained from the excavations of the Canal on either side of the swamp. By this work, about 120 acres of the swamp will be cleared and drained.

PAC, MG24, A12, Vol. 38. The Montreal Herald Saturday, September 22, 1832 "Rideau Canal."

Projected Cost of the Works

Section No. 1. Works between the head of the eight Locks and Dow's Great Swamp. £15,880,,17,,0. In Dow's Great Swamp. £6474,,17,,9.

PAC, W044, Reel B-1294, Vol. 19, p. 20.

Probable Amount of Each Section when Completed

Section L. fm. first 8 Locks to Dow's Swamp £64,079"5"4-3/4

fm. Dow's Swamp to Hog's Back

PAC, RG8, Vol. 52, pp. 229-230.

Excerpts from Lieutenant Frome's Report

...Above the head of the first eight locks is a basin surrounded with an earthen embankment, from whence a channel is cut, with a pair of flood gates at its entrance, by means of which the canal may be drained. The deep cut extends in the same line as the locks, running east for three-quarters of a mile, till it enters a natural 'ravine, whose course is about north and south, the average cutting being 25 feet. The soil is a stiff clay, but which is very soluble in water, and occasioned considerable trouble and expense in excavating, having slid more than once en masse into the canal.

An embankment across the northern end of this ravine, where it meets the deep cut, retains more than the required depth of water for nearly 2 miles to the Notch of the Mountain, where the Cutting recommences, and continues, at an average depth of 20 feet, through gravel and boulders for half a mile, to Dow's Great Swamp, which, by means of two massive earthen embankments, is converted into a pool 20 feet deep.

About 700 yards more excavations through a swamp, at the average depth of 3 feet brings the Canal to Hartwell's.

PAC, Library, UG7 G72, Vol. I, *Professional Papers of the Corps of Royal Engineers* Lieutenant Frome's Report, pp. 80-81.

Miscellaneous Information

Description of the Rocks and Supplies Used in the Construction of the Rideau Canal

From Hogs Back to within a few feet of the bridge at Bytown no rock has been met with in the Excavations although they are for the most part of considerable depth in many places over 30 feet.

On the bank of the Rideau River near the former place a tenacious Clay in which large boulders of blue limestone were found was excavated to the depth of 20 to 40 feet - the sections of the clay presented a very fine row of the different layers as did also the clay excavation at the canal valley at Bytown where the first 8 locks are situated. Near the embankment at Dow's Swamp the (?) consists of a fine sand beneath which are coarse gravel and tenacious clay. - in the gravel were found numerous shells.

PAC, MG29, A24, Vol. I, pp. 5-6 (Drummond Papers). "Rideau Canal" - Geological Features of the line from the Report of Mr. Burrows Civil Engineer, 1832.

A Description of the Canal By a Traveller

After passing from the Dam at the Hog's Back the canal leaves the River Rideau and is continued by inland excavation instead of Darning and Locking till it reaches its outlet at Bytown. In its route it passes from the level of the lower locks to a place called Dow's Swamp, so named from a farmer who resided near this spot. Dow's Swamp is an extensive flat of lowland stretching across from the River Rideau to the Ottawa and so far below the level of the adjacent ground that during the high waters of the spring floods they flow across here out of the Rideau into the Ottawa. To cross this with the Canal required a considerable skill and labour. The plan adopted here and now in progress was to raise two embankments across the swamp. One of these runs parallel and adjacent to the line of the canal connecting the point where the excavation enters the swamp on the one side with the place where it emerges from it on the other. A similar embankment if made securely to retain the water might have passed parallel to this one and at a distance from it corresponding with the width of the canal. This plan however was found liable to several objections - and chiefly on the scene of expence. Instead therefore of this method, the Engineer, considered it more advisable to throw his second embankment across a considerable distance from the former and nearer the Ottawa river at a point where the high banks which bound the swamp converge nearer together. By this judicious plan the second embankment is much shortened and less expensive and when the space between these embankments is filled with water it will form a beautiful sheet of water, giving a value to the surrounding highlands which will far more than compensate for the piece of worthless swamp which will be drowned betwist the embankments. The first and most extensive of these embankments or mounds across the swamp is finished by Philemon Wright and Sons who were the contractors the second is under progress by Mr. St. Louis who has undertaken it. From Dow's Swamp the canal winds along through a tract of country of which every advantage has been taken to diminish the expense of excavation and preserve its proper level

until it reaches the grand lift of eight Locks at its entrance from the Ottawa River at Bytown.

PAC, MG24, 19, Vol. 7, pp. 2057-2058. Memoranda of a Journey from Kingston to Bytown made along the Route of the Rideau Canal, in February 1830.

Name of Canal Section

Dow's Great Swamp to Hog's Back

Number of Canal Section

Section No. 1

Interest Shown, Advertisements and Application for Contracts

1. Persons desirous to contract to execute the undermentioned portions of the intended Rideau Canal, in Upper Canada, are requested to send Tenders stating the terms on which they are willing to undertake the same, to this office, until noon on Friday the 4th of May next.... 3rd: ... also, for the excavation necessary for the ... 1200 lineal feet of Canal between the three Locks and Peter's Gully, over which a small aqueduct has to be carried.

Should the stone during the progress of excavation prove suitable for the purposes of building, the same to be carefully carried by the Contractor, and when measured will be taken from him at a fair valuation.

Further specifications of the above mentioned works may be seen at the Albion Office, New York, and Plans, Sections etc., at the office of Lieut. Col. By, No. 37, St. James St. Montreal.

The whole to be finished in a workman-like masterly manner, in the space of two years from the date of the contract.

Tools and provisions will be furnished, if required, from the Government stores, the value of which will be deducted from the total amount of the contract: and it is requested Tenders may express the number and description which may be probably required.

Two responsible securities, residing in Canada, whose signatures must appear upon the Tenders, will be required for the due fulfilment of such contracts as may be entered into; and payments will be made as the respective works advance.

PAC, MG24, 19, Vol. 21, p. 5538.

Contractors

1. I have the honor to report that this morning I was present at the opening of tenders, for ... the excavation of the canal from Doves great Swamp to the Hog's Back, a farther distance of 1200 lineal feet, and for forming an aqueduct across Peter's Gully; ... these works I am happy to state were all tendered for by a variety of persons; but Mr. Walter Fenton's being much under all

others, his tender has been accept for all the said works, and he is to complete them in two years from the day of signing the contract - this is the same person who offered to build the first 8 locks at 11-1/2 d per cube foot which is the price he has given in for the masonry of the three locks at the Hog's back.

PAC, W055, Reel B-2810, Vol. 864, p. 162. Extract of a Letter from Lieut. Colonel By. dated Rideau Canal Office, 4th May, 1827 - to Colonel Durnford, Com^g Royal Engineer, Canada.

...Mr. Fenlon's contract also embraces the excavation and forming the Canal from Dows great swamp to the Hog's Back, a distance of 1200 feet (supposed to be chiefly Rock excavation forming an aqueduct bridge 210 feet long, across Peter's Gully, excavating and constructing three Locks of 10 feet Lifts each.

PAC, RG8, Vol. 44, p. 84. Letter to General Mann from John By, Rideau Canal, 6th July, 1827.

Mefs. (sic) McKay and Redpath tendered for the Masonry of the Locks at ... Hartwells, & considering the Prices fair & reasonable, I accepted of their proposal;

PAC, W044, Reel B-1294, Vol. 18, p. 231.

Terms of the Various Contracts

1. Before the undersigned J.M. Mondeil Esquire His Majesty's notary for the district of Montreal and his colleague Notary Public for the province of Lower Canada both residing in the city of Montreal.

Appeared Charles John Forbes Esq., Deputy Commisary General, residing in the city of Montreal acting for and on behalf of our Sovereign Lord the King of the one part. And Walter Welsh Fenlon of Montisuma in the state of New York, Civil Engineer, of the other part, which said parties have made and entered into the following agreement, to wit, ... 3rdly To excavate about Twelve hundred lineal feet of Canal between the three locks above mentioned and Peter's Gully ... which said works are to be done and completed within the time aforesaid, in conformity to specifications thereof arrived to those present,

... The present contract and agreement is thus made for and consideration of the rates and prices following to, wit. ... for excavating between the three locks above mentioned in rear of the said Dam and Peter's Gully about twelve hundred lineal feet of canal one shilling and sixpence for cubic yard of rock; and five pence per cubic yard of earth or clay of the like Sterling money, for constructing and carrying over the said Gully the aqueduct above mentioned seven pence halfpenny like money for each and every cubic foot of arched Keywork, therein,

PAC, RG8, Vol. 48, pp. 104, 105, 108, 109.

Progress Made in 1827

I have also to state Tenders were accepted on the 4th inst. at moderate prices ... and for the excavation of the Canal from Doves great Swamp to the Hog's Back, a further distance of 1200 lineal feet, and for forming an aqueduct across [sic] Peter's Gully ...

PAC, W044, Reel B-1294, Vol. 19, pp. 96-97. From John By, Kingston, 15th May, 1827 to His Excellency Sir P. Maitland.

...We shall proceed immediately to mark out the line of canal between this place and the Hog's back, and the Contractors are preparing to break ground -

PAC, MG24, A12, Vol. 24, Letter from H. Pooley to the Earl of Dalhousie, Inverribeau, 10 June 1827.

3. Clearing, burning, and grubbing line of Canal from Dow's great swamp to Hog's back. In progress.

Excavation in the above distance - Aqueducts at Bugle & Peter's Gullies, Towing paths etc., In Progress.

PAC, RG8, Vol. 44, pp. 165-166. Works in Progress between the 1st July and the 31st October, 1827.

Progress Made During 1828

1. Section 1 ... The excavations for the canal, between the Hog's Back and Doves great swamp are also contracted for by Mr. Fenlon and are proceeding well. Doves Great Swamp contracted for by Mr. Philemon Wright and Sons, this work is a mound of earth across the swamp, and it is proceeding rapidly.

PAC, RG8, Vol. 45, To Gen. Mann from John By, Rideau Canal Office. 23rd Jan. 1828, p. 29. See also PAC, W055, Reel B-2810, Vol. 865, p. 148.

2. I find that I cannot possibly continue the work at the prices that I am at present getting according to my Contract and I am the loser to a great amount on what I have already done.

My humble prayer at this time, is, that Govt. will take the job and release me from all Claims on the Contract. I trust I shall be allowed an estimate on what I have done in preparation for carrying on the work, and my losses I submit to the Consideration and discretion of the Commanding Officer.

PAC, MG29, B. 6., Vol. 2, p. E20. Copy of W.W. Fenlon's Letter to Col. By, 18th June 1828. See also PAC, RG8, Vol. 48., p. 116.

3. From Dow's Great Swamp, the Canal proceeds to the Hog's Back on the Rideau altogether by clayey excavation, with the exception of an aqueduct, consisting of 6000 feet of dry masonry over what is termed Peter's Gully, and another of double the extent at Bugle Gully.

Montreal Herald, No. 81, Vol. XVII, Saturday, August 9th, 1828.

Progress Made in 1829

1. From Dows swamp to the Hog's Back: Excavation about 1/8th done. Grubbing 2/3rds done and a considerable quantity of the ashlar for the two Locks, south side of Dow's Swamp has been drawn to the spot as well as sand etc., not yet measured; clearing the land nearly completed; mounds or embankments across the mouth of Bugle and Peter's Gulleys former about 7/8th and latter 1/3 done.

PAC, W055, Reel B-2811, Vol. 866, p. 168. Abridged Statement of the progress of the works of the Rideau Canal, taken 1st March, 1829. See Also, PAC, W044, Vol. 19, Reel B-1294, pp. 40-41. See also PAC, RG8, Vol. 47, p. 244.

Progress Made in 1830

1. First Eight Locks to Hog's Back: In consequence of extra masonry required to the breastworks from bad foundation; constructing waste weirs etc.,

Hogs Back & Captain Wilsons Still Water

This excess includes the masonry required to the breastworks of the lock at Hartwells, in consequence of the nature of the Foundation. The waste weir at Hartwells, and the guard Lock which it was deemed expedient to place at the Hog's Back.

PAC, W055, Reel B-2812, Vol. 867, p. 193. See also PAC, W044, Vol. 19, Reel B-1294, p. 59. No. 121 - Abridged ABSTRACT REPORT of the Works on the Line of the Rideau Canal, amount of original Estimate, Sums Expended, and amount when Completed.

Progress Made in 1831

1. From the First Eight Locks to the Hog's Back. From Dow's Swamp to Hartwells a distance of 783 yards, the Excavation was Clay and gravel with Boulders.

Having ascertained that the distance between Dows Swamp and the Hogs Back might be considerably diminished by placing Two Locks at Hartwells, and rising 20 feet at that place, instead of carrying the Canal by the more circuitous route at first proposed, and having Three Locks of 10 feet lift each at the Hogs Back, and that the Original plan would thereby be improved, the Committee approved of the alteration; between Hartwells and the Hogs Back a distance of 1950 yards, Two Gullies/Peters & Bugle/ occur, across which the Canal was to be carried by Aqueducts.

Hogs Back: ...rendering the River navigable with the exception of the shallows near Capt. Wilson which required to be deepened, for a distance of five Miles. In consequence of placing Two Locks and rising 20 feet at Hartwells, One Lock of 10 feet lift, the Chamber Walls and Gates of which were to have 3 feet additional height, to guard against the Spring floods was to be built immediately

in connection with the Dam.

Deviations from the Plan approved of by the Committee and Extra Works

...No. 3. There has been a slight alteration in the Line of Canal from Dows Swamp to Eartwells, the necessity of which was not ascertained at the period of forming the Estimate given to the Committee, and adopted to avoid some deep cutting, which was not observed when running the original levels, owing to the extreme thickness of the Swamps and Woods; In consequence of the above alteration an Embankment has been required for a distance of 200 yards average height 7 feet.

...No. 4. The lift of the Locks at Hartwells has been increased 4 feet, to save depth of Excavation from thence to the Hogs Back, but in consequence of two feet additional depth of water being thrown up into the lower Chamber for reasons afforded, the total lift is 22 feet. The expediency of this alteration could not have been foreseen at the period of forming the Estimate givento the Committee, and which was adopted in consequence of the Excavation proving full of very large Boulders, the removal of which would have been attended with great difficulty and proved more expensive than the alteration alluded to.

...No. 5. It being ascertained that the Banks on each side of Peter's & Bugle Gullies were not sufficiently sound without sinking to a great depth and considerably extending the proposed aqueducts over the same, to afford substantial foundation whereon to build, both which modes would have been attended with great additional expense above the Estimate, / more particularly as the Stone required must have been procured from the Hogs Back, which was not foreseen at the period of forming the Estimate of those Works, as from the appearance of the ground then thickly covered with trees, it was presumed that Stone could be procured in their immediate vicinity,

...No. 11. In consequence of the alteration in the mode of carrying the Canal between Hartwells and the Hogs Back, Temporary Culverts were indispensably necessary at Peters and Bugle Gullies, in order to afford a passage for the water constantly flowing from the Gullies in question, and which would otherwise have overflowed the Excavations of the Canal during progress, thereby causing a great additional expense upon that service.

...No. 12. The necessity of lining the sides of the Clay Excavation near the Hogs Back, was not ascertained until after the Estimate given to the Committee had been forwarded, and was required to secure the bottom of the slopes from the effects of the weather and Steam Boat Paddles.

PAC, W044, Vol. 20, Reel B-1295, pp. 380-384.

2. Particulars on Hartwells Locks

Masonry of Locks at Hartwells including Waste Weir

1st. The natural soil at Hartwells consisted of stiff clay, which continued to a Depth of about Eight feet, after which the Excavation proved of soft shaking blue clay intermixed with Boulders, and full of Springs, in order therefore to obtain good and secure foundations, it was indispensably necessary to sink deeper than was originally provided for, and to Build Invert Arches, which Circumstances have occasioned a great increase in the Masonry.- In consequence of the nature of the Clay Banks between Hartwells and the Hogsback, to save Depth of Excavation, I added four Feet to the lift of the Locks, this has also occasioned an increase in the Masonry.

3rd. The Waste Weir in connection with the Locks, is built of Masonry, in order to insure its durability, this work consequently causes an increase in Masonry at this place.

4th. It was necessary to raise the chamber and Wing Walls of the Upper Lock, to the same height as the top of the Waste Weir, to prevent the possibility of the Water rising higher than the Lock Gates, and flowing through the Locks, an additional reason for increase of Masonry; all the above alterations from the original Plan approved of by the Committee, I considered indispensably necessary for the permanent security of the Works.

Backing & Puddling behind Lock Walls

Increase of Expense, in consequence of the additional height required to the Chamber Walls of the upper Lock, and from the Puddling necessary behind the masonry of the Waste Weir, for its better security, being included in the above expenditure.

Stop Gate for Lock at Hartwells

Required to do away with the necessity of laying the Canal dry between Hartwells and the Hogs Back, each time it might be necessary to execute any repairs to the Lock Gates, Sluices etc.

Gates for the Locks

Increase of Expense, arises from the additional height given to the upper Gates, to throw the surplus Canal Water over the Waste Weir, in order to prevent its flowing into the Locks.

Sluice Gates

Increase of Expense, arises from the substituting Crabs and Chains for Racks and Pinions, and Cast Iron for Wooden valves.

Bevels, Moulds etc.

In consequence of Two Locks being placed at Hartwells, approved of by the Committee, Bevels & Moulds were indispensably necessary for the construction of the same, and have invariably been supplied by the Engineer Department to the several Contractors, to insure the Execution of the several Works agreeable to Plans and Sections. In forming the Estimate of the Canal, Bevels and Moulds were specifically provided for at each section, the reason why in the present instance they formed a separate item in document K.

Timber Piles, Plank etc. for Foundation of Waste Weir at Hartwells

Indispensably necessary for the security of the Foundation of the Waste Weir, and to form an apron in the Rear of the same, to prevent the Water from washing away the soil, by allowing it to flow for a certain distance over the Apron alluded to.

Fencing Sides of Canal at Deep Cut and Notch of Mountain

The necessity of this Service was not foreseen or provided for in the Estimate of Works given to the Committee, but was included under the head of Extra Works in the probable amount of Works to Complete, forwarded to England in the Spring of 1830, there being a probability of Fencing being required to Keep Cattle from injuring the Banks of the Canal, particularly at the Deep Cut.

Although it was deemed advisable to provide for this Service, it has not yet been necessary to carry the same into Execution.

PAC, W044, Vol. 18, Reel B-1294, pp. 226-228.

3. ...On minutely examining the Lock at Hartwells tried in your presence on the 10th Inst. I found that the coping stone to which the anchor of the Gates was bolted had been moved, but that in so trifling a degree, that it was with difficulty I could pass in the blade of a pen knife. This Movement was occasioned by the swelling of the lower part of the Gates, from being constantly wet or Damp and the shrinking of the upper part of the Gates, exposed to the action of Wind & Sun which although unperceptible to the eye has caused a sufficient alteration in the Square of the Gates to throw them out of the perpendicular when the full pressure of Water is thrown on them; to prevent a recurrence of this, I have ordered the Keys of the Collars to be slackened, and a piece of Iron fixed on the Mitre posts opposite the upper Rails of the Gates, which will effectually preserve them in their perpendicular position, when the pressure of Water is on them; and consequently relieve the coping stones to which the anchors are bolted from all improper pressure.

PAC, RG8, Vol. 441, pp. 279-280. Letter to Col. Durnford dated Royal Engineer Office, Rideau Canal, 14th September,

1831 from John By.

4. ...On the 13th Inst. I passed not only through the 1st 8 Locks but the two Locks at Hartwells.

PAC, RG8, Vol. 441, p. 278. • Letter to Col. Durnford dated Royal Engineer Office, Rideau Canal, 14th September, 1831 from John By.

Projected Cost of the Work

1. From Dow's Great Swamp to the Hog's Back. £21,017,,3,,0.

PAC, W044, Vol. 19, Reel B-1294, p. 209.

Probable Cost of Each Section When Completed

From 1st 8 Locks to Dows Swamp £64,079,,9,,4-3/4

From Dows Swamp to Hogs Back

RG8, Vol. 52, p. 229.

Exerpts from Lieutenant Frome's Report

About 700 yards more excavation through a swamp, at the average depth of 3 feet, brings the canal to Hartwell's, where are two combined locks built of limestone upon invert arches, on a foundation of clay mixed with large boulders, and full of springs. Blocks of rough stone were thrown in between these boulders, and the masonry of the locks built upon them, no piles having been used. In the left wing of the upper lock a small regulating sluice is constructed, capable of emptying the canal above, if required; part of its floor, which is of wood, being 1 foot below the level of the bottom. An immense quantity of cement grout was forced into the masonry, principally of the invert arches, holes being drilled into the work at intervals, and the short end of the bent tube inserted some inches, and well seamed with clay. A large funnel was formed at the other end, and the liquid grout poured in had thus a pressure of 12 or 15 feet, according to the length of the tube.

Between this work and the Hogs Back is 1 mile of cutting, running on the slope of the left bank of the Rideau for nearly half the distance. Below the locks at both places, the steep slopes were revetted with rough stone, to prevent their being injured by the rush of water from the sluices.

PAC, Library, UG7 G72, Vol. I, *Professional Papers of the Corps of Royal Engineers*, Lieutenant Frome's Report, p. 81.

Miscellaneous Information

Description of the Strata

From Hogs back to within a few feet of the bridge at Bytown no rock has been met with in the Excavations although they are for the most part of considerable depth in many places over 30 feet.

On the bank of the Rideau River near the former place a

tenacious Clay in which large boulders of blue limestone were found was excavated to the depth of 20 to 40 feet - the sections of the clay presented a very fine row of the different layers as did also the clay excavation at the canal valley at Bytown where the first 8 locks are situated. PAC, MG29, A24, Vol. I (The Drummond Papers), K, pp. 5-6, Rideau Canal...Geological Features of the line from the Report of Mr. Burrows, Civil Engineer. 1832.

Description of the Route from an Early Traveller

After passing from the Dam at the Hog's Back the canal leaves the River Rideau and is continued by inland excavation instead of Darning and locking till it reaches its outlet at Bytown. In its route it passes from the level of the lower locks to a place called Dow's swamp so named from a farmer who resided near this spot.

PAC, MG24, 19, Vol. 7, p. 2057.

Name of Canal Section

Hog's Back

Number of Canal Section

No. 1

Interest Shown, Advertisements and Application for Contracts

1. Persons desirous to contract to execute the undermentioned portions of the intended Rideau Canal, in Upper Canada, are requested to send Tenders stating the terms on which they are willing to undertake the same, to this office, until noon on Friday the 4th of May next. ...2nd. - For constructing the second chain, or lot of Locks, three in number, to be built on the left bank, or Nepean side of the Rideau at a point called the Hogs Back, distant about six miles from the entrance Bay.

The said three Locks of 10 feet lift each, being excavated out of the solid rock, their side walls and counter forts will differ.

It being expected that excellent stone for building will be found in this part of the line of the Canal, the Contractor will in this case have to take such stone when quarried, at a fair valuation, and the amount deducted from the contract.

The whole to be tendered for at so much per cubic foot of finished masonry, but the laying of the stone to be performed by day-work, under the immediate inspection of the Engineer Department.

...3rd. For constructing a large Dam across the Rideau River at a point called the Hogs Back; also, for the excavation necessary for the formation of three Locks at the back of the said Dam, on the Nepean side of the Rideau;

Should the stone during the progress of excavation prove suitable for the purposes of building, the same to be

carefully carried by the Contractor, and when measured will be taken from him at a fair valuation.

The Dam is intended to raise the waters at the Point above mentioned 45 feet, the required level of the Canal, and is to be constructed of arched Key work, having a certain portion of pulverized stone or clay in the centre, to render it watertight.

Further specifications of the above mentioned works may be seen at the Albion Office, New York, and Plans, Sections etc., at the office of Lieut. Col. By, No. 37, St. James St., Montreal.

The whole to be finished in a workman-like masterly manner, in the space of two years from the date of the contract.

Tools and provisions will be furnished, if required, from the Government stores, the value of which will be deducted from the total amount of the contract: and it is requested Tenders may express the number and description which may be probably required.

Two responsible securities, residing in Canada, whose signatures must appear upon the tenders, will be required for the due fulfilment of such contracts as may be entered into; and payments will be made as the respective works advance.

PAC, MG24, 19, Vol. 21, p. 5538.

2. We the undersigned beg leave to forward our proposals for constructing a Dam at the Hogsback for the undermentioned prices viz.

For the 1st Section dry mason Wall measuring 1308 2/9ths yds	
	stg per yd.
at 10/ cubic. [10/stg per yd ?]	654,,0,,0.
For 2nd Section Ditto, ditto, measuring 11,018 1/6 yds at	
10/stg p. yd.	5509,,0,,0
For 3rd Section ditto ditto, measuring 2768 1/6 yds at	
10/stg per yd	1384,,0,,0
For Gravel 4317 yards at 5/stg per yd.	1079,,5,,0
For Puddling 4459 yards at 3/ stg per yd.	668,,17,,0
For Rubble 6979 1/7 yards at 1/6 stg. per yd.	523,,8,,6
For Wooden Dam 3750 yards at 5/ stg	
per yard.	937,,10,,0
For Puddling of wooden dam 750 yards at	
3/stg. per yd.	112,,10,,0
For 289 (Ggysic) 7652 Yards at 3/6	
stg. per yd.	573,,18,,0
For Guard wall of the waste (ware)	
941 1/9 at 10/ stg per yd.	470,,10,,0
For Rocks, excavation for Puddling	
198 4/9 at 10/6 stg. per yd.	<u>74,,5,,0</u>
Total Yards: 44140	11987 ,,3,,6
	<u>1844,, 3,,6</u>
	13831,, 7,,0

PAC, MG24, D.8, Vol. 33, p. 14880. To Lt. Col. By

Commanding Royal Engineer Rideau Canal dated Hull, 9th May 1829.

3. We the undersigned beg leave to forward our proposals for constructing a Dam at the Hogs back, agreeable to the Plan exhibited [sic] to you by R. Wright, and give undoubted security for the performance of the work, and Securitys to the amount of three thousand pounds that it shall stand for twenty years.

For the undermentioned prices viz.

For the 1st Section Dry Mason Wall 10/stg per yard.

For the 2nd Section Dry Mason Wall 10/stg per yard.

For the 3rd Section Dry Mason Wall 10/stg per yard.

For Gravel 5/ Sterling per yard.

For Puddling 3/ Sterling per yard.

For Rubble, Earth, Clay or Stone 1/6 per yard.

For Wooden Dam 5/Sterling pr. yard.

For Puddling Work of Wooden Dam 3/ per yard.

For Gravel wall of the Waste Ware at 10/ stg. per yard. For Rock excation (sic) for Puddling at 10/ stg per yard.

PAC, MG24, D8, Vol. 33, p. 14887. To Lt. Col. By, Commanding Royal Engineer, Rideau Canal, Hull, 15th May, 1829.

3. We the undersigned beg leave to tender our proposals for building a Dam at the Hogsback agreeable to the plan and specification exhibited to us. With the exception of the time specified for the completion of said work namely 30th October 1829 we will contract to complet [sic] the whole Dam on or before the 30th October, 1830 but not sooner at the following prices;

For the arch Key work Twenty-five shillings sterling pr. cubic yard.

For the Masonry Twenty seven shillings sterling pr. cubic yard.

For the Puddle Three shillings sterling per cubic yard.

For Rough retaining wall for the Puddle in front of Dam Ten shillings sterling pr cubic yard.

For Rubble work front of Dam and by wash channel Five Shillings sterling pr. cubic yard.

For the faithful performance of the above work we hereby offer as securities Messrs. Peter McGill Esq., of Montreal, and Thomas Mears Esq. of Hawkesbury.

PAC, MG24, D8, Vol. 33, p. 14889. To Lt. Col. By Commanding Engineer, Rideau Canal Hull, 16th May, 1829.

4. We the undersigned hereby tender our proposals to build a Dam at the Hogsback agreeable to the enclosed plan, at the following prices: -

For the Dry mason wall ... to be laid in Mass, the faces to be hammer dressed, Ten shillings Sterling pr. cubic yard. For Gravel or pounded Stone Five Shillings Stg. pr Cubic Yard.

For Clay Puddle Three Shillings stg. pr. Cubic Yard.

For Wooden Dam Five Shillings stg per Cubic Yard.

For By wash channel wall to be faced on one side with hammer dress laid in Mass, Ten Shillings Sterling per Cubic Yard. For Rock excavation in the Bottom of the River for the Puddling ten shillings Sterling per Cubic Yard.

For Rubble work of the Dam to be built with stones, clay or gravel at the option of the Contractor at One shilling and Six-pence pr Cubic Yard.

The whole work to be completed previous to the 20th of April, 1830.

For the faithful performance of the above work we hereby offer as securities Messrs. Peter McGill Esq., of Montreal and Thomas Mears Esq., of Hawkesbury; and farthermore we tender their security to the amount of £2000 Stg. that there shall be no failure in the above work for the term of 3 years after completion.

PAC, MG24, D8, Vol. 33, p. 14891.

Contractors

1. Mr. W.W. Fenlon.

"I have the honor to report that this morning I was present at the opening of tender, for ... also for Constructing three Locks of 10 feet lift each, and the Dam of 45 feet at the Hogs backs: these Works I am happy to state were all tendered for by a variety of persons; but Mr. Walter Fenton's being much under all others, his tender has been accepted for all the said works, and he is to complete them in two years from the day of signing the contract - this is the same person who offered to build the first 8 locks at 11-1/4 d per cube foot which is the price he has given in for the masonry of the three locks at the Hogs back.

PAC, W055, Reel B-2810, Vol. 864, p. 162. Extract of a Letter from Lieut. Colonel By dated Rideau Canal Office, 4th, May 1827 to Colonel Durnford, Comg Royal Engineer Canada.

Mr. Fenlon's contract also embraces ... excavating and constructing three Locks of 10 feet lifts each and forming a Dam of arched Key Work, across the Rideau River 240 feet wide, perpendicular height 45 feet, this Dam is to convert the present seven miles of shallow Rapids into a sheet of Still Water, and thereby save the expense of excavating the Canal for that distance.

PAC, RG8, Vol. 44, pp. 84-85 To General Mann from John By, Rideau Canal, 6th July, 1827.

2. It is hereby agreed between P. Wright & Sons of the first part and Asha P. Osborn of the second that the said A.P. Osborn is to devote the whole of his time and attention to the managing, overseeing and directing the work which the said P. Wright & Sons contracted for with Col. By the 24th July it being "to turn the water around the Dam at Hoggs Back and for Rock & Earth Excavation near the said Dam -.

PAC, MG24, D8, Vol. 127, p. 67571. From A.P. Osborn to P. Wright and Sons dated Rideau Canal, 25th July, 1828.

...that the Contractor for the said work (Mr. Fenlon) having failed in his undertaking, I am employing Messrs. P. Wright and Sons; ... but I beg to observe ... I am now of opinion it will require great exertion during the whole of this winter to raise the arch Key work to a sufficient height to resist the spring floods.

PAC, RG8, Vol. 46, pp. 139-140. To Lt. Col. Cowper, Military Secretary from John By, Royal Engineer Office, Rideau Canal, 30th November, 1828.

3. Mr. Garlick.

Having submitted to the Board a letter from the Commanding R1 Engineer on the Rideau Canal dated the 7th March last reporting the circumstances under which he had entered into a verbal agreement with Mr. Garlick to forward all stores and iron work (required for the Lock gates, sills, sluices etc. on the line of Canal) from the Hog's back to Black Rapids;

PAC, W055, Reel B-2814, Vol. 869, p. 104. To M. Gen. Sir A. Bryce from R. Byham, Office of Ordnance, 15th June, 1832.

4. Messrs. McKay and Redpath.

Messrs. McKay & Redpath tendered for the Masonry of the Locks at the Hogs Back ... & considering the Prices fair & reasonable, I accepted of their proposal; The Dam was executed by Day Work with the Exception of the Large Masses of Stone required, which were supplied by Agreement, the prices for which, were considerably reduced from the facility afforded by the Rail Road.

PAC, W044, Reel B-1294, Vol. 18, p. 231.

Terms of the Various Contracts

1. Mr. Fenlon's Contract in part:

Before the undersigned J.M. Mondelil Esquire His Majesty's Notary for the district of Montreal and his colleague Notary Public for the province of Lower Canada, both residing in the city of Montreal.

Appeared Charles John Forbes Esq., Deputy Commissary General, residing in the city of Montreal acting for and on behalf of our Sovereign Lord the King of the one part. And Walter Welsh Fenlon of Montisuma in the state of New York, Civil Engineer, of the other part, which said parties have made and entered into the following agreement, to wit, the said Walter Welsh Fenlon for the several considerations hereinafter mentioned hath covenanted, contracted, and agreed, and by these presents doth covenant, contract, agree, and undertake, bind and oblige himself to do, execute, perform, and complete within the space of time of two years, reckoned from and after the day of the date of these presents, in a good substantial master and workmanlike manner, the works hereafter mentioned and specified to wit, 1st to Construct a large Dam across the Rideau River, in the Province of Upper Canada, at a point called the Hogs Back, distant from Entrance Bay on the Ottawa River about 6 Miles.

2ndly To Build and form three locks at the back of the said Dam on the Nepean side of the river ... all which said works are to be done and completed within the time aforesaid in conformity to specifications thereof arrived to these present,... The Ashlar Stones for the side walls of the said locks to be not less than two feet six inches long nor less than twenty inches Breadth of bed, and from nine a half inches to sixteen inches thick, the beds to be done in the very best manner with header and Stretcher alternately. The face to be cut with good fair chissel draughts arrived and required and hammer-picked between these draughts. The beds are to be levelled off the face with bevells furnished for the purpose by the Royal Engrs, with good chissel draughts all round, and rough hammer picked between, the front draughts to be three inches Broad, the joint to be squared at least ten inches back the hollow quoins to be three feet eight inches on the face, to be two feet eight inches breadth of bed, and from nine and a half inches to sixteen inches thick, to be done in the same manner as the ashlar only the beds are to be square off the face, and the hollow for receiving the bedpost of the Gate, is to be as fair and clean chisselled out as possible, and cut to a mould to be furnished by the Royal Engineers. The beds of the hollow quoins to be square off the face with chissel draughts all round and hammer picked between both beds to have the front draughts three inches broad with the joints to square back full. The inverted arch stones to be two feet long by two feet deep if required and from nine and half inches to sixteen inches in thickness, to be cut to a mould furnished by the Royal Engineers. One edge of the stone to be clean chisselled, the sides to be draughted all round and hammer picked out between, with the front draughts three inches broad, the other edge of the stone, which is the bed on which it is to be set, is to be fair draughted all round and hammer picked between, the joints are to be square full back the whole breadth of the stone. The Ashlar for the back of the lock Gates etc not to be less than two feet length of face, two feet eight inches breadth of bed and from nine and a half inches to sixteen inches thick to be cut in the same manner as the ashlar for the side walls of the Locks only the beds to be cut to the square and the joints squared back at least fifteen inches and the face of the stone is not to be hollowed as that mentioned for those for the side walls. The coping stones for the walls not to be less than two feet six inches length of face and two feet eight inches in breadth, to be cut, the perpendicular face the same as the Ashlar, the horizontal face or upper bed to have good draughts round and picked out between, with the front arris rounded off and made to a bevel furnished by the Royal Engineers, the lower bed with draughts round, and hammer picked between. The whole of the said cut stone to be done after a most workmanlike manner, to the entire satisfaction

of the said Commanding Royal Engineer Lieut. Col. By, or other officer appointed to superintend the said works ... It is also agreed by and between the said contracting parties, that if the excavation for the said locks and line of canal aforesaid affords a good quality of stone for building the said locks, the said Walter Welsh Fenlon doth hereby agree and promise to take and use the same at a fair valuation, the amount whereof to be deducted from such monies as he shall be entitled to receive [sic] in and by virtue of the present agreement.

The present contract and agreement is thus made for and consideration of the rates and prices following to, wit. For constructing the Dam across the Rideau River aforesaid in manner as above stipulated one shilling and ten pence British Sterling money per Cubic Yard being the average price of the whole, that is to say for arched Key Work dry rubble masonry and pulverized stone; For the building and constructing the above three locks, eleven pence half penny said sterling money for each and every Cubic foot of masonry, it being hereby expressly understood and agreed, that the measurement thereof shall only be made after the same shall be built in the wall and the whole thereof to be measured cubically as aforesaid and paid accordingly;

PAC, RG8, Vol. 48, pp. 104-109.

2. Philemon Wright & Son's contract with Lt. Col. By, in part.

We the undersigned do hereby propose and offer to finish the dam at Hogs Back upon the same plan on which it is already commenced viz. by raisine [sic] courses of arch key wall Puddling and Ruble [sic] work to a heit [sic] of Eight feet above The wall already built -

To build two Locks opposite the dam on a plan similar to those now building at By Town.

To Excavate what Earth will be required to be moved south of Merdiths railway including the Lock Pitts [sic] - For the Following Prices viz.

Five shilling pr. Cubic yard for the dam including the part of the old dam that will be required to be moved. All risks of damage by the water and Expense of turning the same to be paid by the party contracting for government.

For the Locks one shilling & three pence Stirling pr. cubic Foot for the Masonry to have the entire privilege of the quarry and For the Earth one shilling pr. yard.

To be allowed the use of the Rail road cranes and Buildings erected for the use of the work and paid monthly for what they may have done in progress of the work. The work to be done under the inspection and direction of the Royal Engineers and the whole to be finished within three years.

Accepted and agreed to this first day of Nov. 1828, By and Victor.

PAC, MG24, D8, Vol. 127, pp. 67509-67510. To Lt. Col. B

Royal Engineer Commanding Rideau Canal.

3. Sub-contract entered into by Philemon Wright with A.P. Osborn.

It is hereby agreed between P. Wright and Sons of the first part and Asha P. Osborn of the second that the said A.P. Osborn is to devote the whole of his time and attention to the managing, overseeing and directing the work which the said P. Wright and Sons contracted for with Col. By the 24 July it being "to turn the water around the Dam at Hoggs Back and for Rock and Earth Excavation near the said Dam - in consideration of which the said P. Wright & Sons agree to Give him one half of the profits realized on the completion of the said job. Each party to have Equal privileges of hiring men or furnishing necessaries for the job, and in compliance each party to share equally in that.

PAC, MG24, D8, Vol. 127, p. 67571. Dated Rideau Canal, 25th July 1828 from A.P. Osborn to P. Wright and Sons.

Supervisors

1. Captain Victor and Lt. Denison, R1 Eng,

Progress Made During 1827

1. Works at Hogs Back excavating for Canals quarrying Stone for Locks & Dam, clearing land and constructing Dam. In progress.

PAC, RG8, Vol. 44, pp. 165-166. Works in Progress between 1st July and 31st October, 1827.

2. I have also to state that Tenders were accepted on the 4th Inst. at moderate prices for ... constructing three Locks of ten feet lift each, and the Dam of 45 feet at the Hogs Back.

PAC, W044, Vol. 19, Reel B-1294, pp. 96-97. To His Excellency Sir P. Maitland from John By, Kingston, 15th May 1827.

Progress Made During 1828

1. Section L. Hogs Back Rapids, three Locks of 10 feet lift each and a Dam of 45 feet high across the Rideau River contracted for by Mr. Fenlon, the Dam is about 36 feet high in most parts, and I hope will be completed to that height before the spring floods commence, the quarries at this place are good, and the work is proceeding rapidly.

865, p. 156. Also PAC, RG8, Vol. 45, p. 30. To Gen. Mann from John By, Rideau Canal Office, 23rd Jan., 1828.

2. I find that I cannot possibly continue the Work at the prices that I am at present getting according to my Contract and I am the looser to a great amount on what I have already done.

My humble prayer at this time, is, that Governmnt would take the job and release me from all claims on the Contract.

I trust I shall be allowed an Estimate on what I have done in preparation for carrying on the work, and my losses

I submit to the Consideration and discretion of the Commanding Officer.

PAC, MG29, A24, Vol. I p. E. 20. Copy W.W. Fenlon to Col. By, 18th June 1828. Also PAC, RG8, Vol. 48, p. 116.

3. - asks for a detachment for sentries to protect the Govt. Stores, - Gunpowder & Mil. Chest at Rideau Canal Office etc... as he had sent greater part of 2 Companies of Sappers Miners to Hog's Back to strengthen the dam in consequence of the sudden unexpected rise of the River. PAC, MG29, A24, Vol. 1, p. B.14. Col. By to Col. Cowper, 11 Nov. 1828. See also PAC, RG8, Vol. 46, p. 119.

4. That the Contractor for the said work (Mr. Fenlon) having failed in his undertaking, I am employing Messrs. P. Wright and Sons ... but I beg to observe ... I am now of opinion it will require great exertion during the whole of this winter to raise the arch Key work to a sufficient height to resist the spring floods; ...

PAC, RG8, Vol. 46, pp. 139-140. To Lt. Colonel Cowper, Military Secretary from John By, Royal Engineer Office, Rideau Canal, 30th Nov., 1828.

5. The Masons of the Sappers have been employed in building the Arch Key Work of the Dam.

The Carpenters in fitting up the Births etc., for the Men. The Laborers in excavating in various parts to form the Dam, and a few employed in the Lock Pit.

Month of November, 1828. Extracts from the Diary of the Hogs Back Kept by Capt. J.C. Victor Royal Engineers commencing the 24th November, 1828.

PAC, W044, Reel B. -1299, Vol. 26, p. 243.

6. Month of December - from 1st to 7th

The Civilian Masons in heightening the dry wall by the side of the Sluice Way.

The Carpenters in fitting up the Barracks and the Laborers have been excavating in various places for the Dam and a few have been employed in the Lock Pit.

From 8th to 13th

The Party employed on the Lock Pits were increased to fifty. The Masons of the Sappers (with the exception of Three at the dry wall) employed as usual at the Arch Key Work together with the Civilians.

The Sawyers in cutting Stuff for the Barracks and the Carpenters in fitting them up, such Miners as could be spared were employed in making facines to be used as occasion may require.

The Civil Laborers in excavating the Lock Pit - in filling the Carts from the Clay Bank to be deposited in the Dam.

From 15 to 20th

Mr. Lawlen Party at the Excavation of the Lock Pits increased to 66. Extracts from the Diary of the Hogs Back kept by Capt. J.C. Victor Royal Engineers commencing the 24th November, 1828.

PAC, W044, Reel B.1299, Vol. 26, p. 243.

7. I am happy to state that the Dam Hogs Back is proceeding well, but it will require great perseverance, to raise it above the spring floods, for the water has stood for the last three weeks 33 feet perpendicular above the bed of the River, I have therefore no doubt in succeeding in raising it to the required height of 45 feet, but every exertion will be required to strengthen it this winter.

PAC, W044, Vol. 18, Reel B-1294, p. 381 To Colonel Durnford, Commanding Roy^l Eng., Rideau Canal, dated Royal Engineer Office, Rideau Canal, 21st Dec. 1828.

8. The Dam at the Hog's Back, I am happy to state is proceeding rapidly; the water has stood the last three weeks at 33 feet perpendicular above the bed of the Rideau River, and I have not the least doubt of succeeding in raising it to the required height of 45 feet.

PAC, W044, Reel B217, Vol. 15, p. 170. To His Excellency, Sir J. Kempt, K.C.B. from John By, Royal Engineers Office, Rideau Canal, 22nd Dec., 1828. Also PAC, RG8, Vol. 206, Reel C-2783, p. 88-9.

9. We have completed our Job, and fulfilled our Contract for building a dam, Excavating a Snie, and turning the water at Hogsback, and that too to your acknowledged satisfaction.

PAC, MG24, D8, Vol. 33, p. 14814. To Lt. Col. By, Commanding Royal Engineer, Rideau Canal, Hull, Dec. 16th, 1828.

10. From 20th Dec. 1828 to 3 Jan 1829
The parties at the Lock Pits, employed as usual.

January 1829

PAC, W044, Reel B.1299, Vol. 26, p. 243 Extracts from the Diary of the Hogs Back kept by Capt. J.C. Victor Royal Engineer commanding the 24th November, 1828.

Progress Made During 1829

1. Month of January

From the 5th to the 10th. 8th. Civil Carpenters commenced squaring Oak Timber for stopping up the waste Channel when required.

From 12th to 17th.
Employed as usual.

From 19th to the 31st.
Commenced building a good Stone wall & abutment of Dam.

PAC, W044, Reel B.1299, Vol. 26, p. 244. Extracts from the Diary of the Hogs Back kept by Capt. J.C. Victor Royal Engineer commencing the 24th November, 1828.

2. Month of February

From 2nd February to the 7th.

Wednesday

The uprights being all fixed in the present waste Channel the first Logs were lowered down to the Cills preparatory to raising the water when required.

Friday

The second row of squared Logs were lowered down across the

waste Channel.

Corp¹ Clyma's party removed from excavating on E Side of Dam and employed in completing the Embankment in front of the Lock Pits.

From the 9th to the 14th.

Wednesday

Began to fill up the opening in the dry wall by the side of the Sluice way.

From the 16th to the 21st.

The parties employed as before.

From the 23rd to the 26th.

Employed as before.

PAC, W044, Reel B.1299, Vol. 26, p. 244. Extracts from the Diary of the Hogs Back kept by Capt. J.C. Victor Royal Engineer commencing the 24th November, 1828.

3. Works at Hog's Back. Dam 3/4 finished: water raised about 30 feet; a quantity of the ashlar and rough stone for the Locks sand etc., drawn to the spot not yet measured. Excavation for the Locks and Upper Entrance 1/3 done. Clearing of land nearly completed.

PAC, W055, Reel B2811, Vol. 866, pp. 168-169. Abridged Statement of the Progress of the Works of the Rideau Canal taken 1st March, 1829.

Also:

PAC, RG8, Vol. 47, p. 244.

Also:

W044, Vol. 19, Reel B-1294, p. 40.

Month of March From the 2nd March to the 7th.

The two upper Booms finished this week.

From the 9th to the 14th.

4. The Key Work being finished the Civilian Masons were discharged and the 7th Company removed to Head Quarters.

PAC, W044, Reel B-1299, Vol. 26, pp. 244-245. Extracts from the Diary of the Hogs Back kept by Capt. J.C. Victor Royal Engineer commencing the 24th November, 1828.

5. ...I have the satisfaction to report that on Friday I raised the Rideau River at the Hog's Back to the height of 41 feet perpendicular which is within 6 feet of the height I expect the Water will ever rise in time of floods. The arch Key Work was closed on Saturday; and the Bridge of Communication leading from the Dam to the Stone quarry, finished; I have taken the precaution of Constructing three booms at different parts of the river above the said Dam at the Hog's Back, to prevent the waste weir being choked with drift timber; and I have ordered a guard to be placed at each Boom to prevent the Rafts Men destroying them; and having made these arrangements, and the Works appearing perfectly out of danger, I leave this for Jones Falls.

PAC, RG8, Vol. 47, p. 240. Letter from John By, Royal Engineer Office, Rideau Canal, 16th March, 1829. to Col. Durnford.

Also,

PAC, W044, Reel B-1296, Vol. 20, pp. 586-587.

6. From the 16th to the 21st.

Monday

The 15th Company marched into Head Quarters.

Wednesday

Completed the Bridge.

The Miners of the 15th Company were employed in making facines to repair the roads in case of a Thaw.

From the 23rd to the 28th.

Carts employed as usual, part in raising the body of the Dam, the rest filling in the Sluice way in front of the bents.

8 of the 15 Company miners have been employed in Sinking a drain to carry the Water from the upper Lock Pits.

The Party employed last week in excavating the Drain at the bottom of the Clay bank to the first Gulley have not yet completed it.

The lower boom was made fast to two parts sunk 6 feet into the Dam, one 5 feet in rear of the other.

PAC, W044, Reel B-1299, Vol. 26, p. 245. Extracts from the Diary of the Hogs Back kept by Capt. J.C. Victor Royal Engineer commencing the 24th November, 1828.

7. ...and as his Dam at the Hog's Back was so ill constructed that the Government have been put to a very great expense in taking down and rebuilding a very considerable part of it,

PAC, W044, Reel B-1296, Vol. 20, p. 541. Letter to Jonas Jones Esq., from John By, Royal Engineers Office, Rideau Canal, 24th March 1829.

8. I have the honour to report, for the information of His Lordship the Master General and Right honourable and Honourable Board, that on Friday morning, 3rd instant, the dam at the Hog's Back gave way, and in a few minutes about one-third of it was destroyed; fortunately no lives were lost, nor any damage done to the surrounding country.

This dam was nearly completed, and the water raised within four feet of the required height, which proves the practicability of the plan, and the correctness of our levels, as the water levels perfectly agreed with those taken by the instrument.

The way I account for the accident is this: the contractor having given up the work in November last, it became indispensably necessary to make every exertion to complete the dam before the spring floods commenced, it being the only chance of saving that part of the work which the contractor had performed; I therefore moved up to this work at the Hog's Back, such of the two companies of the Royal Sappers and Miners as could be spared, leaving a sufficient number to furnish guards for the magazines and military chest, and ordered that two officers should constantly be on duty at this work: from that period, Captain Victor, Royal Engineers, who had charge of the work,

has scarcely been a day absent, and great praise is due to him and to the other officers, for their unremitting attention during the whole of this severe winter; and I have the satisfaction to state, that every exertion was made to accomplish the desired object of finishing the dam, but the severe frosts formed the earth above water into a solid mass, and when the spring floods came, the pressure of the water separated that which was not frozen from the congealed mass above, and caused a great leakage on the 28th March, which continued to increase, notwithstanding every exertion was made to stop it, until ten o'clock on the 3rd of April, when the arch key-work, 26 feet thick at the base, gave way about 15 feet above the foundation, and near the centre of the dam, with a noise resembling thunder. I was standing on it with forty men, employed in attempting to stop the leak, when I felt a motion like an earthquake, and instantly ordered the men to run, the stones falling from under my feet as I moved off.

The loss of work and materials, tools, etc., I estimate at between three and four thousand pounds.

Notwithstanding the present failure of this work, I beg leave to assure his Lordship the Master General and Right honourable and Honourable Board, that I do not entertain the least doubt of being able to establish the dam, but that to prevent a recurrence of a similar event to that which has just taken place, it appears evident that the whole of this work must be carried to its required height in one summer; but as the prevailing sickness renders all operations uncertain, before I commence reconstructing the dam, I propose again exploring the wilderness to the right and left, and taking fresh sections, with the hope of finding some way by which this bold undertaking may be avoided, although from the many examinations I have already given the country, I fear there is but little hope of finding a better route for the Canal at this place, in which case I shall commence re-constructing the dam the moment the spring floods have passed, and you may rely on my using every possible exertion to complete the work before the frost sets in.

PAC, W044, Vol. 19, Reel B-1294, p. 37. No. 72. Letter from Lieut. Colonel John By to General Mann, Royal Engineer's Office, Rideau Canal, 4th April, 1829.

Also.

W044, Reel B-1296, Vol. 20, pp. 608-610. Copies of this letter were also sent from Lt. Col. John By to Lieut. Gen. Sir James Kempt who in turn sent it to Rt. Hon. Sir George Murray, to R.W. Hay Esq., to R. Byham. (see Ref. W044, Vol. 19, Reel B-1294, p. 36. Letters. No. 70 and 71.)

9. The great Dam at the Hogsback has given way the centre extending about 100 feet at Bottom, and more at top, with all the Arch Key work was built by the Royal Sappers & Miners which [sic] has entirely vanished. The only part of

it which remains, is that built by us which stands well and in consequence of which the colonel wishes us to take the whole job into our hands and finish it.

PAC, MG24, D8, Vol. 33, p. 14857. Letter from C.C. Wright to Horatio Gates & Co., Hull, 6th April, 1829.

10. ...I beg to state, for the information of His Excellency Sir James Kempt, that the failure of the dam is to be accounted for as follows: the Rideau River has been raised about 22 feet by the contractor, when he gave up the work in November last, and it was evident, that unless the water could be rendered passive, by its being raised above the Three Island Rapids, the rapidity of the current would carry all away in the spring, to prevent which I caused every exertion to be made, and the desired object was obtained, for we raised the water 41 or 42 feet perpendicular, and the Three Island Rapids were destroyed; our surface water extending on an uninterrupted level to the Black Rapids, the water, as also the ice, became passive; I constructed three booms at different parts of the river to hold back the said ice until it sunk or was dissolved, and I flatter myself our labours were completed, when unfortunately an extensive leak made its appearance and rapidly increased, notwithstanding every exertion was made to stop it. It appears that the earth became one frozen mass from the surface water level of November last to the top of the dam, which is 43 feet above the said level; the dam being upwards of 60 feet high at the time of the accident; 45 feet is the required height, but I added 15 or 17 feet to the height, to give it greater strength, and made the base 200 feet thick.

You will perceive by the accompanying Section, that this whole mass of earth above the surface water level was 22 feet in November last, became one frozen mass, resting on the rocks on each side of the river, 180 feet apart; and such was the strength of this frozen mass of earth, that it remained perfect for some time after the torrent had swept all from under it, until the spray, rising with great force, striking the under part, gradually thawed it, and caused it to fall in large flakes, until it became so thin that its own weight broke it. The force of the water was such, that stones of two or three tons weight were tossed about as if they had been blocks of wood, and the frozen earth was carried over the Rideau Falls, a distance of between five and six miles; but as the frozen earth rested on the side rocks, and did not settle with the earth below, which was considerably compressed by the pressure of the water when raised to its height, the water found a passage between the frozen earth and that which was not frozen; but as the puddle behind the arch key work prevented the water from passing through the key work, this passage was not discovered until a sudden rise of the river on the 28th March, when the pressure became more than the unprotected

puddle could resist, and it was washed through the arch key work, from the height of 15 feet to the bottom; but this did not in the least affect the arch key work therefore I believed it possible to save the dam, and made every exertion, notwithstanding which the leak increased until about ten o'clock in the morning of the 3rd inst. when the water forced its way through the upper part of the puddle at the back of the arch key-work, and began to flow over the top without carrying off any of the coping stones. I then conceived that as the water had found a free passage all was safe; and said to Mr. Sargeant, the barrack master, who stood on the arch key work near me, "You see what perseverance will do, the dam is saved." At which moment I felt it tremble, and instantly ordered the men to run. I stood and looked at it for a few seconds, when the stones fell from under my feet as I ran off. It appeared to give way in the centre of the dam, about 17 feet from the base, and in the strongest part. The cause of the failure being thus evident, there is no doubt of its ultimate success; but as the period for working at it is only from July to the end of November, great exertions are requisite, during the whole period, to insure its completion.

I therefore propose forming it with timber, filled with rough stone, this season, and leaving the arch key work to be carried up at any future period; feeling convinced that if the work is well conducted during the summer, it must succeed, I therefore hope his Excellency will allow me a detachment of thirty men of the line, to furnish the necessary guards, as the guard duty prevents the non-commissioned officers of the Sapper being of so much use to me as they otherwise would be, and there are no persons I can hire, who are of equal value to them, and much depends upon every part of the dam being well executed.

PAC, W044, Vol. 19, Reel B-1294, pp. 37-38. No. 75. REPORT on the Failure of the Dam at Hog's Back on the Rideau Canal. Lieut.-Colonel By to Lieut.-Colonel Cowper Royal Engineer Office, Rideau Canal, 23rd April, 1829. Also, W044, Reel B-1296, Vol. 20 pp., 558-560. Also RG8, Vol. 48, pp. 74-77.

11. 9th May, 1829. Specification for the Dam and work connected therewith at Hogs Back on Line of Rideau Canal - Lt. Colonel By, Com^d. Royal Engineer.

Dam: - The Dam to be constructed in conformity to the accompanying Plan elevation and section and to be situated contiguous to the former Dam as to be particularly pointed out on the Ground.

Arch Kd Wk: - To consist of Arched Key work placed in Gothic form a bed of clay ponding and Rubble work faced with rough arched Keyd work. The Gothic Arched Keyd Work to be 46 feet in height at the Centre and for the Extent shown on the elevation. To have three substantial hammer dressed piers 12 feet breadth of face by thickness of the wall which shall be 21 feet at the foundation at 46 feet from top and latter

upwards to 6 feet at the coping the latter to be radiated on straight as shall be found most adviseable the piers to be carried up flush with face of arched Keyd work to be faced with cut stone not less than 3.6 of face, no course to be less than 18 inches deep with proportional breadth of bed viz. - a half more than thickness of course. To be laid two headers at each alternate course at the corners and the intermediate course one header in the centre, no header to be less than 3 feet deep nor joint be less than 9 inches.

The remaining part of the pier to be substantial hammer dressed coursed work in 2 Courses to each Course of face ashlar. Each course to be levelled off and thoroughly grouted with hot lime. The back corners to be built of rough blocks hammer dressed corresponding in height of course with front ashlar and of similar dimensions, the whole to be covered with a coping from 16 to 18 inches in thickness at the face but increasing backwards to bring the Top of wall to the level as in first 8 Locks. Each alternate coping stone to be of such dimensions as cover the wall viz. 6 feet and all intermediates to be 2 Stones. To be of such breaths [sic] as the quarry will conveniently turn out providing they be not less than the regular proportion of bed to thickness of course as already described.

Arched Keyd work to be done with stones hammer dressed in the face and made fair in the beds (if not naturally so) to be laid at right angle to the latter to be placed on edge with natural bed be perpendicular no stone to be less (saving the pinnings) than 4 feet in length and as much larger as the quarry will produce.

Each course to be properly hand set as close together as possible previous to wedging up between the piers, each stone to be placed perfectly perpendicular in the sides in order to prevent any vacancy below, the whole at the completion of each course to be tightly wedged and pinned up with stone pinnings driven in by a sledge hammer; to be run up with grout made of hot lime and the rougest sand or small gravel which can be got, having previously secured the beds and joints with moss or fog in which each stone must be set leaving a bed of same of six inches in breadth.

Care must be taken that each course of arched Key work shall break hand with the Pillar joints at least 9 inches.

The Back of Archd Keyd work to be carried up perpendicular and stones to be hammer dressed so as to form a regular wall face to recieve the clay punding.

The upper Stream side of Dam to consist of rough rubble Masses of Stone such as the quarry will produce to be thrown in promiscuously with rubble of smaller dimensions or Gravel as shall be required by the superintending Officer.

The rubble work to be faced up with rough archd Keyd Mork of the heaviest Material hammer dressed in the ends so as to form a wall face at 10 feet from back of front work,

to be formed to radius as shewn on the plan.

This rough wall or arch must be carried up along with the rubble work at least so soon as the water can be sufficiently stopped to allow the foundation to be got in and the bed of the River to be cleared from loose shelving rock in order that the wall be founded as equally as possible, the ends of said arch to be run into the present Dam so far as shall be pointed out by the Officer in charge.

The Bed of the river under the punding to be excavated until the rock shall be deemed sufficiently sound to recieve [sic] the punding. The clay to put in perfectly dry or as it may turn out from the heap in layers not exceeding 2 inches thick to be properly rammed or beat down with rammers, taking care that one course be properly consolidated before throwing on more fresh stuff. The punding to be carried round into By wash as shewn on the plan.

Foundation for Gothic Arch^d Key^d Work to be taken out to such a depth and breadth and be stepped up in such manner as the Officer superintending shall deem requisite, the foundation being made perpendicular to face of arch.

The Contractor may use such materials of the old Dam as shall be judged by the superintending Officer to be consistent with the safety of the works but to pay for the same.

In the event of any alteration being deemed requisite from the plan and specification, all adjustment of difference to be left to the decision of the Commg Royal Engineer.

The whole to be completed in conformity to the foregoing Specification and to the satisfaction of the Commanding Royal Engineer by the 30th day of October 1829 to the height of 40 feet above the Bed of the River.

PAC, MG24, D8, Vol. 127, pp. 67519-67522. 9th May, 1829. Specification for the Dam and work connected therewith at Hogs Back on line of Rideau Canal - Lt. Colonel By, Comm^s Royal Engineer.

12. Month of May

18th. commenced to excavate for the new waste Channel. Men. "employed in forming a floating Bridge of Booms laid across the River during the last winter, cutting and drawing Timber and laying down a rail road from the Quarry to the Dam, blasting and burning the Stumps on the line of Canal and excavating for the new waste weir."

PAC, W044, Reel B-1299, Vol. 26, p. 246. Extracts from the Diary of the Hogs Back kept by Capⁿ: J.C. Victor Royal Engineers commencing the first of May 1829.

13. On your departure yesterday morning I visited the Hog's Back with Captain Victor, & commenced clearing the foundations for my regulating sluice, and trust in a month to have them in sufficient state of forwardness to enable me to send you a Plan and Sections of the Proposed Work. ...

PAC, RG8, Vol. 48, pp. 288-289. To Col. Durnford from John By, Royal Engineer Office, Rideau Canal, 28th May, 1829.

14. Month of June

Employed in cutting and drawing Timber, laying down a rail road from the quarry to the Dam, blasting and burning the Stumps and roots from the line of Canal and excavating for the Waste Channel.

PAC, W044, Reel B-1299, Vol. 26, p. 246. Extracts from the Diary of the Hogs Back kept by Captn. J.C. Victor Royal Engineers commencing the first day of May, 1829.

15. July.

Employed as usual at the rail road etc.

PAC, W044, Reel B-1299, Vol. 26, p. 246. Extracts from the Diary of the Hogs Back kept by Captn. J.C. Victor Royal Engineers commencing the first of May, 1829.

16. August.

Oxen employed at the Rail road and in drawing large Stumps and roots from the line of Canal & Plank to the Dam. 7th Corps 97 Laborers employed at the lower Lock at Hartwells in getting out the foundation for the Masons. (Men) Employed in finishing the Rail Road sawing Timber and Plank for the Dam, unloading the Trucks of Stone to fill the Frame Work, excavating and carting Material for the face of the Dam and puddling behind Lock Walls.

PAC, W044, Reel B-1299, Vol. 26, p. 246. Extracts from the Diary of the Hogs Back kept by Capt. J.C. Victor Royal Engineers commencing the first of May, 1829.

17. ... - the Hog's - back [sic] he has recommenced himself, and only means to raise the water 20 feet this season - he means to form the dam entirely of large stones, with two waste weirs on the right bank - but he has lost confidence in the work and no wonder.

PAC, MG24, A.12, Vol. 34, Extract from Letter, Lt. Col. Couper to Lord Dalhousie, Quebec, 20th August, 1829.

18. September.

Military, 21. Civilian Labourers 363. Military and Civil Laborers employed at Hartwells Locks excavating and puddling included in this return (Men) employed in filling the Wooden Framework with the Stone brought by Messrs. McKay and Co. - Excavating and carting Material for the face of the Dam puddling behind Lock Walls etc.,

PAC, W044, Reel B-1299, Vol. 26, p. 247. Abstract from the Diary continued.

19. October.

Military 25. Civilian Laborers, 482, Boys 83. employed at Hartwells Locks and included in the Hogs Back Lists.

(Men) Employed in excavating for the Dam. - Miners excavating for the Waste Channel and Masons building a dry stone wall on side of ditto and a retaining Wall at the back of the Logwork which crosses the old waste Channel. Excavating for the W. Walls and puddling behind Lock Walls.

PAC, W044, Reel B-1299, Vol. 26, p. 247. Abstract from the

Diary continued.

20. I have also the honor to report, that the Dam at the Hogs back, is nearly completed, and answers the desired object, in every respect, having raised the Rideau River to the required height of 45 feet, and thrown back six feet depth of Water into the Lock at Black Rapids, which proves my original levels at this place to be correct and also the practicability of my project, which when the Dam gave way last April was doubted by many,

PAC, W044, Vol. 19, p. 340. Letter from John By, Royal Engineers Office, Rideau Canal, 31st. October, 1829. to General Mann.

21. November.

Oxen removing the Rock excavated from the Waste Channel. (Men) Employed as usual in filling in the face of the Dam excavating the Waste Channel building the dry wall, Making the stop Gate, and laterly making a Coffor Dam in front of the upper Lock.

PAC, W044, Reel B-1299, Vol. 26, p. 247. Abstract from the Diary continued.

22. December.

Oxen employed in drawing out the Stumps and roots of trees brought into the W. Channel by the Water being turned down it.

(Men) employed in widening the W. Channel filling in the front of the Dam, Macadamizing Stone for ditto and preparing a Stop Gate for the upper Lock at Hartwells and fixing the one at the Hogs Back.

PAC, W044, Reel B-1299, Vol. 26, p. 248. Abstract from the Diary cont.

23. ...I have also the honour to report, that the dam at the Hog's Back is nearly completed, and answers the desired object in every respect, having raised the Rideau River to the required height of forty-five feet, and thrown back six feet depth of water into the lock at Black Rapids, which proves my original levels at this place to be correct, and also the practicability of my project, which, when the dam gave way last April, was doubted by many, and to this annoyance I attribute the serious illness with which I was, afflicted in April last.

PAC, W044, Vol. 19, Reel B-1294, pp.46-47. No. 101. Letter from Lt. Cola By to General Mann etc...Royal Engineers' Office, Rideau Canal, 31st December, 1829.

Progress Made During 1830

1. ...and have the gratification of assuring your Excellency that as I have succeeded in raising the water at the Hog's Back to the required height, the surplus quantity of flood water has to pass over a solid Rock, on the East Flank; and the West Flank being protected by the Lock and the Wing Walls of the Said Lock, with a strong natural Bank considerably above the required level, I trust there is no

fear of being beaten on either Flank; and all that remains to be done is to strengthen the centre, which appears to stand the pressure without the least alteration; I am therefore inclined to call this great work finished, with the exception of dressing off the ground in the Spring.

PAC, MG29, A24, Vol. 1, p. E.33.

Also

RG8, Vol. 50, pp. 8-9.

Also

W044, Vol. 19, Reel B-12941, p.77. No. 100.

Also

W017, B, Vol. 19, p. 2, p. 341. Letter from Lt. Col. By to Lt. General Sir James Kempt, Bytown, 8th January 1830

2. 31st Jan., 1830. Excavating Clay and Rock at Waste Channel. 31st Jan. Cutting and Excavating Stone for the Bridge over Canal Excavating Clay and Rock for Waste Channel at Hogs Back, Making Lock Gates Sawing Timber for various purposes.

PAC, W044, Reel B-1299, Vol. 26, p. 241. Abstract cont...No. 3.

3. January, 1830

(Men) Employed in widening the waste Channel and carting the Material to the Dam unloading the gravel carts of the (sic) of the Contractor. Carpenters preparing the Stop gate for Hartwells Locks. Oxen removing Stumps and Roots from the line of Canal.

PAC, W044, Reel B-1299, Vol. 26, p. 248. Abstract of the Diary continued.

4. March

The men were employed in removing the causeway and part of the Bridge from across the Waste Channel. The oxen in removing Boulders & Stumps from the excavation between Hartwells Locks and Bugle Gully.

PAC, W044, Reel B-1299, Vol. 26, p. 248. Abstract of the Diary continued.

5. This Excess includes the extra Masonry required to the Breast Works of the Locks at Hartwells in consequence of the nature of the foundations. The Waste Weir at Hartwells & the Guard Lock which it was deemed expedient to place at the Hogs Back.

PAC, RG8, Vol. 50, p. 131. Abridged Abstract Report of the Works on the Line of the Rideau Canal showing Amount of Original Estimate, Sums Expended, required to complete, amount when completed, amount of additional Work, amount saved and excess. March 31st, 1830.

6. April

Men employed at the Dam and passing drift Timber under the Boom, and cutting drains in the excavation, making floating Bridge on the river above the Dam, and excavating for foundation of lower lock and pumping.

PAC, W044, Reel B-1299, p. 248. Abstract of the Diary Continued.

7. ...I have also the honour to report that the Dam at the Hog's Back raised the water in the Rideau River this Spring 49 feet perpendicular, without the least appearance of failure or damage to the adjoining Country.

PAC, W055, Reel B-2812, Vol. 867, p. 195.

8. May

Employed at Bridge and excavating for foundation of Cill etc..pumping, puddling and backing between Lock Walls. etc...

PAC, W044, Reel B-1299, Vol. 26, p. 249. Abstract from Diary continued.

9. ...that the Dam at the Hog's Back rose the Rideau River 49 feet perpendicular this Spring which is 4 feet above the required level of the Rideau Canal and three feet higher than I had expected, but such are the uncertain fluctuations of this River in the Spring owing to the passage being at times choked with large Masses of Trees that to regulate these fluctuations I propose expending 300 Sterling in widening the present Waste Weir.

PAC, W044, v. 18, Reel B-1294, p. 261. To Gen. Mann from John-By, Royal Engineers Office, Rideau Canal 2nd May, 1830.

10. 31st May. Back Making Lock Gates, handling Tools, and Repairing Tools. Making Iron Work for Lock.

31st May. Excavating at Waste Channel. Forming Causeway across Canal Valley, Constructing Dam at Hogs Back.

PAC, W044, Reel B-1299, Vol. 26, p. 240. Abstract continued.

11. June

Employed in pumping and puddling and backing behind Lock walls sloping banks of Canal as far as Peter's Gulley excavating for foundation of breast wall and blasting stumps and boulders along the line of Canal.

PAC, W044, Reel B-1299, Vol. 26, p. 249. Abstract from Diary continued.

12. 15th June. Making Lock Gates, Handling Tools and Repairing Tools and Making Iron Work for Lock Gates. Excavating Gravel out of Waste Channel. Forming Causeway across Canal Valley. Making Rail Road at Hogs Back. 30th June: Making Lock Gates, handling Tools and repairing Tools, Making Iron Work for Lock Gates.

30th June: Excavating Gravel at Hogs Back. Forming Causeway across Canal Valley Making Rail Roads at Hogs Back.

PAC, W044, Reel B-1299, Vol. 26, p. 240. Abstract continued. No. 3.

13. 8th July. Clearing Timber out of the waste Channel. 15th July. Making Lock Gates Handling Tools, Repairing Tools and Making Iron Work for Lock Gates.

Excavating Rock and Earth at Hogs Back for Waste Channel: 31st July. Forming Waste Channel.

Laborers widening the Waste Channel and thickening Dam.

PAC, W044, Reel B-1299, Vol. 26, p. 236, 240. Abstract

continued No. 3.

14. July

Employed in pumping puddling & Backing excavating for breast and sluices removing Coffers Dam, heightening the Wall of the Waste Channel enlarging the channel itself and thickening the Dam, blasting stumps and large boulders in the excavation.

PAC, W044, Reel B-1299, Vol. 26, p. 249. Abstract from Diary Continued.

15. 15th August. Horses widening waste Channel and carting the Earth into the Dam.

Laborers widening the waste channel and removing the earth into the Dam, Excavating, puddling and backing Locks and removing wooden culvert from Peter's Gulley.

31st August. Excavating at Waste Channel.

31st August. Laborers widening waste channel and thickening Dam, puddling and backing Lockwalls and stopping up Peter's Gulley.

31st August. Horses removing the earth excavated from the waste channel and carting it on the Dam.

PAC,- W044, Reel B-1299, Vol. 26, p. 236. Abstract continued. No. 3.

16. August

Employed in backing and puddling the Lock wall, building a dry stone wall at the mouth of the small gulley, excavating near the lower wing wall for another wall, puddling and making water tight the mound across the mouth of Peter's Gulley occupied by the wooden culvert, enlarging the Waste Channel and carting the Earth into the Dam, also adding to the wall of the waste channel.

PAC, W044, Reel B-1299, Vol. 26, p. 249. Abstract from Diary Continued.

17. 10th September. Excavating at Waste Channel.

15th September. Laborers widening waste channel and thickening Dam backing and puddling, removing Coffers Dam in front of the Locks and stopping up Peter's Gulley.

Horses carting the earth from the waste channel onto the Dam.

PAC, W044, Reel B-1299, Vol. 26, p. 236. Abstract continued. No. 3.

18. September 1830

Employed puddling and backing the Lockwalls, building a dry stone wall along the side of the Canal from the Boulders taken from the excavation, closing up Peter's Gulley and Bugle Gulley, enlarging the Waste Channel and carting the Earth into the Dam.

PAC, W044, Reel B-1299, Vol. 26, p. 250. Abstract from Diary Continued.

19. October

Employed in backing and puddling, building a dry Stone wall along the side of the Canal Banks below the lower wing walls, closing up Bugle Gulley, removing the Coffers Dam in

front of the guard Lock and laterly in replacing it in consequence of the accident to the Pavement in rear of the Stop Gate.

PAC, W044, Reel B-1299, Vol. 26, p. 250. Abstract from Diary Continued.

20. November

Employed in backing the Lock Wall, dressing off the ground and covering it with macadamised stone.

PAC, W044, Reel B-1299, Vol. 26, p. 250. Abstract from Diary Continued.

21. December

Employed in the beginning of the Month in carting Material to the Dam, and removing the coffer dam, laterly in Keeping the floor of the lower Lock at Hogs Back clear of water whilst hanging the Gates.

PAC, W044, Reel B-1299, Vol. 26, p. 250. Abstract from Diary Continued.

Progress Made During 1831

1. January

Employed Keeping the lower Lock at Hogs Back clear of Water whilst hanging the Gates.

PAC, W044, Reel B-1299, Vol. 26, p. 250. Abstract from Diary Continued.

2. April

Employed in dressing off the slopes of the Locks and the Dam at the Hogs Back.

PAC, W044, Reel B-1299, Vol. 26, p. 251. Abstract from the Diary Continued.

3. 30th April. Horses drawing Material for dressing off Locks and Dam.

30th April. Dressing off Dam & Locks.

PAC, W044, Reel B-1299, Vol. 26, p. 237. Abstract Continued No. 3.

4. May

Employed in dressing off the slopes of the Dam and the Locks etc...

PAC, W044, Reel B-1299, Vol. 26, p. 251. Abstract from the Diary Continued.

5. 15th May. Dressing off Dam and Locks and keeping lower lock clear of water.

Horses drawing Material for dressing off Dam & Locks.

PAC, W044, Reel B-1299, Vol. 26, pp. 237-238. Abstract continued No. 3.

6. 15th May. Backing Levelling & finishing Dam.

PAC, W044, Reel B-1299, Vol. 26, p. 242. Abstract Continued No. 3.

7. 31st May. Backing, Levelling & finishing Dam.

PAC, W044, Reel B-1299, Vol. 26, p. 242. Abstract Continued No. 3.

8. June

Employed in straightening Channel of the waste weir &

throwing over blocks of Stone and assisting in relaying Sill etc.

PAC, W044, Reel B-1299, Vol. 26, p. 251. Abstract from the Diary Continued.

9. 18th June. Materials finished for Weir

15th June. Laborers dressing off the Dam etc.

Horses drawing Material to dress off Dam.

30th June. Laborers at Waste Channel.

Horses drawing Stone to ditto.

PAC, W044, Reel B-1299, Vol. 26, p. 238. Abstract continued No. 3.

10. July

Employed quarrying Stone for Waste Channel, building dry wall to ditto, laying wooden floor to Lock, pumping, deepening bottom of Waste Channel, carting the excavation to the Dam.

PAC, W044, Reel B-1299, Vol. 26, p. 251. Abstract from the Diary Continued.

11. 15th July. Labourers at Waste channel and at the Locks pumping and assisting in enlarging sills & wooden floor. 15th July. Horses drawing Stone to W. Channel.

31st July. Laborers laying wooden floor pumping lower locks assisting Masons unloading Stone for the Wall of Waste Channel, clearing out waste Channel.

Horses drawing Stone from the Quarry to the waste Channel and removing the excavation from the bottom of waste channel to the Dam.

PAC, W044, Reel B-1299, Vol. 26, p. 238. Abstract continued No. 3.

12. August

Employed up to the 17th the same as before in quarrying stone for the wall, building ditto. – transporting excavation from waste channel to the Dam, and laterly in removing the Cofferdam and clearing the recess of upper Lock from the clay washed into it by letting the Water into the Canal.

PAC, W044, Reel B-1299, Vol. 26, p. 251. Abstract from the Diary Continued.

13. 17th August. Horses, Drawing Stone from the Quarry to the Dry Wall and removing the Excavation from the Bottom of the Waste Channel to Dam.

PAC, W044, Reel B-1299, Vol. 26, p. 239. Abstract Continued No. 3.

14. 31st August. Building Dry Wall for Dam and Quarrying Stone for ditto.

PAC, W044, Reel B-1299, Vol. 26, p. 242. Abstract Continued No. 3.

15. ...On the 13th Inst. I passed Not only through the 1st 8 Locks but the two Locks at Hartwell's, the two Locks at the Hogs Back.

PAC, WG8, Vol. 441, p. 278. Letter to Col. Durnford dated Royal Engineers Office Rideau Canal, 14th September, 1831

from John By.

16. 15th September. Quarrying Stone & filling in Dam.

PAC, W044, Reel B-1299, Vol. 26, p. 242. Abstract Continued No. 3.

17. Hogs Back.

The Bed of the River at the Hogs Back being formed of a slaty strata, dipping at an Angle of 45° directly across the same, and having observed the effect of the water upon the Rock, when the Dam gave way, I considered it unsafe to allow the water of the Rideau River to flow over this work, as originally proposed, from the conviction that its falling from so great a height, would in time undermine the foundations and ultimately cause its destruction, I therefore considered it indispensably necessary to deviate from the original plan, and have in consequence constructed a permanent Waste Weir, which extends not only across the head of the Channel which it was found expedient to excavate to provide a passage for the water during the construction of the Dam, and which it was originally intended to have closed up, on the completion of that work, but also across a new Channel, forming an inclined plane of Rock to the River, which has been Excavated to meet the alterations explained, and as the failure of the Dam has occasioned a great increase on the original Estimate; and conceiving that Arched Key Work from the plan adopted, was no longer necessary, in order to reduce the expense as much as possible, without affecting the permanent durability of the Works; the rear of the Dam is composed of large masses of Stone as taken from the Quarry, forming their own slope and averaging 58 feet in thickness at the base.

The Excavation for the Lock which the Committee approved of, being placed in connection with the Dam, proving full of Springs, with shaly blue clay, mixed with Boulders, and although by using hot lime and small stones, the foundation was sufficiently good and sound, to bear the superstructure to be placed upon it, under ordinary circumstances, yet reflecting upon the probable effect which a head of water might have upon the Breast Work and Invert Arch, the latter indispensably necessary although not provided for in the Estimate given to the Committee if built upon such a foundation, taking into consideration at the same time, the great injury which the Works of the Canal below the Hogs Back would necessarily sustain, in case of an accident occurring to the Entrance Lock, I deemed a Guard Lock, although an additional Work, called for by the nature of the obstacle to be surmounted and at the same time not only indispensably necessary for the permanent security of the Works, but also, although an increase in the present instance was thus incurred yet it would prevent accidents, the repairs of, or the replacing of which, could not be calculated, and as an example, is it not more than probable, nay almost a certainty, that the uncontrolled rush of the

water of the Rideau River, forcing its way through a Lock, would in a short period, carry away with it, the Clay Bank, between the present bed of the Canal and the River, for several hundred yards,, and should the masonry of the Eastern Chamber Wall of the Locks be undermined, the Dam would be in very great danger, there being only clay and Earth between them.

To provide for the repairs which might be required to the Lock Gates, Sill or Sluices, it was deemed advisable to have Stop Gates,, in readiness, otherwise whenever an accident occurred, however, trifling to the Upper Lock, a Cofferdam must have been formed in front of the same, the construction and removal of which would cost at least £200, and if by a sudden rise of the River, the Cofferdam received any injury, which is not impossible, the sudden rush of water upon the Lower Gates of the Guard Lock, might be attended with serious injury to the Works. The expediency of having stop Gates at the Hogs Back was not taken into consideration through an omission, at the period of forming the Estimate given to the Committee.

In consequence of so much more flood-wood being brought down by the current of the River, than could have been anticipated, and the danger thereby to be apprehended if by any chance it choked up the Waste Weir, it was indispensably necessary to guard against such a probability, by constructing a strong Boom to retain the Timber and Trees until they could be cleared away after taking down the Bridge over the Waste Weir this Boom also answered as a road for the Carts employed in bringing earth to thicken the Dam in such parts as was deemed advisable.

Subsequent to forming the Estimate given to the Committee, it having been ascertained that the deepening of the shoals and rapids at Captn. Wilson would be attended with a much greater expense than provided for to lessen the same as much as possible one foot additional depth of water has been thrown over the rapids and shallows in question by giving one foot extra height to the Waste Weir and Gates of the Guard Lock....

Hogs Back

Chopping & Clearing Land provided for in the Estimate given to the Committee, and is completed.

...Increase of Expense arises from Clearing for a Waste Channel Dam of Arched Key Work provided for in the Estimate given to the Committee, and will be completed by the 30th June next.

...Increase of Expense arises from its failure in the Spring of 1828, and the necessity of all owing an additional height and thickness to the Dam above what was provided for in the Estimate given to the Committee, in order to prevent the water flowing over it. The Excavations in forming the Waste Channel were required for the Dam, and included in the above

expenditure.

Masonry of Locks One Lock only was provided for in the Estimate given to the Committee and is completed.

... Increase of Expense arises from the addition of a Guard Lock, the necessity of Invert Arches in consequence of the nature of the foundation, and the additional height given to the Chamber Walls of the Upper Lock, to throw the water through the Waste Channel.

Backing and Puddling provided for in the Estimate given to the Committee and will be completed by the 30th June next. ... Increase of Expense A Guard Lock being necessary, the rear of the Chamber Walls required to be puddled; the expense of puddling has also invariably proved much greater than Estimated for.

Lock Gates, Oak Sills, Sluices, Crabs and Chains etc... provided for in the Estimate given to the Committee, and will be completed by the 30th June next....

Constructing a Railway not provided for in the Estimate given to the committee, as its necessity could not have been foreseen, and is completed.

... The necessity of this Service arose from the failure of Mr. Fenlon, and the apparent probability that the Works at the Hog's Back, would have to be executed by day Work, from the high prices demanded by various persons; for the performance of the same, which circumstance was not anticipated at the period of forming the Estimate given to the Committee....

Removing Flood-wood not provided for in the Estimate given to the Committee, as its necessity was not foreseen will be completed by the 31st August next.

... This service was indispensably necessary, and consequent upon the alteration from the original plan of allowing the water to flow over the Dam as approved of by the Committee, for had the entrance of the Waste Weir got choked with the floating trees, brought down by the current of the River, the very effect its construction was intended to provide for, viz., the affording a free passage for the water, to prevent its flowing over the Dam, would have been counter-acted, and the consequence very serious injury to that work, which is not constructed to meet such an unexpected casualty.

The expense attendant upon this Service has been very heavy, from the great accumulation of floating timber, the quantity of which could not have been anticipated or foreseen, and the Amount to complete the same, can only be looked upon as the probable one, but whatever the ultimate expense may prove, it is absolutely necessary for the safety of the Dam that the Waste Weir and Channel be kept open & clear from all obstructions, and when once the present mass of wood shall be removed, which was occasioned by the raising of the water by the Dam, I fully anticipate, that the future expense will not be very great, as the Boom which

it was necessary to construct, and which I should recommend being continued until the Banks of the Rideau are well cleared, will prevent the floating wood from passing the Waste Weir, and it can be removed by the Labourers required to work the Locks: the Boom will also serve as a permanent floating Bridge.

Constructing a Waste Weir and Bridge over the Dam not provided for in the Estimate given to the Committee as its necessity was not foreseen and is completed.

... The necessity of the Waste Weir has been explained under the Items Waste Weir and Dam: the Bridge was a continuation of the Rail road from the Mainland to the Dam, it was destroyed early in the Spring of 1830, fearing that it would otherwise prove a check to the flood water of the River, and by preventing its freely passing over the Waste Weir, occasion an additional pressure upon the Dam....

Cartage of Tools etc to Hogs Back Not Provided for in the Estimate given to the Committee, it being a contingent expense....

In consequence of constructing the Dam, Waste Weir, and other Contingent Services at the Hogs Back by day Work, Tools and Stores were indispensably necessary for the Military and Civil artificers and Labourers employed.

Small Coffor Dam, Entrance to Guard Lock and removing Ditto not provided for in the Estimate given to the Committee, as its necessity was not foreseen, and will be completed by the 30th June next...

It was indispensably necessary to raise the Dam to its required height before the breaking up of the Winter, to prevent the Spring floods from passing over it; in consequence a Coffor Dam was required at the head of the Locks until the completion of those Works.

Boom to prevent flood wood choking the Waste Weir was not provided for in the Estimate given to the Committee, as its necessity could not have been foreseen, and will be completed by the 30th June next....

In consequence of so much more flood wood being brought down by the current of the River, than could have been anticipated, and the danger thereby to be apprehended if by any chance it choked up the Waste Weir, it was indispensably necessary to guard against such a probability, by constructing a Strong Boom to retain the Timber and Trees until they could be cleared away, after taking down the Bridge over the Waste Weir, this Boom also answered as a road for the carts employed in bringing earth to thicken the Dam, in such parts as was deemed advisable.

Securing the Dam at Hogs Back in March 1828 not provided for in the Estimate given to the Committee, and is completed.... The Service was necessary otherwise no portion of the Dam would have been saved.

Sloping and Dressing Banks omitted to be provided for on the Estimate given to the Committee, and is completed....

Required to prevent the Banks slipping into the Canal.

Lining the Banks of the Canal with Hemlock Logs, not provided for in the Estimate given to the Committee, and is completed....

Pumps and Labor, not provided for in the Estimate given to the Committee, and is completed....

Required whilst laying the Oak Sill and Hanging the lower Gates of the Locks; the necessity of this Service was not foreseen at the period of forming the Estimate given to the Committee.

PAC, W044, Vol. 20, Reel B-1295, pp. 384-386, 393-398. *Particulars of the Hogs Back.*

18. Dam of Arch'd Key'd Work. ...

This Amount includes the excavation of a Waste Channel, and all the Contingencies which have occurred to the Dam.

Increase of Expense, arises from its failure in the Spring of 1828, and the necessity of allowing an additional height & thickness to the Dam, above what was provided for in the Estimate given to the Committee, in order to prevent the Water flowing over it. The excavations in forming the waste channel were required for the Dam, and included in the above Expenditure, which does not include all the contingencies which have occurred to the Dam, the Statement to that effect in Document K is therefore in Error, the Progress Report shows the Expenditure on each Service.

Three Locks Complete. ...

Arises from the lowness of Contractors Prices below the Original Estimate.

The necessity of a Guard Lock was not foreseen or provided for in the Estimate of Works given to the Committee. In forming the probable Amount of Works to complete forwarded to England in the Spring of 1830 on finding that a Guard Lock was indispensably necessary for the Security of the Works, I Estimated for the Two Locks at Hartwells as Extra Works, and then by deducting the Amount of the Two Locks required at the Hogs Back, from the Sum provided for the Three Locks in the Original Estimate, the Saving on the Item, Masonry at the Hogs Back would be shewn, the correct mode I acknowledge would have been, to have deducted the Amount of the Two Locks at Hartwells (as approved of by the Committee) from the Original Estimate of the Three Locks, and then to have provided for the Guard Lock and Inverts in the probable Amount of Works to complete before alluded to under the lead of Extra Works; indispensably necessary.

Backing & Puddling behind Lock Walls. ...

Increase of Expense, a Guard Lock being necessary the Rear of the chamber Walls required to be Puddled; the Expense of Puddling has also invariably proved much greater than estimated for.

Sluice Gates, Complete, Eight Pair. ...

Increase of Expense, arises from the substituting Crabs

& Chains for Racks & Pinions, & Cast Iron for Wooden Valves, also from the Two Pair of additional Sluices required for the Guard Lock.

Stop Gate.

To provide for the Repairs which might be required to the Lock Gates, Sill or Sluices, it was deemed advisable to have Stop Gates in readiness, otherwise whenever an accident occurred, however trifling to the Upper Lock, it would be necessary to form a Cofferdam in front of the same, the Construction and removal of which, would cost at least £200 and if by a sudden rise of the River, the Cofferdam received any injury which is not at all improbable, the sudden rush of Water upon the Lower Gates of the Guard Lock, might be attended with serious injury to the Works.

Constructing a Railway, 1160 feet in Length

Necessary to convey Materials from the Quarry to the Dam.

The necessity of this Service arose from the failure of Mr. Fenlon, and the apparent probability that the Works at the Hogs Back would have to be executed by Day work from the high prices demanded by various persons for the performance of the same, which I felt myself called upon to resist; on the completion of the Railway which is carried from the Quarry to the Dam;

Removing Flood Wood etc...from River.

Occasioned by the Drift Wood which was aground on the Three Island Rapids floating down when Dam was raised.

This Service was indispensably necessary, & consequent upon the Alteration from the Original Plan (of allowing the Water to flow over the Dam as approved of by the Committee for had the Entrance of Waste Weir, got choked with the floating Trees brought down by the Current of the River, the very effect its construction was intended to provide for (namely the affording & free passage for the water, to prevent its flowing over the Dam) would have been counteracted, & the consequence very serious injury to that Work which is not constructed to meet such an unexpected casualty.

The Expense attended upon this Service has been very heavy, from the great accumulation of floating Timber, the quantity of which could not have been anticipated or foreseen, and the Amount to complete the same can only be looked upon as the probable one, but whatever the Ultimate Expense may prove, it is absolutely necessary for the safety of the Dam, that the Waste Weir and Channel, be kept open & clear from all obstruction, and when once the present Mass of Wood shall be removed, which was occasioned by the raising of the water by the Dam, I fully anticipate that the future Expense will not be very good, as the Boom which it was necessary to construct, and which I should recommend being continued until the Banks of the Rideau are well cleared, will prevent the floating Wood from passing the

Waste Weir, and it can be removed by the permanent Labourers required to Work the Locks; the Boom will also serve as a permanent floating Bridge.

Constructing Waste Weir & Bridge Over the Same.

Waste Weir to prevent Water passing over the Bridge is a continuation of the Railway. Waste Weir - The Bed of the River at the Hogs Back is formed of a Slaty Strata, dipping at an Angle of 45° directly across the same, and having observed the effect of the Water upon the Rock when the Dam gave way, I considered it unsafe to allow the Water of the Rideau River to flow over this Work as originally proposed from the conviction, that its falling from so great a height, would in time undermine the foundations, and ultimately cause its final destruction - I therefore considered it indispensably necessary to deviate from the Original Plan, and have in consequence constructed a permanent Waste Weir, which forms a regular inclined plane over Rock to the River.

The Bridge was a continuation of the Rail Road from the Mainland across the Waste Channel, and required in the construction of the Dam, upon the completion of which work, it was destroyed, from the consideration that it would prove a check to the Flood Water of the River, and, by preventing its freely passing over the Waste Weir, occasioned an additional pressure upon the Dam. ...

Small Cofferdam Entrance to Guard Lock, and Removing Ditto.

Considering that the additional pressure upon the Stop Gates (required whilst Building the Upper Sill Hanging Gates etc...) occasioned by the Spring Floods might in some degree effect the Masonry whilst in a green state, I considered it indispensably necessary to provide against the possibility of such an event by constructing a Cofferdam in front of the Guard Lock, to such a height as would relieve the Stop Gates from the extra pressure alluded to....

PAC, W044, Reel B-1294, Vol. 18, p. 230-234.

Progress Made During 1832.

1. The Locks at the Entrance Valley, Hog's Back ... have been completed...

Report of Canals in Canada, p. 6 and 7. Mem. 3rd February, 1832. in *British Parliamentary Papers*, Reports Correspondence and Papers Relating to Canada 1825-32, Colonies Canada, Vol. 6.

Projected Cost of the Works

Hog's Back £27,022,16.

PAC, W044, Vol. 19, p. 20.

Probable Amount of Each Section When Completed.

Hog's Back. £34,701,4,,8.

Exerpt's from Lieutenant Frome's Report.

At the Hog's Back ... the canal first enters the Rideau on its left bank. Of the two combined locks constructed here, the upper is only a guard lock, its coping being 8 feet above the surface of the 7-foot water on its sill; the

lift of the other is 14 feet 6 inches, allowing 6 feet in the lock; and the height of the masonry of the breast is 13 feet 6 inches. The stone used in building was quarried on the opposite side of the river, and is very similar to that of the works below; the excavation was also clay mixed with boulders, and the walls and invert arches were built upon large rough stones without any piling. The recesses were planked.

The dam, one end of which abuts against the wing wall ... It was afterwards finished under the superintendence of Captain Victor, Royal Engineers, by forming a strong framework of timber in front of the breach, which was afterwards filled with stone, and supported in the rear by a quantity of large stones thrown in from the top, and filled in front with an enormous mass of clay stone and gravel; the base extending about 250 feet up the stream forming a slope about five to one. It is now one of the most substantial works on the whole line of the canal.

Luckily the rock, which on the left bank of the river (where the locks are placed) only rose 12 or 14 feet above the bottom, on the opposite side was nearly 40 feet, and made an excellent floor for the channel cut to carry off the surplus water. The waste-weir is framed of timber, strongly bolted to the rock, and backed with large blocks of stone. In spring-floods this helps to carry off the rush of water, but the main channel is sufficient of itself at other times. The top of the dam is on the same level with the coping of the lock, 8 feet above the average surface water. - It forms a sheet of still water to the foot of the works at Black Rapids, a distance of 4 miles. ...

PAC Library, UG7 G72, Vol. I, *Professional Papers of the Corps of Royal Engineers*, Lieutenant Frome's Report, pp. 81-82.

Miscellaneous Information.

Description of the Route from an Early Traveller's Report.

...Descending along the River from this place we came to the Hogs Back - a rapid fall in the Rideau occasioned in part by the declivity and partly by the contracting of the high banks on each side - the name originated with those people employed in bringing down Timber. ... Here there is one of the largest and most precarious pieces of work to be met with through the whole line. A Dam in height as to be thrown across the river to raise the water up so as to overcome the swift current and shallows which intervene between this & Black Rapids. The magnitude of this Dam and the strength of the River here during the Freshets - its having received all its tributary streams before reaching this point rendered it necessary to complete the Dam during the Low water so as to stand the force of it when at its height; and as the quantity of materials required for this

was very great and the length of the low water season short - several attempts were made before successful. It is now however finished and bids fair to stand. The locks here are (?) in number with more about one mile farther down. There are of (?) feet lift and built of an excellent grey limestone presenting specimens of excellent strong masonry. An over fastidious examiner of the works here might perhaps cavil at their being too finely done, in other words it might be alleged that the contractor had bestowed too much pains in the suriety of his work, that more labour of the chisel had been used than necessary in a piece of strong work of this kind; but nothing is lost of strength by this means, and if the contractor has done so it was his own loss and no injury to the works. The Dam has been erected partly by Government hiring labourers, and partly by contracts, & the stones were furnished by Mr. Creighton at contract and were laid under the direction of Capt. Victor Royal Engineers under whose immediate superintendance this part of the canal is making Creighten McKay and Redpath are sub-contractors under McKay and Redpath for the Locks here. After descending by the first locks from the high level of water above the Dam the canal is formed by excavation along a high clay bank till it reaches the lower locks. In its route here we find it using some deep Gullies which are the channels of rivulets when the waters are high at the breaking up of the winter. These have to be crossed by culverts, and it is a matter of regret to remark that these are formed of timber without any of that regard to durability so conspicuous in other parts of the work.

PAC, MG24, 19, Vol. 7, pp. 2055-2057.

Comment on the Rideau Dams.

1. ...The following description of the Hogs Back is drawn up from notes and memoranda taken on the spot during the progress of the work.

The Hogs Back rapid at the Head of which it was proposed to construct the Dam the subject of the present paper is formed by a ridge of limestone which crosses the Rideau obliquely at a point about 5 miles above its mouth. - On the right bank which rises nearly vertical from the river to the height of about 30 feet the limestone which at that point is very irregular in its stratification, is but thinly covered with a bed of earth and gravel, beyond the immediate bank the ground rises rapidly to a height of 50 or 60 feet above the bed of the river, and then continues to rise more gradually for 200 or 300 yards to a rocky ridge from whence most of the stone for the works in the immediate neighbourhood was procured. - On the left bank the rock does not rise above 10 or 12 feet above the bed of the river. In this bank 2 locks were placed (one of which was a guard lock) which raised the canal 117' 6" above the level of the Ottawa, this level being requisite to enable boats to enter

the lock at the Black rapids, a point on the Rideau about 3 miles above the Hogs back. - It being necessary therefore to preserve this level two modes of accomplishing it presented themselves viz. either by continuing the excavation through the clay bank of the river for the whole distance or by making a dam across the river and raising the water to the necessary height - and as the former of these two plans would have been enormously expensive on account of the heavy cutting and the numerous embankments that various small streams and gullies would have required which fall into the river between Hogs back [and Black rapids it was determined to adopt the latter (expedient) and make a detour at the head of the Hogs Back rapid -] although the water at that point required to be raised 45 feet.

The river below the dam is about 170 feet and in ordinary seasons according to a rough calculation made on the spot discharges about 170,000 cubic feet of water in a minute. - The specification for the dam stated that the upstream part was to be made of earth gravel etc...that the down stream portion should be built of arched Key Work or as a dry wall made of stones laid on edge and wedged together in the form of an arch and that between these two should be 20 feet of good clay puddle sunk 2 feet into the bed of the river. (see Figures 1 & 2). The dam to be coped with stone at the top so as to allow the water to flow over it and act as a waste weir.¹

The plans sections & specifications for the work being published various tenders were made out for its Execution. - The contract was taken by Mr. Fenlon at the price of 1/10d per cubic yard....

Mr. Fenlon having made what he conceived to be the necessary preparations for the work, began his operations on the right bank of the river in the summer of 1827 as soon as the spring floods had subsided. He threw stones, earth, rubbish into the bed of the river so as to form a sort of jetty by which the channel was contracted to about half its original width and behind the mass he built the Keywork to the height of 37 feet. Having accomplished so much of his plan he attempted in the autumn to close up the unfinished portion. -

He cut a small channel through the rock on the right bank of the river close to the flank of the dam. The bottom of this channel was about 27 feet above the bed of the river and its purpose was to serve as a waste weir to carry off the water when raised to that height. (see Plate XXVIII fig. 1)

Having taken this precaution he attempted to close the opening by throwing in stones, rubbish etc. and had succeeded nearly in raising the water high enough to flow over his waste weir when a sudden flood in the river swept away all his unfinished portion of the work leaving it in such the same state as it was in the summer; before the

attempt to complete it had been made. - This happened in February 182P....it became necessary to take some steps to provide against the spring floods either to secure that portion of the dam already finished or by attempting to complete the whole at all events as much as would turn the water down the waste channel.

Accordingly the waste channel was widened and deepened and its Course altered so as to afford a freer passage to the water.

A rough wooden dam was erected before the unfinished portion of the work one end of which rested on the portion of the dam already completed and the other on the clay bank at the opposite side of the river. Various difficulties occurred in the construction of the dam, partly owing to defects in the plan, but chiefly to the state of the weather, the rottenness of the ice; increase of water in the river etc. The dam was constructed of the largest timber that could be procured in the neighbourhood, pine & hemlock 50 to 60 feet long but nevertheless the top could not be raised more than 2 feet above the level of the bottom of the sluice way which had been lowered 4 feet and made nearly 40 feet wide.

Every precaution was taken to secure the flanks of the wooden dam where it joined the clay bank and the old dam but all proved unavailing....

In the summer Mr. Wright undertook for the sum of £300 to close the gap in the dam and turn the water down the waste channel which was enlarged to the width of 60 feet. - Mr. Wright accomplished his work in November 1828 by fixing a sort of coffer dam made of rough timber notched together and pinned at the angles across the opening of the dam; This coffer dam had a sluice way 12 feet wide in the centre which was kept open until the remainder of the Dam was loaded with rough stone & rubbish and filled in in front with clay. - A door made of strong oak logs was then dropt down to close the opening and clay and rubbish thrown in front till the water was completely stopped. After which it rose rapidly and discharged itself through the waste channel. Two partial breaches in Mr. Wrights work were easily repaired by driving sheet piles across the openings made by the water. - As soon as the water was turned through the waste channel the Key Work was commenced in the rear and both Mr. Wrights work and the portion of the dam constructed by Mr. Fenlon were thickened & heightened the earth too on the rocky bank on the right of the river was cleared away so as to allow as free a passage as possible to the spring floods. All this work was carried on during the winter. - The frost was so intense that powder was used to procure the earth necessary to fill in the front of the Keywork which was raised to the height of 37 feet by the middle of March 1829. The earth and clay in front of it was raised to the height of 50 feet but to puddle was impossible on account of the severity of

the weather. - At the same time that these works were carrying on the waste channel was stopped and the water turned over the rocky bank to the right of it. - Before the water was raised oak sills had been strongly bolted down to the floor of the waste channel with mortices to receive uprights and braces to support them in rear. - These were now fixed and in front of the uprights squared logs were laid and pinned as well as possible to each other and to the uprights. This kind of work was continued beyond the waste channel for a distance of 130 feet on the right bank and by driving down oak plank where the inequalities of the rock permitted the water to escape and filling in the front with clay and gravel the surface of the river was raised 15 feet higher than the bottom of the waste channel and the width of the water way increased to 150 feet.

... In the summer after the spring floods had subsided and the amount of damage had been ascertained it was decided to continue Mr. Wrights wood work across the opening, to raise it higher than he had done filling in every bay with broken stone or gravel, and backing it with heavy blocks of stone in rear, thrown from the top and allowed to take their own slope. All idea of completing the dam with keywork according to the original plan was given up-the costly experiment of the winter having proved the impossibility of wedging rough stone of the description to be procured on the spot into such compact form as to enable it to resist the pressure which any failure in the mass of materials in front would bring on it.

The work was commenced in July and carried on rapidly, the frame work was easily raised after the first course of timber had been laid across the bottom of the river and this did not present the difficulties that might have been anticipated. - A strong log of timber was laid parallel and close to the bank of the river on this were notched at about 20 feet apart two rough timbers about 50 or 60 feet long which were supported against the stream by guy ropes. - Under these at intervals of 15 or 20 feet other logs parallel to the first were inserted and as soon as each bay was completed it was loaded with stone which enabled it to resist the action of the water. Other timbers were then pushed out upon these and supported in like manner and the work was carried on in this way until the opposite bank was reached. - A second course of traverse & longitudinal timbers was then placed exactly over the former and the work being now able to resist the effect of the water no more stone was thrown in the water finding its way freely through the openings of the timbers. - As soon as the frame work was raised to the proper height a road way was formed along the top and the bays at the two extremities were filled in with small stone and gravel at the same time large blocks were thrown over at the rear and clay and gravel filled in at the front of work was thus carried on from the flanks of the dam

to the centre and a mass gradually formed the base of which extended 300 feet or more up the river.

While this was going on the waste channel was widened nearly 100 feet by clearing away the earth down to the rock, a rough wall built to throw the water from the flank of the dam, rough stone steps laid behind the frame work of the waste weir to prevent the action of the water upon the rock to which the sills were bolted, in fact every expedient which the skill of the Officer in charge of the work could devise or the means at his disposal enable him to execute was put in practice to guarantee the work against accidents or failures.

The water was raised by the 3rd Nov. high enough to flow over the waste weir and from that line although partial settlements have taken place in the earthen portion of the dam, nothing has occurred to threaten its stability.

The channel shown in fig. 6. was cut to the depth of 10 or 12 feet in a very short time through a mass of hard rock irregularly stratified. A similar action is going on in other portions of the whole channel and although there is no immediate prospect of the action of the water wearing away the rock as to reduce the head of water kept by the dam yet in a series of years this will probably be the case.

In every attempt therefore to raise the level of a river by means of dams great attention must be paid to the outlet provided for the stream - the descent from one level to another should be on as gentle & regular a slope as possible and if an abrupt pitch is unavoidable it should be broken if possible by steps in order to diminish the action of the water.

This was done with good effect (see fig. 5.) at the back of the wooden waste weir where previously the action of the water had worn the stone from under the sills leaving the iron bolts exposed for a great portion of their length in many places.

PAC, MG29, A24, Vol. I, G.34-41. *Rideau Dams* by Lieut. Denison R.E. "Rideau Canal - Copies of original Mss. etc. in Canadian Archives etc. (by Andrew Drummond Ottawa 1890-1893). also *Professional Papers of the Corps of Royal Engineers*, Vol. II, p. 113.

Accidents Reported.

1. The last advices from the Rideau Canal, we regret to state, mention the occurrence of a number of distressing accidents. Two labourers have been smothered by a bank of clay falling on them at Hog's Back. ...Considering, however, the extent of the works, and the dangerous nature of many of them, there have been fewer accidents since the commencement, than could have been supposed. - Two have been before this killed by blasts ... and one killed by a tree falling on him.

Montreal Herald, Saturday, December 15th, 1827, No. 13., Vol. XVII.

2. Last week a distressing circumstance occurred at the Hog's Back, near Bytown. Several people were engaged, under the direction of Mr. Joseph Charles, in removing a bank, and it was supposed the best way would be to apply gun-powder to the root of a tree which was deeply inserted in the earth, and which it was expected would carry away a large portion of the bank with it. Accordingly a large charge was inserted under the tree, and a match applied, when, by the explosion, Mr. Charles, who was about 30 rods distant, was killed, and a labourer had one of his legs broken.

Montreal Herald, Saturday, April 5th, 1828. No. 45. Vol. XVII

Name of Canal Station

Hogs Back to Black Rapids, Black Rapids.

Number of Canal Section

Section No. 1.

Contractor

1. 5th June 1827 - Phillips and White - Section 1. Black Rapids...

PAC, W055, Reel B-2811, Vol. 865, p. 210.

2. ...Mr. Phillips a respectable mason at Montreal is now opening quarries at the foot of the Black Rapids, to construct a Dam across the Rideau River 280 feet wide, perpendicular height 10 feet & a Lock of 10 feet lift; this Dam is to throw back the Water & thereby form a sheet of still water 5 miles long, which completes the Canal to the foot of Long Island Rapids,

PAC, RG8, Vol. 44, p. 85. Letter to General Mann from John By, Rideau Canal, 6th July, 1827.

3. ...Mr. Andrew White the Contractor for the Job at Long Island and Black Rapids.

PAC, W044, Reel B-1300, Vol. 27, p. 167. Letter from H.H. Burgess, New York, 1st April. 1832.

4. Having submitted to the Board a letter from the Commanding R1 Engineer on the Rideau Canal dated the 7th March last reporting the circumstances under which he had entered a verbal agreement with Mr. Garlick to forward all stores and iron work (required for the Lock gates, sills, sluices etc. on the line of Canal) from the Hog's Back to Black Rapids, Long Island and Burritts Rapids;

PAC, W055, Reel B-2814, Vol. 869, p. 104. To M. Gen. Sir A. Bryce from R. Byham, Office of Ordnance, 15 June 1832.

Progress Made During 1827

1. Mr. Phillips a respectable mason at Montreal is now opening quarries at the foot of the Black Rapids, to construct a Dam across the Rideau River 280 feet wide,

perpendicular height 10 feet & a Lock of 10 feet lift; this Dam is to throw back the water & thereby form a sheet of still water 5 miles long, which completes the Canal to the foot of Long Island Rapids,

PAC, RG8, Vol. 44, p. 85. Letter to General Mann from John By, Rideau Canal, 6th July, 1827.

2. Nov. 3rd. Paid Phillips & White Works at Black Rapids etc... £972,,19,,11

PAC, RG8, Vol. 45, p. 46. Lennox Rudyard Paymaster at this Station, requests an Allowance for the following Sums by him disbursed on Account of the undermentioned Services between the 1st October and 31st Decem^r 1827.

3. For clearing 20 Acres of Wood at the black rapids for river Lock Dam & part of Canal. In Progress.

Works from Hogs Back to Black rapids, chopping & clearing 6 Acres deepening Shoals, Coffor Dam, & removing boulders out of channel.

Works at Black Rapids, chopping, clearing and grubbing, excavating for Lock, quarrying stones clearing land, constructing Dam etc...In Progress.

PAC, RG8, Vol. 44, p. 155, 165, 167. Progress Report of Works, at the Rideau Canal, from the 21st September, 1826, to the 31st October, 1827.

4. ...At...Black Rapids...Quarries have been extensively opened & a quantity of Cut stone prepared for the Locks.

The dams & excavation for the Locks & Cuts at these Stations are in a forward state of progress.

PAC, W044, Reel B-1294, Vol. 19, p. 71.

Progress Made During 1828

1. Section 1. Black Rapid. One lock 10 feet lift & a Dam 10 feet high across the Rideau River, contracted,... the excavation for the Lock nearly completed....

PAC, RG8, Vol. 45, p. 28. Letter to Gen. Mann from John By Rideau Canal Office, 23rd January, 1828.

Also

W055, Reel B-2811, Vol. 865, p. 156-157.

2. Janr^y 25: Paid Phillips & White, Works Black Rapids etc...£992,,19,,9.

Janr^y 31: Paid Phillips & White Works Black Rapids £1000,,0"0.

PAC, RG8, Vol. 45, p. 182. Lennox Rudyard Paymaster at this Station requests an Allowance for the following Sums by him disbursed on Account of the undermentioned Services between the 1st January and 31 of March, 1828.

3. ...The dams and other works at Black Rapids and Long Island, are also going on with renewed vigour under the steady and judicious management of Messrs. Philips and White.

The Loyalist Aug. 9th, 1828, p. 74.

Progress Made During 1829

1. From Hogs Back to Black Rapids: Deepening shoals not yet

commenced.

Works at the Black Rapids: Dam about 3/4 finished. Clearing completed. Excavation of Lock pits completed, of lower & upper entrance about 1/2 done; masonry of the lock about 3/4 finished. Lower pointed Sill laid. Ashlar and rough stone to complete the Lock drawn to the Spot.

...Backing & Puddling of Lock completed nearly as high as the masonry of, side walls about 2/3rds. finished.

PAC, W055, Reel B-2811, Vol. 866, p. 169.

Also.

W044, Reel B-1294, Vol. 19, p. 40.

Also.

RG8, Vol. 47, p. 244.

Progress Made During 1830

1. Hogs Back to Capt. Wilson's Still Water: This excess includes the Masonry required to the Breast works of the Lock at Hartwells in consequence of the nature of the Foundation.

Black Rapids: - and the guard Lock which it was deemed expedient to place at the Hog's Back.

PAC, W055, Reel B-2812, Vol. 867, p. 193. Abridged Abstract Report of the Works on the Line of the Rideau Canal Showing amount of Original Estimate, Sums Expended and amount when Completed, March 30th, 1830.

2. General Description of the Works at Black Rapids as approved of by the Committee:

The Works at this place as approved of by the Committee. consisted of a Lock of 10 feet lift, a Dam 12 feet in height, and a Lock Master's House, with the necessary Excavations etc.

Earth Excavation: ...Increase of Expense arises from the necessity of affording sufficient room for a direct Entrance into the Lock, which was not precisely defined when the Estimate was made.

Dam: The land abutments having...(too faded to read) ...

Waste Weir at West end of Dam, with Wing Walls, Stop Gates, Sill etc.

From Winter's experience it has been found that the Frost affects these dams several feet below the surface of the Water has been allowed to ... them ... [too faded to read].

Having observed that the Spring floods flowing over the Dam, had a great effect upon the Bed of the River immediately in front of the same, by tearing up the Strata, I considered it indispensably necessary to provide for the safety of the Dam, and conceived that a Waste Weir, sufficiently wide to allow a large portion of the Water of the River to pass through it during the Spring floods, was the safest as well as the cheapest mode that could be adopted, and I am happy in being able to state, that this work completely answered the purpose desired in the Spring

of 1830.

Cill [sic] for Waste Weir

A Waste Weir having been decided upon as the best mode of providing for the safety of the Dam, an Oak Sill for the same was indispensably necessary for the Stop Gates, by which the Water in the River is regulated to rest upon, otherwise, the Water would have passed between the Stop Gates and the Rock, owing to the unevenness of the latter.

Stop Gates in Waste Weir and Cills

These Stop Gates were indispensably necessary upon the Construction of a Waste Weir, forming the Breast work of the same, over which the Water of the River flows, and are required to regulate the depth of the Water.

Rock Excavation, Substructure etc...

The necessity of Extra Rock Excavation in the Lock Pit, and consequently Extra Substructure was not foreseen at the period of forming the Estimate of Works given to the Committee, but was found indispensably necessary for the permanent security of the Lock, and arose from the dip of the Rock, which had to be removed to a greater depth than anticipated, to obtain level foundations.

PAC, W044, Reel B-1294, Vol. 18, pp. 250-253.

Progress Made During 1831

From the Hogs Back to the Black Rapids

As the works to be constructed at the Hogs Back would not give the required depth of water over the rapids & shallows at Captain Wilson's, it was necessary to deepen the same; also to clear the three Islands of Standing timber, which would otherwise have obstructed the Navigation; these several Services were in consequence provided for, as far as their nature and extent could be ascertained, in the Estimate given to the Committee.

Works from the Hogs Back to the Black Rapids

Removing Boulders out of the Rapids, Deepening Shoals and Clearing the Islands provided for in the Estimate given to the Committee, and will be completed by the 30th June next.

Increase of Expense has arisen from the difficulty of removing large Boulders out of the rapids, also from the being obliged to clear the Channel of the River of sunken timber and fallen trees, which would have obstructed the Navigation. The necessity of these latter services was not foreseen at the period of forming the Estimate given to the Committee....

Black Rapids

Works approved of by the Committee

These Rapids were 2945 feet in length, descent in that distance 4 feet 6-1/2 inches, mean breadth 275 feet, and average depth over the site of the proposed Dam 2 feet,

distant from Bytown 9-1/3 Miles, and from the Hogs Back 4 miles. The plan submitted to and approved of by the Committee, was to place a Lock of 10 feet lift, the Chamber Walls & Gates of which were to have an additional height of 3 feet, to guard against the Spring floods, in a bay on the left bank of the River at the foot of the Rapids: the depth of water where it was proposed to place the lower Sill, being 3 feet 2 inches, not including 1 foot 6 inches to be backed up by the Works at Hogs Back. This Shallow continued for some distance, and as the Canal was to be carried through the point forming the Bay alluded to, the Excavation, consisting of Rock & Earth, necessary to obtain the required depth of 5 feet water, averaged 700 feet in length, 50 feet in breadth and 3-1/2 feet in depth. A Dam of 300 feet in length, and 12 feet in height to serve also as a Waste Weir, was to be constructed across the Rapids, which required to be cleared of large Boulders. The Works described were to render the River Navigable for a distance of 6 Miles by backing a sufficient depth of water over Little & Wicked Rapids, situated between Black Rapids and Long Island, and two feet on the lower Sill of the Lock, to be built at the latter place; A Lock Master's House with the necessary Backing, Puddling & Embankments were also provided for in the Estimate given to the Committee.

Deviations from the Plan approved of by the Committee and Extra Works

No. 1. Having observed that the spring flood flowing over the Dam, had a great effect upon the bed of the River; immediately in rear of the same by tearing up the strata of Rock, I considered it indispensably necessary to provide for the safety of the Dam, and in consequence have built a Waste Weir sufficiently wide to allow a large portion of the water of the River to pass through it during the Spring floods, and so constructed, as that the water can be drawn down below the level of the Upper Sill of the Lock, to provide for repairing the Works when required. The Weir completely answered the purpose desired in the Spring of 1830, very little water passing over the Dam.

No. 2. In consequence of the nature of the rock dipping at a great angle, extra Excavation in the Lock Pit was required to obtain a level and secure foundation for the Masonry of the Lock, the necessity of which could not have been foreseen at the period of forming the Estimate given to the Committee.

Works at Black Rapids

Clearing Land: provided for in the Estimate given to the Committee, and will be completed by the 30th June next.

Grubbing: provided for in the Estimate given to the Committee, and is completed.

Increase of Expense has arisen from it being found requisite to give a greater width in front of the Lock, to allow of a

good and direct entrance into the Same, which I considered indispensably necessary in every case, and was not fully provided for in the Estimate given to the Committee. Clearing Boulders out of the Rapids: provided for in the Estimate given to the Committee, and is completed.

...The above expenditure includes the clearing out Wicked Rapids.

Coffer Dam: provided for in the Estimate given to the Committee, and is completed.

Pumps & Labour: provided for in the Estimate given to the Committee, and is completed.

Increase of Expense: Has arisen from the open nature of the Rock, which could not have been foreseen, admitting water from the river into the Lock Pit, which had to be pumped out whilst laying the Oak Sill and hanging the Lower Gates.

Earth Excavation provided for in the Estimate given to the Committee and is completed....

Increase of Expense has arisen from the necessity of obtaining a direct entrance into the Lock, which the plan submitted to the Committee, did not fully provide for.

Rock Excavation provided for in the Estimate given to the Committee, and is completed.

Increase of Expense has arisen from reasons afforded.

Lock Masonry provided for in the Estimate given to the Committee, and is completed.

Backing & Puddling provided for in the Estimate given to the Committee, and is completed.

Increase of Expense has arisen 1st From the necessity of Puddling in rear of the Masonry of the Waste Weir. 2nd. The Contract price for these Services exceeded the Estimated one, which circumstance was omitted to be provided for in the Estimate given to the Committee. 3rd. A greater quantity of Backing was required, owing to the formation of the ground than provided for in the Estimate given to the Committee.

Lock Gates, Oak Sills, Sluices, Crabs & Chains etc. provided for in the Estimate given to the Committee, and will be completed by the 30th June next.

See explanations afforded on the First Eight Locks relative to the above Services.

Dam provided for in the Estimate given to the Committee, and it will be completed by the 30th June next.

Increase of Expense Has arisen from the construction of a Waste Weir, which rendered an increase in the height of the Dam necessary, also in consequence of the unsound nature of the Eastern Bank, the Key work had to be extended into the same for 71-1/2 feet in length, and a retaining wall built in front, to prevent the water working round the end of the Dam.

Embankments provided for in the Estimate given to the Committee, and are completed.

Increase of Expense: In consequence of the alteration from

the original plan an additional height and thickness was required to the Embankments.

Lock Master's House provided for in the Estimate given to the Committee, and is completed.

Waste Weir not provided for in the estimate given to the Committee, and will be completed by the 30th June next. This Work was required for reasons afforded ...

Macdamizing face of Embankment not provided for in the Estimate given to the Committee and is completed.

Considered expedient to prevent the wash of water acting on the Earth forming the Embankment.

PAC, W044, Vol. 20, B-1295, pp. 393-403.

Progress Made During 1832

1. The Locks at the Entrance Valley, Hog's Back, Black Rapids...in number 15, have been completed, thus opening more than 40 miles of the intended Water Communication from the Ottawa.

Report on Canal Communication in Canada pp. 6 and 7. Mem. 3rd February, 1832.

British Parliamentary Papers, Reports Correspondence and Papers Relating to Canada 1825-30.

Projected Cost of the Works

From Hog's Back to Black Rapids £366,,12,,0

Black Rapids £9831,,15,,11

PAC, W044, Reel B-2394, Vol. 19, p. 20.

Probable Amount of Each Section When Completed

Black Rapids £13977,,10,,2

PAC, RG8, Vol. 52, pp. 229-230. - Statement to the 31st March 1831....

Excerpts from Lieutenant Frome's Report

This work consists of a single lock on the left bank of the river, built on a rock foundation, and a dam, about 12 feet high, constructed on the original plan, with the water flowing over it, - but, to avoid the injury likely to be sustained by the large volume in the spring, a cut stone sluiceway was formed on the bed of the river, between the wing-wall of the lock and the dam, closed as required with squared logs lowered down a groove in the piers of the masonry. ...The lift of the lock is 9 feet, allowing 7 feet water on the lower, and 6 feet on the upper sill; the height of the breastwork being 10 feet.

PAC Library, UG7 G72, Vol. I, *Professional Papers of the Corps of Royal Engineers*, Lieutenant Frome's Report, pp. 82-83.

Miscellaneous Information

Description of a Traveller's Journey through the Canal The Black Rapids. Here the works consisting of a small

embankment or Dam, a waste weir and one lock are completed; and seem a piece of good substantial work every way worthy of the talents and attention of the contractors Messrs Phillips and White. This part has been done under the immediate direction of the former gentleman and he has performed his duty.

PAC, MG24, 19, Vol. 7, p. 2055. Memoranda of a Journey from Kingston to Bytown made along the Route of the Rideau Canal, in February 1830.

Various Particulars of Interest Concerning the Rideau

From the Hog's Back to the Black Rapids the channel of the Rideau is entirely used, as it continues to be, to its source in Rideau Lake. The only labour required is in removing large boulders out of the river and deepening some shoals. The bed of the Rideau lead is generally rocky and often covered with boulders averaging 1-2 a ton in weight. These boulders are not limestone of the same nature with the rocks abounding about them, but chiefly of granite.

The Black Rapids are situated between Capt. Wilson's House in Gloucester and Long Island Still Water, and cause a fall in the level of the river of 8 1/4 feet. To surmount this, a dam of 12 feet elevation across the river, with a lock of 10 feet lift on the right bank of the river is required. Sufficient water will be thrown back into the lock from the dam at Hog's Back; and the rapids, which before had only 1 foot of water, will be entirely drowned. The shores are high, and the excavation consists mostly of rock and hard clay. ...Messrs Philips White have contracted.

PAC, MG24, A12, Vol. 38. *The Montreal Herald*, Saturday, Sept. 22nd, 1832. "Rideau Canal."

Name of Canal Section

Long Island - Long Island Still Water.

Number of Canal

Section Number 1.

Contractors

1. Mr. Phillips a respectable mason at Montreal is now opening quarries at the foot of the Black Rapids, to construct a Dam across the Rideau River...; this Dam is to throw back the water & thereby form a sheet of still water 5 miles long, which completes the Canal to the foot of Long Island Rapids, where I propose three Locks of eight feet lift each, & a Dam across the Rideau River 158 feet wide, perpendicular height 24 feet, which will throw back the water three miles, & convert that length of Rapid into still water, and given an uninterrupted navigation for 23 miles to Colonel Burrett's house on the Banks of the Rideau River 44 Miles from the Ottawa.

PAC, RG8, Vol. 44, pp. 85-86. Letter to General Mann from John By, Rideau Canal, 6th July, 1827.

2. 5th June, 1827: Phillips & White - Section 1 Black Rapids & Long Island.

PAC, W055, Reel B-2811, Vol. 865, p. 210. List of the various Contractors on the line of the Rideau Canal.

3. Section 1. Long Island still water. Deepening shoals and removing Boulders contracted for by Messrs. White & Phillips.

Section 1. Long Island Rapids. Three Locks of 9 feet lift each, and a Dam across the Rideau River 27 feet high, and embankments contracted for by Messrs. White & Phillips, their works are being well constructed and are proceeding rapidly.

PAC, RG8, Vol. 45, p. 28. Letter to Gen. Mann from John By, Rideau Canal Office, 23rd Jan, 1828.

Also

W055, B-2811, Vol. 265, p. 145.

4. Mr. Andrew White the Contractor for the Job at Long Island and Black Rapids.

PAC, W044, Reel B-1300, Vol. 27, p. 167. Letter from H.H. Burgess, New York, 1st April, 1832.

5. Having submitted to the Board a letter from the Commanding R1 Engineer on the Rideau Canal dated the 7th March last reporting the circumstances under which he entered into a verbal agreement with Mr. Garlick to forward all stores and iron work (required for the Lock gates, sills, sluices etc. on the line of Canal) from the Hog's back to Black Rapids, Long Island and Burritts Rapids. PAC, W055, Reel B-2814, Vol. 869, p. 104. To Maj. Gen. Sir A. Bryce from R. Byham, Office of Ordnance, 15th June, 1832.

Progress Made During 1827

1. Mr. Phillips a respectable mason at Montreal is now opening quarries at the foot of the Black Rapids, to construct a Dam across the Rideau River 280 feet wide, perpendicular height 10 feet & a Lock of 10 feet lift; this Dam is to throw back the Water & thereby form a sheet of still water 5 miles long, which completes the Canal to the foot of Long Island Rapids, where I propose three Locks of eight feet lift each, & a Dam across the Rideau River 158 feet wide, perpendicular height 24 feet, which will throw back the water three miles, & convert that length of Rapid into still water, and given an uninterrupted navigation for 23 miles to Colonel Burrett's house on the Banks of the Rideau River 44 Miles from the Ottawa ...

PAC, RG8, Vol. 44, pp. 85-86. Letter to General Mann from John By, Rideau Canal, 6th July, 1827.

2. Works at long Island rapids, chopping clearing & grubbing, excavating for the locks, quarrying stones, clearing Land Constructing Dam etc...In Progress.

Works at Lond [sic] Island still water clearing away rushy Islands, and floating swamps, dressing banks & scouring river bed, deepening the bed of river at Fords shallows [fords and shallows].

PAC, RG8, Vol. 44, pp. 167-168. Progress Report of Works at the Rideau Canal from the 21st September, 1826 to the 31st October 1827.

3. At the Hog's Back, Black rapids, Long Island...Quarries have been extensively opened & a quantity of Cut Stone prepared for the Locks...and Cuts at these Stations are in a forward State of progress.

PAC, W044, Vol. 19, Reel B-1294, p. 71.

Progress Made During 1828

1. Section 1. Long Island still water, Deepening shoals and removing Boulders contracted for by Messrs. White and Phillips.

Section 1. Long Island Rapids. Three locks of 9 feet lift each, and a Dam across the Rideau River 27 feet high, and embankments contracted for by Messrs White and Phillips, their works are being well constructed and are proceeding rapidly.

PAC, RG8, Vol. 45, pp. 22-30. Letter to Gen. Mann from John By Rideau Canal Office, 23rd January, 1828.

Also

W055, Reel B-2811, Vol. 865, p. 148.

2. The dams and other works at Black Rapids and Long Island, are also going on with renewed vigour under the steady and judicious management of Messrs. Philips and White.

The Loyalist, August 9th, 1828, p. 74.

Progress Made During 1829

1. Works at Long Island: Dam about 3/4 finished. clearing and grubbing is completed; Excavations for Lock and entrance about 1/2 finished. Masonry of the Upper lock about 1/2 finished; a quantity of cut & rough stone prepared on the spot. ...Embankment west side of river nearly finished. Works at Long Island Still Water: Deepening Shoals etc. not commenced.

PAC, W055, Reel B-2811, Vol. 866, p. 169. Progress Report to 1st March, 1829.

Also

PAC, W044, Vol. 19, Reel B-1294, p. 40.

Also

PAC, RG8, Vol. 47, p. 244.

Progress Made During 1830

1. Long Island Still Water: In consequence of increased height of Dam consequent increase of volume of waste weir to carry flood water off bad foundations etc.

PAC, W055, Reel B-2812, Vol. 867, p. 193. Abridged abstract Report of the Works on the Line of the Rideau Canal Showing

amount of Original Estimate Sums Expended and amount when Completed.

2. Rock Excavation for Locks

Increase of Expense: 1st.- In the Upper Lock, the Rock on the side next the Dam turned out very unsound, which rendered an increase in the Depth of the Excavation indispensably necessary to obtain a secure Foundation for the Masonry of the Side Walls and Breast Work; Secondly, In Excavating the Second and River Lock Pits the thickness of the last Strata to be removed, turned out from 18' to 22 Inches, when only Nine Inches was required this was unavoidable, and explains itself, but occasioned an increase in the Rock Excavation; Thirdly The Bed of the River forming the Foundation of the Dam, was of so shelsy a Nature that a Puddle Drain was indispensably necessary in order to prevent the Water forcing its way under the same, & the Excavation of which is included, in the Rock Excavation for the Locks.

- Fourthly more Rock Excavation occurred in general, than was stated in the Estimate given to the Committee, arising from the necessity of Excavating the Lock Pits to a greater Width owing to the unsound nature of the Rock than was provided for in the said Estimate this circumstance could not have been forseen and was indispensably necessary, in order to allow of a, proper thickness of puddle being placed in Rear of the Chamber Walls of the Locks for their Security.

Masonry of Locks:

Increase of Expense: Caused in consequence of its being found requisite to have additional Depths of side Walls, and in Upper Lock on Account of Rock foundation...out unsoled, as shewn on the Sections additional Breast Work in 2nd Lock for same reason additional Retaining Side Walls for Puddle etc..etc...

2nd. It was also necessary to raise the Chamber Walls of the Upper Lock (to meet the alteration from the Original Plan) to the same height as the Dam, in order to prevent the Water of the River from flowing through the Locks, or between the Upper Lock & the Dam.

3rd. Extra Masonry was required for reasons stated respecting the Increase in Rock Excavation.

Backing and Puddling Locks: The same reason applies as for the proceeding and in consequence of its having been found necessary to extend the Puddle round flank of Dam and between retaining Wall and Dam to secure abutments.

Dam, containing The Bed of River not being found sufficient to resist the Power of Water Falling over the Dam, it was found necessary to turn Water of the River thro' Waste Weir formed for that purpose to do which it was found indispensably necessary to raise the Dam 5 feet higher than was originally intended and in consequence to extend the Base & volume of the Dam.

Removing Old Saw Mill

Old Saw Mill, is an erroneous expression, & ought to have stood in the Original Estimate, Removing a Saw Mill. The Mill in question was in full operation when I proceeded through the Line of Canal in the Spring of 1827, the Dam and Sluice way connected with it, at that period were in good repair; It was found indispensably necessary to remove the Mill & Dam, they occupying that part of the River which it was proposed to render Navigable.

In consequence, I estimated the Expense of their removal to another Site, but the Proprietor, having also a Claim for Damages sustained by his Land being overflowed with Water, I ultimately considered it better to come to some arrangement, and therefore paid him the Sum of £433,,6,,8 which I deemed a fair and just remuneration for such Damages including the Mill Priviledges, and which is in full of the above Claims in consequence of the construction of the Canal as reported at the time.

Embankment from Dam Wing

The same reason applies as for Dam, extension Base and general balance, as well as increase of height.

Purchase of Lands

It having been ascertained that a greater quantity of Land would be Drowned, than stated in the Estimate approved of by the Committee the deficiency was provided for in Document K.

Paving Bed at River Below Dam

In the construction of the Dam it was found necessary to turn the whole water of the River through a temporary Sluice Way in the Dam situated on the Rapids, the face of the Water acting on the Bed of the River...it out so as to render the Foundation of Dam precarious which rendered incurring of the Item of Expense indispensable.

The Pavement in question was formed of the largest Boulders that could be procured from the Bed of the River and Masses of Rock Wedged in with smaller Material.

Contingencies on Locks

These Items of additional Expense incurred to be balanced by Item of Stone Sills, wood proving equally Serviceable when always under Water.

...the Contingencies in question were the Expenses incurred in laying the Oak Sill, the Rock on which it had to be placed having to be worked even.

Retaining Wall, West Side

The West Side of the Upper Lock being superstructure it was indispensably necessary to place Walls between it and the River, to retain the Puddle, I also found it necessary to Puddle & Pave immediately in front of the Upper Breast Work, to prevent the possibility of its blowing.

Masonry at Waste Weir

The necessity of Masonry arose from there being no Rock, where it was deemed most advisable to place the Weir in question, the Soil consisting of blue Clay; Substantial Stone Piers were constructed, to guard against the rush and pressure of Water immediately at the outlet, from the fear that no other description of Work would stand.

Macadamizing in Front

This Service was executed from the consideration that the covering the clay with small Stones at the Entrance of the Waste Weir immediately in Front of the Sill would tend to Counteract the effect of water on so soft a material, the Draft of Water flowing over the Weir naturally causing an Eddy.

Excavation, Puddle, etc.: See Remark on Dam.

These Services were indispensably necessary, the former, for a channel from the Waste Weir to a Natural Gully which entered the River below the Dam, the latter, for the Security of the Waste Weir. Increase, above the probable Amount of Works to complete sent to England in the Spring of 1830, was in consequence of having to give a greater Slope to the Clay Banks of the Excavation, than was at first contemplated.

Clearing and Grubbing

These services were indispensably necessary, the space to be occupied by the Waste Weir, as well as the Surface of the necessary Excavation for the Channel having to be Cleared and Grubbed, and the Expense of these Services was increased in consequence of the clearances made, with a view of ascertaining the most eligible Site for the proposed Waste Weirs.

Clearing Out Wicked Rapids

These Rapids are situated between the Black Rapids and Long Island, it was necessary to remove some Boulders and large Masses of Rock out of the Same.

Wooden Sill for Locks

Considered to be equally durable with Stone when perpetually under Water and never exposed.

1st A Wooden Sill was substituted for a Stone one in the Lower Lock; from the circumstance, that Oak constantly under Water is equally durable with Stone, and less expensive, being quicker laid down and consequently causing a great Saving on Pumping.

2nd. The Quarry at this place ran out, and the Contractors had to procure Stone from the Hogs Back to complete the Masonry of the Locks, a distance of 9 Miles.

Stop Gate Complete

In the event of any repairs to Sills, Sluices, etc...; it was deemed necessary to introduce this.

To provide for the Repairs which might be required to the Lock Gates, Sills, or Sluices, it was deemed necessary to have Stop Gates in readiness, otherwise, when an accident occurred, however trifling to the Upper Lock it would be necessary to form a Cofferdam in Front of the same, the construction and removal of which at any one period would Cost at least £200, and in case of a sudden rise of the River, the Cofferdam might be injured and the Water rushing into the Upper Lock and upon the second Pair of Gates, might give rise to serious injury.

PAC, W044, Vol. 18, Reel B-1294, pp. 254-258. Signed John By, Lt. Col. Royal Engineers, Commanding Rideau Canal.

Progress Made During 1831

1. On the 13th Inst., I passed not only through the 1st 8 Locks but the two Locks at Hartwell's, the two Locks at the Hogs Back, the lock at the black Rapids, and the three Locks at long Island Making 16 Locks all perfect which opens the Navigation from the Ottawa to Burrets Rapids, a distance of 45 Miles, and I feel Confident that next Month will nearly complete all the other Locks with I trust equal success.

PAC, RG8, Vol. 441, p. 278. Letter to Col. Durnford from John By, Lt. Col. Royal Engineer Office, Rideau Canal, 14 Sept., 1831.

2. Long Island Rapids:Works approved of by the Committee.

Long Island distant from Bytown 14-1/2 Miles, and from Black Rapids 5-1/3 Miles, divides the Rideau River into two Channels, its length prior to commencing the Works was 3960 yards, and medium breadth 900 yards. The Rapids which it was necessary to surmount commenced immediately at the head of the Island, their length being 4266 yards, descent in that distance 23 feet 11 inches, mean width of each Channel 300 feet, and depth of water over the site of the proposed Dam 1 foot 9 inches.

The Plan submitted to, and approved of by the Committee, was to a much greater extent, were also required, than provided for in the Estimate given to the Committee; the former to enable a Steam Boat to Work freely and the latter, from the circumstance of a Ravine running from the Snie to the River, which was not discovered until the Clearing above stated had been executed, and across which an Embankment had to be formed to prevent the escape of the water. As the River at the Upper entrance into the Snie required to be deepened, in order to lessen the expense of the same as much as possible, I have increased the lift of the Lock 6 inches. No. 4. In consequence of the banks of the River proving very unsound, I considered it indispensably necessary to

construct Stone Abutments for the Dam, which serves also as a Waste Weir, fearing otherwise that the water would in time find its way round the ends of that Work, thereby occasioning serious injury to the same, if not its total destruction.

PAC, W044, Vol. 20, Reel B-1295, First paragraph is on p. 403 and last five paragraphs are on p. 413.

Progress Made During 1832

1. The Locks at the Entrance Valley, Hog's Back, Black Rapids and Long Island, in number 15, have been completed, thus opening more than 40 miles of the intended Water Communication from the Ottawa.

PAC, Mem. 3 February, 1832. p. 6 & 7. Report on Canals in Canada. in *British Parliamentary Papers*, Reports, Correspondence and Papers Relating to Canada 1825-32, Colonies Canada, Vol. 6.

Projected Cost of the Works

Long-Island Rapids	£19,540,,11,,0
Long-Island's Still Water	£650,,0,,0

PAC, W044, Vol. 19, Reel B-1294, p. 20.

Probable Amount of Each Section When Completed

Long Island and Long Island Still Water	£38,525,,19,,7-1/2
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PAC, RG8, Vol. 52, pp. 229-230. Statement to the 31st March 1831.

Excerpts from Lieutenant Frome's Diary

Long Island. At the foot of Long Island, 5-1/2 miles higher up, are three combined locks on the right bank of the river, on a rock foundation, and a dam 31 feet, on the original plan...a large channel was cut through the clay, on the opposite side of the river, to a ravine, through which the surplus water finds its way back into the river about a quarter of a mile below. The dam was raised 4 feet to guard against the spring floods, and an embankment between it and the sluiceway continued on the same level. This sluiceway consisted of three channels of 33 feet wide, between piers of cut stone 60 feet long, the centre about 6 feet deeper than the two extreme ones. The floors were of timber, continued some distance below the end of the piers; but where this flooring ceased, the water formed deep pools, undermining the whole work. ...Another channel, to carry off a portion of the water, was also formed by taking advantage of a creek, a mile and a half up the river, and leading it into the same ravine. The total lift of the three locks is 25-30 inches allowing 8 feet 5 inches water in the lower lock, and 7 feet against the upper gates.

Excerpts from Lieutenant Frome's Diary, PAC Library, UG7 G72, Vol. I, *Professional Papers of the Corps of Royal*

Engineers, p. 83.

Miscellaneous Information

Memorandum of a Journey along the Route of the Rideau Canal

Long Island this place as its name implies is so called from an island of about three miles long which lies in the middle of the river separating it into two branches. The water position of this island confining the channel on each side of it renders the current swift; and a further obstacle to the navigation is presented in the fall of the river which is very considerable along the whole length of the island. To overcome these impediments the works are erecting at the foot of the island under the direction of Mr. White of the firm Phillips & White who are the contractors for this and the next job we come to. These works consist of a Dam of 31 feet high to back the water up to the top of the island; and three locks of nine feet lift each to overcome the fall. These last are building partly of a greyish sandstone very hard and so difficult to cut that the contractors have found it more advantageous to bring some of their stones from the Hog's back a distance of 10 miles during the favourable winter roads rather than use the above kind in whole. The Dam here is finished and is a piece of Masonry which bids fair to endure - at all events the Contractors have done their duty. It would be well if the plan had been as well devised as it is executed; but here as well as in other Dams on the Canal I observe a defect; In almost all of them the figure of an arch presenting its apex to the current is maintained so far the principle is correct, but as the resistance they have to make against the pressure of the current is exactly the same as that of weight placed upon an arch; unquestionably the arch of the strongest form ought to have been adopted. This is allowed to be the Gothic or pointed arch and the nearer these dams approximate to this figure the stronger they will be - and vice versa the less circular or the nearer the approach to a straight line across the river the weaker they will be for resisting the pressure. On this ground the dam at Long Island is badly formed being a segment of a very large circle or arch crossing the river in too straight a direction to be considered strong. There is a very complete waste weir here completed with two handsome stone piers at its entrance, and a gate composed of neatly square logs fitted into a notch in each pier so that one or more of them can be removed at pleasure and the water kept at a proper height. At this station the works upon the whole are well advanced both the Dam and waste weir are finished; One of the Locks is also nearly complete and the other so far progressed that there is every prospect of the whole being completed this next summer. There is also an appearance of the stable foundation of a new village here not observable at many

other stations on the line.

PAC, MG24, 19, Vol. 7, pp. 2054-2055. Memoranda of a Journey from Kingston to Bytown made along the Route of the Rideau Canal, in February 1830.

Various Particulars of Interest Concerning the Rideau Canal

The Canal meets with no interruption for 5 miles, till it arrives at Long Island Rapids, situated at the foot of Long Island. These rapids contain only 1 foot of water, but are of such height as to require 3 locks of 9 feet lift each, to surmount them. To drive the water back as far as Burrett's Rapids, a dam 29 feet above the base of the river will be erected across the stream, and extend over both banks, which here are high on both sides. The locks are erected on the left side of the river, and a large embankment on the right narrows the Channel. The dam will not only overflow the rapids of Long Island,..but will afford deeper water over several shallows which occur...and give an uninterrupted navigation of 28 miles ... Some labour will be necessary at the latter still-water in clearing away rocky islands, dressing the banks, scouring the bed of the river, and deepening it at the fords and shallows. The wilderness along Long Island is extremely rough and difficult to be surveyed, and some doubts are entertained, if the banks be able to retain the waters backed on the rapids by the dam. Limestone abounds at this place, of a quality adapted for building the locks, but sand has not yet been met with. These are the whole of the works in what is termed the first section of the Canal.

The Montreal Herald, Saturday, September 22, 1832 "Rideau Canal."

PAC, MG24, A12, Vol. 38.

Geological Features of the line of the Rideau Canal

From Burritts to Long Island the banks of the Canal are covered with deluvium to some depth - at the latter place and thence to Bytown after removing several feet of sand or clay a (secondary) limestone is met with this in general is very compact and excellent building stone. At Long Island good cement or water lime may be made from some of the Strata.

PAC, MG29, A24, Vol. I, K. p. 51. "Rideau Canal" -Geological Features of the line from the Report of Mr. Burrows, Civil Engineer, 1832.

Name of Canal Section

Burritts Rapids or Oxford Snie

Number of Canal Section

Section Number 2.

Application for the Contract

1. Proposals for performing the Several Works required

towards the Construction of the Rideau Canal at Burrits Rapids.

We Philomen Wright & Sons do hereby propose to perform the above mentioned Work according to the plans Sections and elevation of the same exhibited at the Royal Engineers Office at this place viz:

The River is to be raised at this place by a Dam of 10 feet high and 240 feet long or thereabouts with wing walls extending to the banks on each side.

A lock of 10 feet lift to be constructed at the lower end of the natural ravine called "Oxford Snie" this is to be made and constructed according to the other locks on the Rideau Canal.

The necessary excavations for the lock pits and line of Canal, in the above mentioned "Oxford Snie" together with the necessary chopping, Clearing, and Grubbing of the land required for the works of the place.

The Dam is to be built on the following manner, viz, The bed of the River is to be cleared out and excavated in the Solid Rock to the depth of 2 feet to form the foundation for the front wall of the Dam and for the puddle this wall is to be 12 feet thick at the bottom and 8 feet thick at top, the upper course is to be continued 20 feet towards the reverse slope of the Dam so as to secure the puddle placed in the rear of the aforesaid wall; This wall is to be built of large rough stones as taken from the Quarries not to be less than three feet long these are to be placed on their edges with their best ends outwards to form the front of the works and are to be fitted in with such stones as can be driven down between them. Where the angles or other parts are imperfect so as to render the whole mass as compact as possible or as the nature of the materials used will admit. The puddle placed in rear of the front wall is to be 6 feet thick to be formed of clay put in, in the best possible manner to prevent the Dam from leaking, or to render it water tight, that part of the Dam in rear of the puddle may be composed of rough stones, rubble, boulders, Earth, Clay or gravel as shall be found most convenient, or as shall be directed to be used. The whole of these materials are to be covered with at least two feet in thickness of good rubble stones laid closely together so as to prevent the Earth, Clay etc. placed beneath these from being washed away, and in this event of the puddle or other parts of the Dam proving defective; or not capable of retaining the water. The contractors are to make the same good at their own expense and for the due fulfilment of this part of the Contract, their Securities will be held responsible until two Spring floods shall have passed over the Dam, the prove the same, after the works are finished and the Canal in operation.

The locks to be constructed in a similar manner to the other Locks of the Rideau Canal and the General

Specification of the Locks given to the Several Contractors is to be acted upon in all its particulars, the necessary plans, sections and other drawings of these works will be furnished by the Royal Engineer Departments.

A Cofferdam to be constructed at the entrance of the Lock within which some deepening will be required the water in the Space inclosed will require to be pumped out & the works kept dry during its progress and the Dam will also have to be removed when the works are finished the whole of which is to be done by the Contractors.

The Excavations for the line of Canal and Lockpits Entrance of Lock etc., to be performed together with the chopping, clearing and grubbing of such lands as required for the works etc. the excavations at the lock pit and entrance to it consists chiefly of Rock, the other parts of the Soil of Earth and Clay.

The whole of the above works we propose to perform for the several prices following viz. For the Dam and wing walls as far as it is thought necessary to build the retaining walls the sum of 2/10/2 pr Cubic Yard, for the masonry of the locks 1" 3-1/2 per Cubic foot Excavations of lock 3/6 per Cubic yard and of Earth and Clay Gravel etc. /6 pr Cubic yard, the various works of the Cofferdam as furnishing the necessary materials for its Construction. Constructing the same pumping out the water and keeping the works dry during their progress - together with the removing the whole of it, or such parts as may be found necessary, when the works are completed we propose to perform for the sum of one Hundred pounds £100-pounds. And for the chopping, clearing and burning off, of the Lands £4 " " pr English acre, and for the parts which required to be grubbed an additional sum of £16"15""pr acre.

The before mentioned Services are to be done in a good substantial and workmanlike manner and to be Subject to the inspection and approbation of Lieut. Colonel By Comg Royal Engineer Rideau Canal, or to that of such officer as he may appoint to inspect and superintend the same, and it is to be distinctly understood that only such part or parts as the Commanding Royal Engineer shall direct, shall from time to time be performed the Comg Royal Engineer at the same time reserving to himself the power of making such alterations from or additions to the original plans & specifications as he shall deem necessary for the benefit of the Service, but if it is found that the Contractors suffer any loss or damage by so doing the same shall be compensated for, to them.

And further if any disputes or misunderstandings should arise the same shall be left to the decision of the Commanding Royal Engineer which shall be final and binding on all parties. The whole to be completed by the first day of ----- and for the due fulfilment of this agreement we offer as securities Thomas Brigham and Thomas Marshall

Fulford ----- to be bound in the paid Sum at Two Thousand ----- And payments to be made as the work progresses the prices in the above Contract are in Sterling.

PAC, MG24, D8, Vol. 127, pp. 67493-67497. Dated By Town Rideau Canal, November 15th, 1827.

Contractors

1. 1st February, 1828, P. Wright & Sons. Section 2. Burrets Rapids.

PAC, W055, Reel B-2811, Vol. 865, p. 210. List of the various Contractors on the line of the Rideau Canal.

2. Section 2, Burritts Rapids or the Oxford Snie. Clearing out the Snie; a Lock of 11 feet lift & a Dam across the Rideau River 8 feet high near the mouth of the Snie, contracted for by Messrs. P. Wright & Sons. The clearing is proceeding rapidly.

PAC, RG8, Vol. 45, p. 28. Letter to Gen. Mann from John By Rideau Canal Office, 23rd Jan., 1828.

Also

W055, Reel B-2811, Vol. 865, p. 148.

3. Having submitted to the Board a letter from the Commanding R1 Engineer on the Rideau Canal dated the 7th March last reporting the circumstances under which he had entered into a verbal agreement with Mr. Garlick to forward all stores and iron work (required for the Lock gates, Sills, Sluices etc. on the line of Canal) from the Hog's back to Black Rapids, Long Island and Burritts Rapids.

PAC, W055, Reel B-2814, Vol. 869, p. 104. To M. Gen. Sir A. Bryce from Robert Byham, Office of Ordnance, 15 June, 1832.

Progress Made During 1827

1. Works at Burritts Rapids, chopping clearing and grubbing, excavating for Lock, constructing Dam...In Progress.

PAC, RG8, Vol. 44, pp. 167-168. Progress Report of Works at the Rideau Canal from the 21st September 1826 to the 31st October, 1827.

Progress Made During 1828

1. Section 2. Burritts Rapids or the Oxford Snie. Clearing out the Snie; a Lock of 11 feet lift & a Dam across the Rideau River 8 feet high near the mouth of the Snie, contracted for by Messrs. P. Wright & Sons. The clearing is proceeding rapidly.

PAC, RG8, Vol. 45, p. 28. Letter to Gen. Mann from John By, Rideau Canal Office, 23rd January, 1828.

Also

W055, Reel B-2811, Vol. 865, p. 153.

Progress Made During 1829

1. Section No. 2: Burritt's Rapids. Chopping and Clearing finished. Grubbing about 1/2 done. Excavation about 3/4s

done, a quantity of rough stone raised for the Dam & Cut & rough Stones for Lock quarried some of which are drawn to the spot, not yet measured.

PAC, W055, Reel B-2811, Vol. 866, p. 170.

Also

PAC, W044, Vol. 19, Reel B-1294, pp. 39-41.

Also

PAC, RG8, Vol. 47, p. 244.

2. I take this opportunity to Rite a few lines By the Barrer Mr. Whilemore he wants to look at McKay Locks and I Can spare him better now than any other time as I am making the Lower embankment the watter is so deep in the lock pit that Cannot work in it. I want you to send me a whipsaw and some files by the Government Cane [sic].

PAC, MG24, D8, Vol. 18, p. 6739 - Letter to Ruggles Wright from Tiberius Wright, Oxford, 7th May, 1829.

3. I have seen Mr. Frome and Capt. Gitt a general measurement of my work till next week I like wise spoke to him about the Dam he says that we must tender to Col. By before we Can Commence work as it must be bilt on the new plan and has Given me a ruff sketch which you will find inclosed I have examined the plase and stone and think that we Cannot build it short of fifteen shillings or seventeen and six per yd you considering the distance we have to draw the stone which is 1/2 Mile but I will leave that to your better judgement but wish you to tender with out deay [sic].

PAC, MG24, D8, Vol. 18, pp. 6912-6913. Letter from Tiberius Wright to Ruggles Wright, Oxford, 1st November, 1829.

Progress Made During 1830

1. Burrirt's Rapids: In consequence of increased Embankment for security from proximity to River constructing waste weir extra excavation etc.

PAC, W055, Reel B-2812, vol. 867, p. 193. Abridged Abstract Report of the Works on the Line of the Rideau Canal Showing amount of Original Estimate sums Expended and amount when Completed.

2. I send down a lonne [sic] for powder which I want sent immediately for we are obied Stop work for the want of it please to send me six barels of ninety lbs each if we have not Got it you must Go to Mr. Baird and he will Git it for you, pray don't detain the men on any Consideration.

PAC, MG24, D8, Vol. 19, p. 7231, Letter from Tiberius Wright to T. Brigham, Oxford Sny 11 June, 1830.

3. I take this opportunity to write a few lines by my to have you Git a requesion for five Barrels of powder for Burirts Rapids and send the men Back as quick as possible for I am quite out if Mr Hund Can be Spared let him lon with them, our masons are all idle for want of the Coln. Sanction to the plan Lieut. Frome will be Down tomorrow with the plan and I want you to see him and if he is not Coming back

immediately Git him to send the plan by one of my Boys in hast.

PAC, MG24, D8, Vol. 19, p. 7292. Letter from Tiberius Wright to Ruggles Wright Oxford, 3rd September, 1830.

4. Alterations and Extra Works

Prior to forwarding the probable Amount of Works to Complete, to England in the Spring of 1830, the Rock forming the Bed of the River at the Hog's-Back, Black Rapids and Long Island, proving so unsound, as not to resist the action of Water falling from a height; I deemed it expedient to provide for a Waste Weir at Burritt's Rapids, but having since that period ascertained that the Rock at that place is of a durable nature, I have returned to the original Plan, and the Work is being executed accordingly, but to secure the ends of the Dam as much as possible from the action of the Water I am building Stone Piers as abutments for the same.

It was necessary from the nature of the excavation of the Lock Pit that an Invert Arch or Wooden floor should be placed in the same, to guard against the rush of Water from the Sluices which would otherwise have worn the bottom of the Lock away, and in time, have undermined the Breast Work and Chamber Walls, but Considering that Hemlock Logs upon a hard Clay, and which would be constantly under Water, were nearly as durable as Stone, and at the same time a much less expensive material, I decided upon having a Wooden floor, instead of an Invert Arch.

After having cleared the Snie and taken correct levels, which it was almost impracticable to do in its original State, I found that much more rock and earth Excavation would occur, and that Embankments to a much greater extent, were also required, than provided for in the Estimate given to the Committee, the former to enable a Steam Boat to work freely, and the latter from the Circumstance of a Ravine running from the Snie to the River, which was not discovered until the Clearing above Stated had been executed, and across which an Embankment had to be formed to prevent the escape of the Water.

As the River at the upper entrance into the Snie required to be deepened; in order to lessen the expense of the same as much as possible, I have increased the lift of the Lock 1 foot 6 inches, this has occasioned an increase in the height of the Embankments.

Grubbing 5-1/4 Acres

Increase of Expense arises from the additional Embankment, the foundation of which had to be grubbed; more grubbing was also found necessary in Consequence of giving a greater width at the head of the Lock to allow of a direct entrance into the same for Steam Boats.

Earth Excavations: (too faded to read)

Rock Excavation and Deepening Hurds Shallow

Increase of Expense arises from a greater depth and width of Excavation being required than provided for in Estimate given to the Committee.

Backing and Puddling

Increase of Expense arises from the not being able to get those Services executed for the Estimated price of 6d per Cubic Yard; and additional height given to the Chamber Walls of the Lock, to save six inches in depth of rock Excavation under Water, at the upper Entrance into the Snie.

Two Sluice Gates Complete

Excess from substituting Crabs and Chains for Racks and Pinions, and Cast Iron Valves for Wood.

Masonry of Piers for Dam

These Piers and the Waste Weirs are necessary to prevent the Water flowing over the Dam as it is found to injure these works in Winter, they also insure a complete control over the Waters to regulate these in time of floods or draw them down in the case of repairs being necessary, or to clear out ... of River.

Indispensably necessary to form good abutments for the Dam, in Consequence of the Nature of the Banks of the River, there being a great probability, that unless Piers were built, the Waters might in time wash away the Banks, and work its way round the ends of the Dam.

Wooden Floor of Lock

Indispensably necessary to prevent the rush of water through the Sluices from undermining the Breast Work, and Chamber Walls of the Lock. If this Mode had not been adopted, an Invert Arch must have been substituted at a greater expense.

Waste Weir

The Dam serving also as a Waste Weir, the above work has not to be executed, the above Sum will therefore be a Saving.

PAC, W044, Reel B-1294, Vol. 18, pp. 259-63. Signed John By, Lt. Col. Royal Engineer, Commanding Rideau Canal.

Progress Made During 1831

1. Works at Burrett's Rapids:

Cutting & Clearing: provided for in the Estimate given to the Committee, and is completed.

Grubbing: provided for in the Estimate given to the Committee, and will be completed by the 31st Aug next.

Increase of Expense, has arisen from the additional Embankment, the foundation of which had to be Grubbed; more Grubbing was also found necessary in consequence of giving a

greater width at the head of the Lock, to allow of a direct Entrance into the same for Steam Boats.

Coffer Dam including Pumping provided for in the Estimate given to the Committee, and will be completed by the 31st August next.

Required whilst deepening the upper and lower entrances to the Snie, and Building the Lock. The Contractors are to receive £100 Sterling for constructing the lower Coffer Dam in the Completion of the Works.

Earth Excavation provided for in the Estimate given to the Committee, and will be completed by the 31st August next.

Increase of Expense, has arisen from a greater depth and width of Earth Excavation being found necessary than provided for in the original Estimate.

Rock Excavation and Deepening Hurds Shallows provided for in the Estimate given to the Committee, and will be completed by the 31st August next.

Increase of Expense. See reasons for in last remark. page 96.

Lock Masonry provided for in the Estimate given to the Committee, and will be completed by the 30th June next.

Backing & Puddling provided for in the Estimate given to the Committee, and will be completed by the 30th June next.

Increase of Expense, has arisen from the not being able to get that Service executed for the Estimated price of 6d per cubic yard, and additional height given to the Chamber Walls of the Lock.

Lock Gates, Oak Sills, Sluices, Crabs & Chains etc. provided for in the Estimate given to the Committee and will be completed by the 30th June next.

See explanations afforded on the First Eight Locks relative to the above services.

Dam provided for in the Estimate given to the committee, and will be completed by the 31st August next.

Embankment provided for in the Estimate given to the Committee, and will be completed by the 30th June next. Increase of Expense has arisen from the necessity of throwing an Embankment across a Ravine leading from the Snie to the River; also from a greater extent of Embankment being found necessary, than provided for in the Estimate given to the Committee.

Wooden Truss Bridge provided for in the Estimate given to the Committee, and will be completed by the 31st August next.

Increase of Expense has arisen from the necessity of having a Draw Bridge, omitted to be provided for in the Estimate given to the Committee. This work has not yet been executed.

Lock Master's House provided for in the Estimate given to the Committee; and will be completed.

This Service has not yet been carried into execution....

Masonry of Piers for Dam Not provided for in the Estimate

given to the Committee, and is completed.

Increase of Expense has arisen from a greater quantity of Masonry being required than at first contemplated.

Wooden Floor of Lock Not provided for in the Estimate given to the Committee and is completed.

Required for reasons afforded paragraph No. 1. p. 93.

PAC, W044, Vol. 20, Reel B-1295, pp. 413-416.

Progress Made During 1832

1. ...that whilst laying the sill of the waste weir at the entrance of Mud Creek, Long Island, it was necessary to employ men day and night bailing and pumping out the water; also that at Merrick's Mills, Nicholson's rapids, and Burrirt's rapids, the Labourers were employed extra time in Keeping the several Lock Pits free of Water; and that those services were not provided for on Contract, but were indispensably necessary.

PAC, W055, Reel B-2814, Vol. 869, pp. 101-102. Letter from R. Byham, Office of Ordnance, 15 June 1832 to Maj. Gen. Sir A. Bryce K.C.A.

Projected Cost of the Works

1. Section, No. 2. Burret's Rapids £10,657,,18,,1/4

PAC, W044, Vol. 19, Reel B-1294, p. 20.

Probable Amount of Each Section When Completed

1. Burrett's Rapids £13,698,,4,,3-1/2

PAC, RG8, Vol. 52, pp. 229-230. Statement Shewing the Total Amount of Works on each. Section as Approved of by the Committee the Expenditure up to the 31st of March 1831 and the Sum still required to complete.

Exerpts from Lieutenant Frome's Diary

At Burrirt's Rapids, 25-3/4 miles above, is a single lock and dam; the former built on the right bank of the river on a very stiff clay foundation, with a wooden floor the lift is 10 feet, 7 feet depth of water being on the upper sill, and 9 feet in the lock, the bottom of which is at least 3 feet lower than a rocky shoal in the bed of the river a short distance below. The canal above is about a mile and a quarter in length, and advantage having been taken of a hollow into which water always flowed in the spring, the cutting was not deep, but near the lock the embankment is considerable.

...The upper sill of the lock is 1-2 inches lower than the floor of that part of the work above; but the canal is not excavated quite so deep, part of it being through rock. The dam could not be constructed at the foot of the small rapids, on account of the flat country on the opposite shore, but is situated within less than 400 yards of the head of the canal: it is formed of timber framed and bolted to the smooth rock, and the intervals between the bays, are

filled up with pine logs squared at three sides to fit the uprights, and to be nearly water-tight when laid one upon another. The upper row can be removed, to prevent any great rise of water in the spring, and several whole logs taken up, if necessary. The average height is about 8 feet, and the length between 80 and 90 yards, each end abutting upon a cut stone pier.

Lieutenant Frome's Report. PAC Library, UG7 G72, Vol. I, *Professional Papers of the Corps of Royal Engineers*, pp. 83-84.

Miscellaneous Information

Memorandum of a Journey along the Route of the Rideau Canal

After a pleasant short ride we reach that part of the Canal termed the Oxford Snie. This is an outlet or Bay of the River through which the Canal is to pass so as to avoid some shallows and rapids which occur in the Main channel here.

To effect this an embankment of earth and wood is to be thrown across the River in a Diagonal Direction so as to raise the water till it flows through an artificial cut connected with the Snie. To overcome the fall two locks are required; the stones for which are nearly all drawn and the building in progress. Mr. Wright is the contractor. Both the excavation and the embankment are also well advanced. From this place the River is of sufficient depth and the water so smooth as to be navigable for steam without any artificial assistance till we reach Long Island, a distance of about 20 miles.

PAC, MG24, 19, Vol. 7, pp. 2053-2054. Memoranda of a Journey from Kingston to Bytown made along the Route of the Rideau Canal, in February 1830.

Name of Canal Section

Nicholson's Rapids

Number of Canal Section

Section Number 3

Interest Shown, Advertisements & Application for Contracts

1. Persons desirous of contracting to execute the undermentioned portions of the intended Rideau Canal, are requested to send tenders stating the terms on which they are willing to undertake the same, to this Office until Friday the first of February next....? To construct a Dam, Lock and Embankments at Nicholson's Rapids. The dam to be raised 16 feet high and 250 feet wide; the Lock 10 feet lift; and the embankment eight feet high, and 280 feet long.

The Tenders must express the rate in Currency per Cubic Foot for the Masonry of the Locks; per Cubic yard for the Dams; the Rock and Earth excavation, and for Rock under

water three feet deep. Plenty of stone may be raised to build the Locks quite beside them; and other materials, such as Lime, Sand, Wood, etc., equally convenient. The whole of the above - mentioned works to be constructed in every respect similar to those at present in progress on the Canal; and to be completed in two years from the date of signing the contract; and none but practical Tradesmen need tender.

The power of rejecting the whole of the Tenders will be reserved if they should be found too high, on reference to the professional opinion of the officer of the Royal Engineers, superintending the works.

Further particulars of the above mentioned works, as also the amount of security required for the due fulfilment of each, for which two competent individuals residing in Canada must be responsible, may be obtained at the Commissariat Office, and also at the office of Lieut.-Col. By, St. James street....

The Albion, Vol. 6, No. 28, p. 223 New York, Dec. 22, 1827.

2. Section 3. Nicholson's Rapid, Lock of 11 feet lift Dam 10 feet high with some excavations, and embankments; advertized & tenders to be opened 1st February at the Comm General's Office, Montreal.

PAC, RG8, Vol. 45, p. 28. Letter to Gen. Mann from John By Rideau Canal Office, 23rd Jan. 1828.

Also

PAC, WO55, Reel B-2811, Vol. 865, p. 153.

Contractors

1. 5 February, 1828. H.C. Stevens and Co., Section 3. Nicholson's Rapids.

PAC, WO55, Reel B-2811, Vol. 865, p. 210. List of the Various Contractors on the Line of the Rideau Canal.

Progress Made During 1827

1. Works at Nicholsons Rapids, chopping, clearing, and grubbing, excavating for Lock, constructing Dam etc... In Progress

PAC, RG8, Vol. 44, pp. 167-168. Progress Report of Works at the Rideau Canal from the 21st September 1826 to the 31st October, 1827.

Progress Made During 1828

1. Section 3. Nicholson's Rapid. Lock of 11 feet lift Dam 10 feet high with some excavations, and embankments; advertized & Tenders to be opened 1st February at the Comm^r General's Office, Montreal.

PAC, RG8, Vol. 45, p. 28 Letter to Gen. Mann from John By Rideau Canal Office, 23rd Jan., 1828.

Also

WO55, Reel B-2811, Vol. 865, p. 153

Progress Made During 1829

1. Section No. 3. Nicholson's Rapids. Clearing and Grubbing 1/2 done, a quantity of cut stone drawn to the spot not measured.

PAC, W055, Reel B-2811, Vol. 866, p. 170.

Also

W044, Reel B-1294, Vol. 19, p. 40.

Also

PAC, RG8, Vol. 47, p. 244.

Progress Made During 1830

1. Nicholson's Rapids - In consequence of dividing the Lift increased height of Dam; waste weir to prevent valuable Land being drowned.

PAC, W055, Reel B-2812, Vol. 867, p. 193. Abridged Abstract Report of the Works on the Line of the Rideau Canal ... March 25th, 1830.

2. Alterations and Extra Works:

The levels from which the original Estimate was formed proved, upon a more minute examination of the ground, very erroneous, the rise to be overcome being above fifteen feet 2 inches, and the necessary height of Dam Twenty feet, 2 inches, the nature and extent of the Embankments required were also much underrated, and if the Dam had been placed on the Site at first proposed, a much greater extent of cultivated land would have been flooded than provided for, the value of which must necessarily have occasioned a considerable increase in the Estimate.

Taking the above circumstance into consideration, I deemed it indispensably necessary to deviate from the original plan and instead of Keeping the River and raising the whole lift by a single Lock placed in connection with the Dam, I have quitted the same at the foot of the Rapids; cutting the Canal along the Right Bank, -placing two locks in the above distance to suit the Section of the ground, and forming the Dam at the head of the Rapids. The above alterations have caused an addition to the following services, namely Clearing and Grubbing, Rock and Earth Excavations, Masonry, Backing and Puddling and Contingencies.

The advantages gained, are the dividing of the lift into two, one of 7 feet, the other of 8 feet 2 inches; a diminution in the height of the Dam which is now 9 feet in the Center, the doing away with extensive Embankments, and a great saving in the purchase of Land which from the erroneous levels was not provided for in the first instance.

The Rock forming the Bed of the River has also proved so unsound that the Construction of a Waste Weir has been deemed advisable. If the original plan of placing the Dam at the foot of the Rapids had been followed, the Construction of a Waste Weir in that Case would have been

attended with much greater expense than the present one, and it would also have been necessary to have given an additional height, and Consequently, thickness to the Dam and Embankment to prevent the water from flowing over them.

The above statement will I trust satisfactorily show an error having occurred, owing to the thickness of the Woods and Swamps, that there was an indispensable necessity of deviating from the original plan, and that the mode adopted is the most judicious one that could have been followed, under the existing Circumstances.

Chopping and Clearing

This excess arises from necessity of ...position of Dam to avoid flooding valuable land, - and in Consequence of deviating from the original plan as explained.

Rock Excavation

This excess arises from Rock being met with in greater abundance than was at first anticipated.

Increase of Expense arises from the necessity of deviating from the Original Plan as explained.

Backing and Puddling

Excess arises from difference of Contract price over that estimated. Also from the deviation from the original plan in having two Locks instead of only one.

4 Sluices

Excess from using Crabs and Chains in place of Rocks and Pinions. And Cast Iron Valves for wood.

Oak Sills for Water Gates

Sill being on Rock and used Iron instead of Copper.

The Sill being on Rock required less Timber, and Iron Spikes have been Substituted for Copper, these Circumstances have caused a Saving on the original Estimate.

Dam

The quoted £800 is the amount of Contract, difference arises from decrease of Value of Dam to prevent water passing over it and necessity of deviating from the original plan.

Earth Excavation

This Service was necessary in consequence of deviation from Original Plan.

Masonry of Lock

Increase of Expense arises from the necessity of having two Locks instead of one, as originally proposed.

Masonry of Sluices

This work is intended to be nearly sufficient to hold the Stop Gate Logs, and from the ...being understood there would be sufficient Material on the ...fit for such work; the above... was conceived Sufficient, but the rock from Excavation turned out small beds and sizes, the Stones Recess must be drawn from a distance which may probably add £200, the ... say in all £350 ...

The rock forming the bed of the River proving unsound,

it was feared that if the flood water of the River was allowed to pass over the Dam, it would endanger the foundation of the same, in consequence of which Circumstance, I considered a Waste Weir to Carry off a portion of the Spring floods indispensably necessary for the permanent security of the Dam.

Gates Complete - 2 Pair

In consequence of an additional Lock being found necessary, two pair of Gates were required for the same.

Sluices

See last remark.

Oak Sills for Water Gates

Required for the additional Lock.

Stop Gates

Required to enable repairs to be performed to the Lock Gates, Sluices etc. without Making Coffe Dams.

PAC, W044, Vol. 18, Reel B-1294, pp. 265-269.

Progress Made During 1831

1.

Nicholsons Rapids, Section No. 3, Works approved of by the Committee.

Nicholsons Rapids distant from By Town 43-1/2 Miles and from the Works at Burrets 3 Miles, are 990 yards in length, descent in that distance 14 feet 4-3/4 inches, and depth of water over the site, where it was proposed to construct a Dam 1 foot 9 inches.

The plan submitted to, and approved of by the Committee, was to place a Lock of 11 feet lift, the Walls and Gates of which were to have an additional height of 3 feet, to guard against the Spring floods on the right Bank of the River, in immediate connection with a Dam of 16 feet in height averaging 200 feet in length, and 28 feet in thickness, which Work was to serve as a Waste Weir, and to give five feet depth of water over the Upper Sill of the Lock. A Lock Master's House with the necessary Embankments, Clearing, Grubbing, Excavations etc. were also provided for in the Estimate given to the Committee.

The Works described were to back up 3 feet 2 inches into the Chamber of the Lock to be built at Clow's Quarry, rendering the River navigable for a distance of 2/3 of a Mile, and giving a medium width to the same of 120 yards.

Deviations from the Plan approved of by the Committee and Extra Works

The Levels from which the original Estimate was formed proved upon a more minute examination of the ground very erroneous, the rise to be overcome being 15 feet 2 inches, and the necessary height of Dam 20 feet 2 inches. The nature and extent of the Embankments required were also much underrated; and if the Dam had been placed on the site at first proposed, a greater extent of cultivated Land would

have been flooded than provided for.

No. 2 Taking the above circumstances into consideration, I deemed it indispensably necessary to deviate from the original plan, and instead of keeping the river, and raising the whole lift by a single Lock, placed in connection with the Dam, I have quitted the same at the foot of the Rapids, cutting the Canal along the right Bank, placing Two Locks in the above distance, to suit the section of the ground, and forming the Dam at the head of the Rapids.

No. 3 The above alterations have caused an addition to the following services, namely, Grubbing & Clearing, Rock and Earth Excavation, Masonry, Backing and Puddling; and contingencies.

No. 4 The advantages gained, are the dividing of the lift into two, one of 7 feet, the other of 8 feet 2 inches, a diminution in the height of the Dam, which is now 9 feet in height, doing away with additional Embankments, averaging 330 yards in length, 25 feet in height, and 43 feet in thickness, and a Saving in the purchase of 25 Acres of cultivated Land, which from the erroneous levels was not provided for in the first instance.

No. 5 The rock forming the Bed of the River has also proved so unsound, that the construction of a Waste Weir has been deemed advisable. If the original plan of placing the Dam at the foot of the Rapids, had been followed, the construction of a Waste Weir in that case, would have been attended with much greater expense than the present one, and it would also have been necessary to have given an additional height, and consequently thickness to the Dam and Embankments to prevent the water from flowing over them.

No. 6 The above statement will I trust satisfactorily shew, (an error having occurred, owing to the thickness of the woods and swamps,) that there was an indispensable necessity of deviating from the original plan and that the mode adopted is the most judicious one that could have been followed under the existing circumstances.

No. 7 A Draw Bridge will also be necessary; the Canal obstructing a public communication, this Work was omitted to be provided for in the Estimate given to the Committee as its necessity at that period was not fully ascertained.

No. 8 I have also considered it advisable in order to do away with the necessity of forming Cofferdams whenever the Lock Gates, Sills or Sluices required repairing, to have Stop Gates in readiness.

Works at Nicholson's Rapids

Chopping & Clearing provided for in the Estimate given to the Committee and is completed.

Increase of Expense The necessity of deviating from the original plan was not ascertained until the Banks of the

River where it was first proposed to construct a Dam had been cleared.

Grubbing provided for in the Estimate given to the Committee, and is completed.

Increase of Expense has arisen from deviating from the original plan.

Rock Excavation provided for in the Estimate given to the Committee, and will be completed by the 30th June next. Increase of Expense has arisen from the necessity of deviating from the original plan for reasons afforded.... Excavation of Gravel provided for in the Estimate given to the Committee, and is completed.

Increase of Expense

See last remark.

Lock, Masonry provided for in the Estimate given to the Committee, and will be completed by the 31st Aug^t next.

Backing & Puddling provided for in the Estimate given to the Committee and will be completed by the 31st Aug^t next. Increase of Expense See last remark, also from the Contract price exceeding the Estimated one, the former being 1/6d Currency, the latter 6 Sterling per cubic yard, and the omitting to provide for the same in the Estimate given to the Committee.

Lock Gates, Oak Sills, Sluices, Crabs & Chains etc. provided for in the Estimate given to the Committee, and will be completed by the 31st Aug^t next

Dam provided for in the Estimate given to the Committee, and will be completed by the 31st August next.

Increase of Expense has arisen from deviating from the original plan.

Embankments provided for in the Estimate given to the Committee, and will be completed by the 31st August next.

Increase of Expense A greater extent of Embankment was required than provided for in consequence of deviating from the plan approved of by the Committee and the necessity of facing the said Embankment with dry rubble work, to counteract the effect of Steam Boat Paddles.

Lock Master's House provided for in the Estimate given to the Committee, and will be completed.

This Service has not yet been carried into execution, it not being decided whether the more judicious made would not be to erect a Block House for the purpose of defence, as well as to serve as a dwelling for the Lock Master and Labourers ...

Earth Excavation Not provided for in the Estimate given to the Committee, and will be completed by the 31st Aug^t next.

This Service was necessary in consequence of deviating from the original plan.

Masonry of Sluice not provided for in the Estimate given to the Committee and will be completed by the 31st Aug^t next ...

The Rock forming the bed of the River proving unsound,

it was feared that if the flood water of the River was allowed to pass over the Dam, it would endanger the foundations of the same; in consequence of which circumstance, I considered a Waste Weir to carry off a portion of the Spring floods, indispensably necessary for the permanent security of that work.

Coffer Dam not provided for in the Estimate given to the Committee, and is completed.

Required whilst excavating the upper and lower entrances of the Canal.

Wooden Draw Bridge not provided for in the Estimate given to the Committee, and will be completed by the 31st August next.

Required in consequence of the Canal crossing a public road, which was not fully ascertained at the period of forming the Estimate given to the Committee.

PAC, W044, Vol. 20, Reel B-1295, pp. 416-421.

Progress Made During 1832

1.that whilst laying the sill of the waste weir... it was necessary to employ men day and night baling and pumping out the water; also that at ... Nicholson's Rapids ... the Labourers were employed extra time in Keeping the several Lock Pits free of water; and that those services were not provided for an Contract, but were indispensably necessary.

PAC, W055, Reel B-2814, Vol. 869, pp. 101-102. Letter from R. Byham, Office of Ordnance, 1st June 1832 to Maj. Gen. Sir A. Bryce K.C.A.

Projected Cost of the Works

1. Section No. 3. Nicholson's Rapids. £9996 ,, 6 ,, 2.

PAC, W044, Reel B-1294, Vol. 19, p. 20.

Probable Amount of Each Section When Completed

1. No. 8. Nicholson's Rapids. £14,660 ,, 15 ,, 7-1/2

PAC, RG8, Vol. 52, pp. 229-230. Statement to the 31st March 1831.

Excerpts from Lieutenant's Frome's Diary

1. At the next work, Nicholson's Rapids, distant one mile and three quarters, 5 feet 10 inches water is back up by this dam into the lower lock, which is situated within 200 yards of the river; a canal nearly 400 yards long intervenes between it and the other lock, with a rough stone embankment backed with clay on the river side, the other cutting into rather a steep bank. - Above this a similar canal extends about the same distance till it enters the river, the excavation being altogether 1120 yards long, and entirely through rock, except a small portion near the river below. Close to the head of the canal a regulating sluiceway of timber, between rough stone piers, is formed in an opening cut through the rocky bank to the river, to prevent any very

large body of water flowing over the dam, which is formed on a plan something similar to that at Black Rapids, but instead of clay, the slope up-stream consists almost entirely of gravel and broken stones; - the section is much diminished by this change, as there is no risk of its washing away.

Lieutenant Frome's Diary, PAC Library, UG7 G72, Vol. I, Professional Papers of the Corps of Royal Engineers, p. 84.

Miscellaneous Information

Memorandum of a Journey along the Rideau Canal

...About an equal distance farther on there are two more Locks and a small Dam erecting by Mr. Stephens above mentioned.

PAC, MG24, 19, Vol. 7, p. 2053. Memoranda of a Journey from Kingston to Bytown made along the Route of the Rideau Canal, in February, 1830.

Various Particulars of Interest

The third section consists of the works at Nicholson's Rapids. At Nicholson's Rapids ... the river is found to be convenient and appropriate for putting in one lock and a dam (which will back the waters of the Canal in still water, into the chamber of the next lock at Clowes' Quarry, about one mile above), for the river here is narrow in width, has a horizontal bottom, and steep banks, while limestone, sand and clay are in abundance. The dam will be 16 feet in height, and the lock will give a lift of 10 feet. The dam stretches across the river, and embankments are necessary in some parts of the bank; by this dam the rapids, which had only 2-1/2 to 3 feet water are ... overflowed. The lock is on the left side of the river. The excavation required for the works is generally rock, earth and gravel excavation.

... Mr. Stevenson has contracted.

PAC, MG24, A12, Vol. 38. *The Montreal Herald*, Saturday Sept. 22, 1832. 'Rideau Canal.'

Geological Description

From the upper or first rapids to Burritts rapids the country is chiefly paved (at least near the river) with a grey silicious limestone - in many places this rock is any gelaloidal the cavities being with sulphate of iron and dogtooth spar - a highly calcareous limestone is also to be met with in this section.

PAC, MG29, A24, Vol. I, K p. 5. "Rideau Canal....Geological Features of the line from the Report of Mr. Burrows Civil Engineer, 1832."

Name of Canal Section

Clowes Quarry.

Number of Canal Section

Section No. 4.

Contractor

1. Section 4 Contracted for by Mr. James Clowes.

PAC, RG8, Vol. 45, p. 27. To Gen. Mann from John By, Rideau Canal Office, 23rd January, 1828.

Also

W055, Reel B-2811, Vol. 865, pp. 152-153.

2. 1st Feb. 1827. Alex Hays. Section 4 Clowes Quarry.

PAC, W055, Reel B-2811, Vol. 865, p. 210. List of the various Contractors on the line of the Rideau Canal.

3. 14th May, 1827. James Clowes for excavation at Clowes Quarry.

PAC, W055, Reel B-2811, Vol. 865, p. 378. List of Contracts for Work at the Rideau Canal accompanying General Mann's Note to Mr. Byham dated 19th November 1828.

Progress Made During 1827

1. Works at Clowes quarry, chopping & clearing, excavating for Lock Constructing Dam forming Embankments. In Progress.

PAC, RG8, Vol. 44, pp. 167-168. Progress Report of Works at the Rideau Canal from the 21st September, 1826 to the 31st October, 1827.

2. At the Hogs Back.... Clowe's Quarry ... Quarries have been extensively opened & a quantity of Cut stone prepared for the Locks...& Cuts at these Stations are in a forward State of progress.

PAC, W044, Vol. 19, Reel B-1294, p. 70.

3. October 26, 1827 Paid James Clowes, Wk's, Clowes Quarry £500,,0,0.

Nov. 28th 1827 Paid James Clowes - Clowes Quarry - £500,,0,0

PAC, RG8, Vol. 45, pp. 46-47. Lenox Rudyard Paymaster at this Station, requests an Allowance for the following Sums by him disbursed on Account of the undermentioned Services between the 1st October and 31st December, 1827.

Progress Made During 1828

1. Section 4: Clowe's Quarry: Dam 10 feet high Lock 10 feet lift, with some embankments and excavations. Contracted for by Mr. James Clowes who has cut a large quantity of good stone for the Locks, and commenced the Dam, but in so unworkmanlike a manner, that I broke his contract on the 13th Instant, Capt. Savage, Capt. Victor & myself being of opinion he had not ability to conduct such a work. I have sent Lts. Frome and Dennison to measure his work, with the intent of closing his account, and advertizing the work of this section immediately.

PAC, W055, Reel B-2811, Vol. 865, pp. 152-153.

Also

PAC, RG8, Vol. 45, p. 27. To Gen. Mann from John By, Rideau Canal Office, 23rd Jan, 1828.

Progress Made During 1829

1. Section No. 4. Clowes Quarry. Dam about 1/3 finished. Excavation for Lock completed, of Lower Entrance about 3/4 done. Masonry of lock commenced about 1/4 done, 1/2 the quantity of cut stone required is on the spot.

PAC, W055, Reel B-2811, Vol. 866, p. 170.

Also

PAC, W044, Vol. 19, Reel B-1294, p. 40.

Also

RG8, Vol. 47, p. 244.

Progress Made During 1830

1. Clowe's Quarry - In consequence of injury the Dam sustained from flood 1828 - bad foundation, constructing waste weir etc.

PAC, W055, Reel B-2812, Vol. 867, p. 193. Abridged Abstract Report of the Works on the Line of the Rideau Canal Shewing amount of Original Estimate sums Expended and amount when Completed.

2. Alterations and Extra Works

In consequence of the unsound Nature of the Rock forming the Bed of the River, a Waste Weir was indispensably necessary, the construction of which has caused an Increase in the height and thickness of the Dam; I have also thrown the whole Lift at this place upon the Gates, which has caused a saving on the Masonry; the natural Rock in front of the Lock answering the purpose of an advanced Breast Work.

Chopping and Clearing

Clearing enlarged to promote circulation of Air and prevent Sickness, also in the Line which had to be abandoned, on account of the extreme hardness of Rock.

Also from the having to abandon the Line at first thought of, it being ascertained that instead of Clay & Earth only, the necessary Excavations would be through Rock; some Low flat Land at the Head of the Lock was also cleared to allow of a free circulation of Air to prevent sickness.

Rock Excavation

This also includes loose Rock Excavation for the foundation of Dam, and an Extension of the Excavation below the Lock to give a better Entrance.

Required in consequence of Steam Boat Navigation being adopted and the necessity of which was not foreseen, at that period of forming the Estimate approved of by the Committee.

Backing and Puddling

This Excess arises from the difference of Contract price over that Estimated.

Increase of Expense arises chiefly from the difference between the Estimated and Contract Prices the former being 6d Sterling, the latter 1/6 per cubic yard, and no provision having been made for this increase in the Estimate given to the Committee.

In the Original Plan it was proposed to run Embankments from the Wing Wall of the Lock into the Bank, it has since been deemed more advisable for the better Security of the Works, to extend the Wing Walls of the Lock which had necessarily to be backed and Puddled, causing also an increase in the above Services.

The Increase in the Price arose from the necessity of obtaining the Puddle required at a distance from the Work which circumstance was not foreseen at the period of forming the Estimate approved of by the Committee.

Four Sluices

Excess arises from using Crabs and Chains instead of Racks and Pinions.

Dam and Embankment

From greater Extension of Dam in length 300 Feet to avoid Embankments from the loose nature of the Rock in Bed of River, which had to be removed and filled in with Sound Material, also from injury Dam sustained from Spring Flood in 1828.

On commencing the Excavation of the Right Bank of the River to provide for a good Abutment, it proved so extremely unsound, that I deemed it indispensably necessary to alter the Curve of the Dam and to carry its Eastern Extremity lower down the River for its permanent Security, fearing otherwise that the Wash of the Water might Work into the Bank above mentioned, and in time turn the Dam, which would be attended with serious injury and occasion a great Expense, and foreseeing the probability of this event, ultimately taking place, I felt it my duty to deviate from the Original plan, although the so doing occasioned a present increase in the Amount of that Work.

The additional height & thickness given to the Dam in order to turn the Water of the River through the Waste Weir, has also caused an increase in the Expense.

Earth Excavation

On Surface of Rock Excavation below Lock and at East end of Dam for Foundation.

There was an accumulation of Earth & Gravel upon the Bed of Rock, immediately below the Lock which it was deemed advisable to cut through in Order to provide for a direct Entrance into the same, the Earth and Gravel had necessarily to be removed and which would not have been necessary had not a deviation been made in the Original Plan as before explained.

Masonry of Waste Weirs

To insure a Complete Control over the Water to regulate it in time of Floods and also to enable its being turned down if necessary for repairing Works or Clearing Channel of River if required.

This Work was rendered indispensably necessary from the apparent probability that if the Spring Floods were permitted to flow over the Dam, the force of Water falling

from a height of 16 feet would in time undermine and ultimately cause its final destruction the Rock forming the Bed of the River being very unsound and of a Nature likely to be soon acted upon and torn up by a great rush of Water.

PAC, W044, Vol. 18, Reel B-1294, pp. 271-272.

Progress Made During 1831

1. Clows Quarry, Section No. 4. Works approved of by the Committee.

The rapids at Clows Quarry distant from By Town 44 $\frac{1}{6}$ Miles and from the Works at Nicholsons Rapids $\frac{2}{3}$ of a Mile were 1110 yards in length, descent in that distance 11 feet 5- $\frac{1}{4}$ inches, and depth of water over the site where it was proposed to construct a Dam 2 feet.

The plan submitted to, and approved of by the Committee, was to place a Lock on the left Bank of the River of 10 feet lift, the Walls and Gates of which were to have an additional height of 3 feet, to guard against the Spring Floods. A Dam to serve also as a Waste Weir of 16 feet in height, mean length 240 feet, and thickness 32 feet, was to be constructed across the foot of the Rapids, abutting on the Lock, to give five feet depth of water over the Upper Sill of this Work. A Lock Master's House with the necessary Clearing, Grubbing, Excavation etc. etc. were also provided for in the Estimate given to the Committee.

The Works described were to back up 2 feet 5 inches of water into the Chamber of the lower Lock to be built at Merricks Rapids, rendering the River Navigable for a distance of 2- $\frac{1}{2}$ Miles and giving a medium width to the same of 400 feet.

Deviations from the Plan approved of by the Committee and Extra Works

No. 1 The right Bank of the River, on Excavating into the same in order to obtain a good and secure abutment for the Dam, proved so extremely unsound, that I deemed it indispensably necessary to alter the direction of that Work, and to carry its eastern extremity lower down the River, otherwise the water by working into the Bank, would in time have turned the Dam, and as such a circumstance must necessarily have been attended with injurious results, and occasioned a very great expense, I felt it my duty, foreseeing the possibility of such an event occurring, to deviate from the original plan, the alteration from which has occasioned an additional length to the Dam of 300 feet, but has done away with the necessity of an Embankment of 242 feet in length, and 8 feet in height which had otherwise to be constructed across a low point of land.

No. 2 The Rock forming the bed of the River being unsound, and of a nature likely to be soon acted upon, and torn up by a rush of water. The construction of a Waste Weir was rendered indispensably necessary, from the apparent

probability, that if the Spring floods were permitted to flow over the Dam, the force of such a body of water falling from a height of 16 feet, would in time undermine, and ultimately cause the destruction of that Work.

No. 3 The natural rock in front of the Lock, answering the purpose of an advanced Breast Work, I have thrown the lift upon the Gates, which has caused a saving of 9308 cubic feet of masonry, without diminishing the security of the Work, as the Waste Weir will prevent any additional pressure on the Gates in question.

Works at Clows Quarry

Chopping & Clearing provided for in the Estimate given to the Committee, and is completed.

Increase of Expense has arisen from the having to abandon the line at first commented upon, it being ascertained that instead of Clay and Earth only, the necessary Excavations would be through Rock. Some low flat land at the head of the Lock was also cleared, to allow of a free circulation of air to prevent sickness.

Rock Excavation for Lock provided for in the Estimate given to the Committee, and is completed.

Increase of Expense The Rock Excavation required to obtain a good foundation for the Dam, is included in the above amount.

It was also necessary to deepen the lower Entrance into the Lock, and to cut through a rocky point to give a fair entrance into the same.

Lock Masonry provided for in the Estimate given to the Committee, and is completed.

Backing & Puddling provided for in the Estimate given to the Committee, and is completed.

Increase of Expense has arisen

1st From the difference between the Estimated and Contract prices, the former being 6d Sterling, the latter 1/6d Sterling per cubic yard, and no provision having been made for this increase in the Estimate given to the Committee. 2^{ly} More backing was required than provided for.

Lock Gates, Oak Sills, Sluices, Crabs & Chains etc. etc. provided for in the Estimate given to the Committee, and will be completed by the 31st August, next....

See explanations afforded on the First Eight Locks relative to the above services. page 18.

Dam provided for in the Estimate given to the Committee, and is completed.

Increase of Expense causes of, see reasons afforded. Paragraph 1, page 112.

Lock Master's House provided for in the Estimate given to the Committee, and will be completed....

This Service has not yet been carried into execution, it not being decided whether the more judicious mode would

not be, to erect a Block House for the purpose of defence, as well as to service the dwelling for the Lock Master & Labourers, a part of the material has been furnished.

Purchase of Land provided for in the estimate given to the Committee.

See purchase of Land at the end of the Report, page 308.

Earth Excavation Not provided for in the Estimate given to the Committee, and is completed.

There was an accumulation of Earth and Gravel upon the Bed of the rock, immediately below the Lock, which it was deemed advisable to cut through, in order to provide for a direct entrance into the same, the earth and gravel had necessarily to be removed.

Masonry of Waste Weir Not provided for in the Estimate given to the Committee, and is completed.

This Work was required for reasons afforded.

Paragraph 2, page 113.

Rock Excavation for Waste Weir not provided for in the Estimate given to the Committee, and is completed.

Necessary to obtain a secure foundation for the Waste Weir.

Coffer Dam for Waste Weir Not provided for in the Estimate given to the Committee, and is completed.

Required whilst building the Masonry of the Waste Weir.

Pumps & Pumping not provided for in the Estimate given to the Committee, and is completed.

These Services were indispensably necessary whilst laying the foundation of the Waste Weir.

PAC, W044, Vol. 20, Reel B-1295, pp. 421-425.

Projected Cost of the Works

Section, No. 4 Clow's Quarry £9,189,, - ,, 1-1/4

PAC, W044, Vol. 19, Reel B-1294, p. 20.

Probable Amount of Each Section When Completed

No. 9: Clowes Quarry £11,565 ,, 6 ,, 9-3/4.

PAC, RG8, Vol. 52, pp. 229-230. Statement to the 31st March, 1831.

Miscellaneous Information

Memorandum of a Journey along the Route of the Rideau Canal

...Proceeding from this place along the river bank for the distance of about a mile we reach another job contracted for and carrying on by Mr. Hayes. It consists of one Lock and a Dam.

PAC, MG24, 19, Vol. 7, p. 2053. Memoranda of a Journey from Kingston to Bytown made along the Route of the Rideau Canal, in February 1830.

Various Particulars of Interest Concerning the Rideau Canal-

The fourth section comprises the work at Clowes' Quarry. The Canal is uninterrupted in its course till it arrives at the rapids, at what has been termed Clowes' Quarry. It becomes necessary here to erect a dam 16 feet high and 1 lock, giving a lift of 10 feet to throw the waters back into the chamber of the lock at Merrick's Mills, 2 miles above and of course drowns the rapids at this place. The dam stretches across the whole of the channel, enters the right bank of the river, where is situated one of the best limestone quarries that has been discovered, from which the place derives its name. The lock is on the right side of the river. ... Mr. Hay has become the contractor.

PAC, MG24, A12, Vol. 38. The Montreal Herald, Saturday, Sept. 22, 1832. "Rideau Canal."

Geological Information

From the upper or first rapids to Burritts rapids the country is chiefly paved (at least near the river) with a grey silicious limestone - in many places this rock is any gelaloidal the cavities being filled with sulphate of iron and dogtooth spar - a highly calcareous limestone is also to be met with in this section.

PAC, MG29, A24, Vol. I, K p. 5. "Rideau Canal...Geological Features of the line from the report of Mr. Burrows, Civil Engineer, 1832."

Name of Canal Section

Merrick's Mills or Merrick's Rapids

Number of Canal Section

Section Number 5.

Interest Shown, Advertisements, and Application for Contracts

Rideau Canal - Persons desirous of contracting to execute the undermentioned portions of the intended Rideau Canal, are requested to send TENDERS stating the terms on which they are willing to undertaken the same, to this Office until FRIDAY the FIRST of FEBRUARY next.

Three Locks, of 8 feet 4 inches lift each, with considerable Rock and Earth Excavation in Merrick's Snie. The Wing Walls of the Locks and side retaining Walls will be considerable; Also, Dam at the head of Merrick's Snie, lift the Rideau River into said Snie: this Dam will be about 7 feet high, and 180 feet long.

... The TENDERS must express the rate in Currency per Cubic Foot for the Masonry of the Locks; per Cubic Yard for the Dams; the Rock and Earth Excavation, and for Rock under . water three feet deep. Plenty of Stone may be raised to build the Locks quite beside them; and other materials, such as Lime, Sand, Wood etc., equally convenient. The whole of the abovementioned Works to be constructed in every respect

similar to those at present in progress on the Canal, and to be completed in two years from the date of signing the Contract; and none but practical Tradesmen need tender.

The power of rejecting the whole of the Tenders will be reserved if they should be found too high, on reference to the professional opinion of the officer of the Royal Engineers, superintending the Works.

Further particulars of the abovementioned Works, as also the Amount of Security required for the due fulfilment of each of the several works, for which two competent individuals, residing in Canada must be responsible, may be obtained at the Commissariat Office, and also at the Office of Lieut. Col. By, St. James Street. ...

Montreal Herald, Saturday, Dec. 15th, 1827. No. 13, Vol. XVII

Contractors

1. 5th February 1827: H.C. Stevens & Co. Section 5. Merricks Mills or Rapids.

PAC, W055, Reel B-2811, Vol. 865, p. 210. List of the Various Contractors on the line of the Rideau Canal.

Progress Made During 1827

1. Rideau Canal:- We have during the week, conversed with several persons who have been on the line of the Rideau Canal, from whom we learn that the Contractors are getting into active operation. At the junction of the Canal with the Ottawa, a great number hands are employed in excavating, blasting, stone cutting, quarrying, and in burning coal and lime etc. At Mr. Merrick's, Mr. Clowes, the Contractor, is getting together his stores, provisions and labourers, etc.

United Empire Loyalist Vol. 2., Saturday, July 7th, 1827, p. 47.

2. Works at Merricks Rapids, chopping, clearing & grubbing, excavating for the Locks, constructing Dam etc...in Progress.

PAC, RG8, Vol. 44, pp. 169-170. Progress Report of Works at the Rideau Canal from the 21st September 1826 to the 31st October, 1827.

Progress Made During 1828

Section 5: Merrick's Rapids; 3 Locks of 8 feet 4 Inch lift each. Dam 8 feet high at the head of the rapid; a considerable quantity of side walling, and clearing in Merrick Snie. Advertized and tenders to be opened on the 1st February at the Coe General's Office Montreal.

PAC, RG8, Vol. 45, p. 27. To Gen. Mann from John By, Rideau Canal Office, 23rd Jan., 1828.

Also

PAC, W055, Reel B-2811, Vol. 865, p. 147.

His Excellency Sir Peregrine Maitland, accompanied by his Aid-De-Camp, and Sir Noel Hill, Adjutant General, with

Colonel By, Commanding-Engineer, arrived here on the 7th. They expressed themselves highly pleased with the rapid progress of the works along the line. From this place they proceeded on their route to Kingston, to Waye's job, and thence to Merrick's Mills, where...His Excellency laid the first stone of the Locks at that place.

This may be considered the first stone of the Locks, as the former, which have been laid, being on the Locks of the former small size, are to be again taken up.

PAC, *The Montreal Herald*, Vol. XVII, No. 104, Wed. Oct. 29, 1828. Oxford Snie, (alias) Burrits Rapids, 9 Oct., 1828.

Progress Made During 1829

1. Section No. 5. Merricks Mills Chopping and Clearing finished. Excavation of Lock Pits, Basin and Line of Canal about 1/2 done. Masonry of middle Lock 1/4 done, 3/4s of cut & rough stone Land etc. required; drawn to the spot. Dam not commenced, wooden - Sill framed but not laid.

PAC, W055, Reel B-2811, Vol. 866, p. 170.

Also

PAC, RG8, Vol. 47, p. 244.

Also

PAC, W044, Vol. 19, Reel B-1294, p. 40

Progress Made During 1830

1. Merrick's Mill: - In consequence of deviation from original Line in Timber Snie, Extra Grubbing, detached Lock, extra Sills Basin walls deepening River etc..etc....

PAC, W055, Reel B-2812, Vol. 867, p. 193. Abridged abstract Report of the Works on the Line of the Rideau Canal Showing amount of Original Estimate Sums Expended and amount when Completed.

2. Alterations & Extra Works

Nearly at the Head of the Rapids, Mr. Merrick had established a Mill, the Dam and Sluice Way of which occupied the Main Channel of the River, from its Left Bank to the Island forming the Snie, through which a part of the Water of the River passed, and where it was proposed to place the Locks, and to form the Canal. Had therefore the Original plan been carried into execution, it follows as a natural consequence that all the Water would have to pass either through the Sluice way or over the Dam in question, but on a Careful Examination of these works, I felt satisfied that they could not resist the additional rush and pressure of Water, which would necessarily be thrown upon them, & consequently that measures must be adopted to remedy the evil as far as possible, no provision having been made for Damages to the Mill in question, the case appeared to me to resolve itself into the following heads (each of which required consideration and reflection, in order to decide upon the most judicious to be adopted) namely,

1st The running the risk of allowing all the Water of

the River to pass through the Mill Sluice Way, or over the Dam, with the full conviction that their destruction would most probably follow such an Act, and consequently that the proprietor would have a just Claim not only for the Damages above stated, but also for the loss of time which would be incurred whilst rebuilding or repairing the Works alluded to during which the Mill would be necessarily stoped, as by blocking up one of the Channels of the River, the Mill Dam and Sluice Way would be constantly subjected to receiving damage whenever a more than ordinary rise, in the River took place, the Government would consequently have a perpetual liability hanging over their heads and a constant expense should be incurred.

2nd The Building of a permanent Mill Dam and Sluice Way, and paying for the loss of time, the Mill would necessarily be stoped during the construction of these works.

This mode appeared to me preferable to the former, but the Expense attendant upon it would have exceeded £7000.

3rd On running fresh Levels, it appeared that the Canal might judiciously be carried to the East of the Snie, and that by placing the Locks separately, according to the nature of the Ground, with Basins between them, the increase upon the Original Estimate would not Amount to more than £4000, and this mode would also prevent any Claims for Damages to the Mill, the Original Channels of the River not being interfered with, the Dam being placed at the head of the Rapids, and considerably above the Snie in question, and as this latter mode appeared to me the most judicious, and the one that would most probably be attended with the least Expense, I have accordingly adopted it, and beg to remark that the Natural Floods of the River, have occasioned so much Damage to the Mill Dam and Sluice Way, that it was necessary to rebuild the former, and the latter required very considerable repairs, the Expense attendant upon which, would have fallen upon Government, had the Original Plan been pursued, as the Proprietor would naturally have attributed the Damages in question to the blocking up of the Snie, thereby throwing more than the usual quantity of Water on his Works.

Chopping & Clearing

In consequence of necessary deviation from Original Line in Timber Snie, and by alteration of Site of Locks, from the Timber Snie to avoid necessity of Water flowing over Merrick Mill Dam, and injuring the same, it was therefore thought advisable to cut through past the Mills to avoid injuring the Dam or incurring disputes or actions at law with Proprietor.

Grubbing

This Extra Grubbing incurred by alteration of the Site of Locks, see last Remark.

Rock Excavation

The same Remarks apply to this Item as two former.

Earth Excavation

See same Remark.

Backing & Puddling behind Walls

...quantity arises from position of the Locks ...already assigned. Excess in Price from difficulty in obtaining Clay for Puddle which had to be brought from a distance.

Sluice Gates, Complete

Excess arises from 2 Additional pair being required by detaching Locks, and using Crabs & Chains instead of Racks and Pinions.

Dam

Increase of Expense, arises from the Deviation from the Original Plan, the Dam being placed higher up the River than at first proposed, had rendered an increase in its length necessary, and in order to lessen the Expense of Cofferdams and Rock Excavation at Maitlands Rapids, an additional 1-1/2 foot of Water has been backed up, by raising the Dam at Merricks Ville [sic].

Masonry of Basin Walls & Piers of Dam

Masonry of Basin Walls is necessary to prevent Wash of Water injuring the Embankments.

The former of the above Services was necessary in consequence of the Deviation from the Original Plan to meet the Section of the ground, and less expensive than joining the Locks by Straight Walls, which would otherwise have been necessary, and in consequence of placing the Dam above the Snie, an Embankment was necessary from the head of the Cut to the River, I therefore deemed it advisable to construct Stone Piers, for Abutments to the Dam, in order to prevent the Water from acting upon the Bank of the River, and junction of the said Dam & Embankment.

Backing & Puddling behind Dam

Found necessary to Retain water in Basin. Necessary for the Security of the Basin Walls by preventing Water from lodging immediately behind them.

Coffer Dam

Found necessary to deepen Bed of River at Upper Entrance of Excavation.

Building a Log House for Engineer Office

... A Building was in the immediate direction of the New Line of Canal, and had to be removed and as accommodations were required for a Detachment of Royal Sappers and Miners, and an Office a Log House was Built from the Material of the One, which had to be pulled down for reasons above stated.

PAC, W044, BV18, Reel B-1294, pp. 274-276.

Progress Made During 1831

1. Merricks Rapids, Section No. 5. Works approved or by the Committee:

Merricks Rapids distant from By Town 46 1/3 Miles, and from the Works at Clows Quarry 2 1/8 Miles are 1300 yards in

length, descent in that distance 25.5 feet, and depth of water over the site where it was proposed to construct a Dam 1 1/6 feet.

The plan submitted to, and approved of by the Committee, was to leave the River at the foot of the Rapids, and to carry the Canal to the head of the same through a Snie, which required deepening. Three Locks of 8 feet 4 inches lift each, were to be placed in connection, at the lower end of the Snie in question, the Walls & Gates of the Upper Lock having 3 feet additional height to guard against the Spring floods, and a Dam of 6 feet in height average length 150 feet, and thickness 13 feet, was to be thrown across the River at the head of the Rapids to back 5 feet depth of water over the Sill of the Upper Lock. A Lock Master's House with the necessary Excavation, Clearing, Grubbing, etc. were also provided for in the Estimate given to the Committee.

The Works described were to back up 1 foot 10-1/2 in depth of water into the Lock to be built at Maitlands Rapids, rendering the River navigable for 8-1/4 miles, giving a medium width to the same of 1800 feet.

Deviations from the Plan approved of the Committee and Extra Works

No. 1 Nearly at the head of the Rapids Mr. Merrick had established a Mill, the Dam and Sluice Way of which occupied the main branch of the River, from its left Bank to an Island forming the Snie through which a part of the water of the River passed, and where it was proposed to place the Locks, and to form the Canal; Had therefore the original plan been carried into execution, it follows as a natural consequence, that all the water would have to pass, either through the Sluice Way, or over the Dam in question, but on a careful examination of those Works, I felt satisfied that they could not resist the additional rush and pressure of water, which would necessarily be thrown upon them, and consequently that measures must be adopted to remedy the evil as far as possible, no provision having been made for damages to the Mill in question; the case appeared to me to resolve itself into the following heads; namely,

No. 2 1st The running the risk of allowing all the water of the River, to pass through the Mill Sluice Way, or over the Dam, with the full conviction that their destruction would most probably follow such an act, and consequently that the proprietor would have a just claim; not only for such damages, but also for the loss of time which would be incurred while rebuilding or repairing the Works alluded to, during which the Mill would necessarily be stopt, and as by blocking up one of the Channels of the River, the Mill Dam and Sluice Way would be constantly subjected to receiving damage whenever a more than ordinary rise in the River took place, the Government would

consequently have a perpetual liability hanging over their heads, and a constant expense in all probability be incurred.

No. 3²^{ly} The building of a permanent Mill Dam and Sluice Way, and paying for the loss of time the Mills would necessarily be stopt, during the construction of these Works. This mode appeared to me preferable to the former, but the expense attendant upon it, would have exceeded £7000.

No. 4³^{ly} On running fresh levels, it appeared that the Canal might judiciously be carried to the East of the Snie, and that by placing the Locks separately, according to the nature of the ground, with Basons between them; the increase upon the Original Estimate would not amount to more than £4000. and this mode would also prevent any claims for damages to the Mill, the original Channels of the River, not being interfered with, the Dam being placed at the head of the Rapids, and considerably above the Snie in question, and as this latter mode appeared to me the most judicious, and the one that would most probably be attended with the least expense, I have accordingly adopted it, and beg to remark that the natural floods of the River have occasioned so much damage to the Mill Dam and Sluice Way, that it was necessary to rebuild the former, and the latter required very considerable repairs, the expense attendant upon which, would have fallen upon Government; had the Original Plan been pursued, as the Proprietor would naturally have attributed the damages in question, to the blocking up of the Snie, thereby throwing more than the usual quantity of water on his Works.

No. 5 In consequence of the alterations above stated, Coffor Dams were required in order to get out the excavations at each extremity of the Cut, to their respective depths.

No. 6 The Excavation of the Rock at the lower Entrance into the Lock at Maitland's Rapids proving extremely difficult, far beyond what could have been anticipated, arising from its open nature, admitting the water from the Upper Level, I deemed it advisable, in order to lessen the expense as much as possible, to increase the height of the Dam, to back up 1-1/2 foot more water to save that depth of Rock Excavation at the place above stated.

No. 7 In consequence of placing the Dam above the Snie, an Embankment is necessary from the head of the Cut to the River. I therefore deemed it advisable to construct Stone Piers for abutments to the Dam, in order to prevent the water from acting upon the Bank of the River, and junction of the Dam and Embankment.

No. 8 The Line of Canal crossing a Public Road a Draw Bridge is indispensably necessary in consequence of deviating from the Original Plan.

No. 9 I have taken upon myself the responsibility of

deviating from the Original Plan by substituting a Block House for a Lock Master's House for the following reasons.

Merricks Ville as it is now named, being a very flourishing Village, very much on the increase not arising from the Workmen employed by Government, but in consequence of the Canal passing through it, and the thickly settled state of the County in its vicinity, and as the High road from Brockville also crosses the Line of Canal at this place, immediately over the Locks. I considered that some work of defence would of necessity have ultimately to be constructed for the security of the Works, the expense of which at a future period would I feel confident be at the least, three times the amount of the Block House in question.

The Contractors for the Locks proposed to build the Masonry required in the Block House for the sum of £300. - and the Contractor for the Gates, offered to complete the Wood Work of the Building for £300 - leaving £200 - to cover the further expense which would be incurred in Tinning the roof, and other Contingencies, making the total amount of the actual cost of the building in question £800 instead of £1500, the sum reported by me, as the probable amount which would be required.

It may be necessary to explain that the Houses for the Lock Masters, were planned upon a scale that would have cost £300, but as it was expected that the Contractors who required places of residence, would gladly bear half of that expense, in consideration of being allowed to occupy the Buildings in question during the construction of the Works they contracted to execute; the Sum of £150 was only provided for in the Original Estimate, and Lock Masters' Houses have only been built where the Contractors have offered to divide the expense with Government: permanent Buildings will be indispensably necessary for the several Lock Masters and Labourers to reside in, and as the expense of their construction could not be Estimated at a less sum than £300 each, it appears that the increase of expense attendant upon substituting Block Houses, to serve the double purpose of defence to the Works, and places of residence for the persons required in working the Locks, and taking care of the Canal would only be £500, that is to say, if they be constructed without loss of time, and whilst the Contractors have their Artificers and Labourers about them. Taking the above circumstances into consideration, I trust that my having without authority or indispensable necessity, deviated in the present instance from the original plan, will be considered as arising from my anxiety for the good of the Service committed to my charge, and the wish of ascertaining the exact cost of Buildings which would serve also for the Defence of the Works, as well as places of residence, and the expense attendant upon the alteration appears to me so trifling in comparison with the advantages

to be gained, that I respectfully beg to suggest the propriety of Block Houses being built at such places, as are not already provided with Lock Masters' Houses, and where it can be done for the price above stated, namely £800 each House.

Works at Merricks Rapids:

Chopping & Clearing provided for in the Estimate given to the Committee, and is completed.

Increase of Expense has arisen from the deviating from the original plan.

Grubbing provided for in the Estimate given to the Committee, and is completed....

Increase of Expense See last remark

Earth Excavation provided for in the Estimate given to the Committee, and is completed ...

Increase of Expense See remark upon Chopping and Clearing. Rock Excavation provided for in the Estimate given to the Committee, and is completed ...

Increase of Expense See last remark.

Masonry of Locks provided for in the Estimate given to the Committee, and will be completed by the 30th June next

Backing & Puddling provided for in the Estimate given to the Committee, and will be completed by the 30th June next...., Increase of Expense In consequence of the Locks being detached, an additional quantity of puddling and Backing was required, also from the Contract price exceeding the Estimated one, the former being 1/6 Currency, the latter 6d Sterling the cubic yard, and no provision being made for this increase in the Estimate given to the Committee.

Lock Gates, Oak Sills, Sluices, Crabs & Chains etc. provided for in the Estimate given to the Committee, and will be completed by the 31st August next ...

See explanations afforded on the First Eight Locks, relative to the above services.

Dam provided for in the Estimate given to the Committee, and will be completed by the 31st August next

Increase of Expense has arisen from the deviating from the original plan, the Dam being placed higher up the River than at first proposed, has rendered an increase in its length necessary, and in order to lessen the expense of Cofferdams, and Rock Excavation at Maitlands Rapids, an additional 1-1/2 foot of water has been backed up by raising the Dam at Merricks Ville.

Embankment provided for in the Estimate given to the Committee, and is completed

Lock Master's House provided for in the Estimate given to the Committee, and will be completed by the 31st August next ...

Increase of Expense has arisen from the having built a Block House, as explained under the head of Deviations and Extra Works.

Purchase of Land provided for in the Estimate given to the Committee ...

Masonry of Bason Walls and Piers of Dam not provided for in the Estimate given to the Committee, and will be completed by the 30th June next.

The expenditure on this Service is included under the head of Masonry of Locks.

The former of the above Services was necessary in consequence of the deviation from the original plan to meet the Section of the ground, and less expensive than joining the Locks by Straight Walls, which would otherwise have been necessary, the prices for these services being the same as for the Masonry of the Locks, the expenditure is included under the latter head.

Backing & Puddling behind Do not provided for in the Estimate given to the Committee, and is completed....

Necessary for the security of the Bason Walls and Piers of the Dam, by preventing water from lodging immediately behind them.

Coffer Dam not provided for in the estimate given to the Committee, and will be completed by the 31st Aug^t next.... Required whilst deepening the entrances into the canal.

Building a Log House for Engineer Office not provided for in the Estimate given to the Committee, and is completed....

A Building was in the immediate direction of the new line of Canal, and had to be removed, and as accommodations were required for a Detachment of Royal Sappers and Miners, and an Office, a Log House was built from the Material of the one which had to be pulled down.

Pumps & Pumping Not provided for in the Estimate given to the Committee, and is completed....

Required whilst laying the Oak Sill, and hanging the lower Gates.

Removing Ashlar and rough Stone not provided for in the Estimate given to the Committee, and is completed ...

Rendered necessary in consequence of deviating from the original plan, they occupying the ground, through which it was necessary to cut the Canal.

Draw Bridge Not provided for in the Estimate given to the Committee, and will be completed by the 31st Aug^t next ...

Required for reasons afforded, but has not yet been commenced upon.

PAC, W044, Vol. 20, Reel B-1295, pp. 425-433.

2. I have the honor to report that after exciting myself with the hope of opening the Rideau Canal on the 21st Instant from By Town to Burrits and having every thing ready to pass Steam Boats, I find the Navigation impeded by the supply of water being cut off by Mr. Merrick having darned up the river, to enable him to perform repairs at his Mill etc.; I therefore respectfully beg to observe that if individuals are allowed to Control the waters of the Rideau Canal, the great expenditure that has already taken place

will be rendered of little value; consequently it appears indispensably necessary that Mr. Merrick should be written to on this subject and that the law Officers of the Crown should be authorized to take such steps as will effectually prevent such interruptions in future, waiting your instructions....

PAC, RG8, Vol. 53, p. 38. Letter to the Resp. Officers of H.M. Ordnance, Quebec from John By, Lt. Col. RY Eng^{rs}, Comm. Rideau Canal, Royal Engineer Office, Rideau Canal, 19th August, 1831.

Also

PAC, MG29, A24, Vol. 1, p. 86.

Progress Made During 1832

1. ...also that at Merricks rapids ... the Labourers were employed extra time in Keeping the several Lock Pits free of water; and that these services were not provided for on Contract, but were indispensably necessary.

PAC, W055, Reel B-2814, Vol. 869, pp. 101-102. Letter from R. Byham, Office of Ordnance, 15th June, 1832 to Maj. Gen. Sir A. Bryce K.C.A.

Projected Cost of the Works

Section No. 5 Merrick's Rapids £15,696 ,, 8 ,, 6-1/2

PAC, W044, Reel B-1294, Vol. 19, p. 20.

Probable Amount of Each Section When Completed

No. 10. Merrick's Mills £20,456 ,, 8 ,, 0

PAC, RG8, Vol. 52, pp. 229-234. Statement to the 31st March, 1831.

Miscellaneous Information

Memorandum of a Journey from Kingston to Bytown

... The side from this is to Merricks Mills, the next scene of operations. The contractor for the job is a Mr. Stephens and the work seems to be progressing with due celerity. Here the Rideau River forms a chain of Rapids which have to be surmounted by 4 Locks of the usual lift and a dam of 13 feet height at the top of the natural rapids so as deepen the water above. The stones for constructing the Locks here are brought from a distance of several miles and the want of them upon the spot may be adduced as a reason for resorting to the use of timber in constructing the dam. A plan we have before had occasion to deprecate. But although the want of stones may be alledged as a reason for a wooden Dam here it is not a valid one, for although no stones but at a distance could be found proper for the locks, stone of an inferior quality but such as would answer for a Dam could be quarried on the spot as a proof of this, on cutting down to the required depth they reached a flat rock - sufficient to form the bottom of the locks and supersede the necessity of an inverted arch. While on the subject of the Dams in the

Rideau, I cannot avoid again remarking that the use of wood in their construction will no doubt be hereafter attended with disappointment and expense. These dams are the places of the canal most liable to accident from the floods and freshets. When one of them gives way which is most likely to happen during the high waters of the Spring that section of the Canal where such an accident happens is rendered utterly useless for the whole season or until the Damage can be repaired. Reasoning therefore a priori it is certainly a strange infatuation to use the weaker material where the greatest strength is requisite; and accidents (if occurring) would be most injurious in their effects. This place is admirably situated for a village, the ground rising by a gentle acclivity from the banks of the Canal - and several houses and shops have been already erected.

PAC, MG24, 19, Vol. 7, pp. 2052-2053. Memoranda of a Journey from Kingston to Bytown made along the Route of the Rideau Canal, in February 1830.

Various Particulars of Interest Concerning the Rideau Canal

The fifth section embraces Merrick's Rapids and the works there. From Clowes' Quarry, the Canal follows the river, for two miles without interruption till it is obstructed by Merrick's Rapids, where a fall of no less than 27 feet 10 inches is to be surmounted by a dam and embankments, and by 3 locks of 8 feet 4 inches, each in lift, which with 6 feet water thrown back from Clowes' Quarry below, will render sufficiently navigable, the bed of the river, for the purpose of the Canal. The dam stretches across the main channel of the river to an island, and the Canal is lifted into the smaller remaining channel, or natural snie on the east or left bank of the river. On this island and on another below, embankments are found necessary. The dam rises 8 feet above the rapids. These locks and dam will back the water of the canal as far at Maitland's Rapids, 8 miles above.

...Mr. Stevenson has contracted.

The Montreal Herald, Saturday, September 22, 1832. 'Rideau Canal.'

Geological Details on the Rideau Canal

From the upper or first rapids to Burritts rapids the country is chiefly paved (at least near the river) with a grey silicious limestone - in many places this rock is any gelaloidal the cavities being filled with sulphate of iron and dogtooth spar - a highly calcareous limestone is also to be met with in this section.

PAC, MG29, A24, Vol. I, K p. 5. "Rideau Canal...Geological Features of the line of the Rideau Canal from the Report of Mr. Burrows, Civil Engineer, 1832."

Name of Canal Station

Maitland's Rapids

Number of Canal Section

Section Number 6

Contractors

20th June, 1827, Edwd W. Thompson Section No. 6. Maitlands Rapids.

PAC, W055, Reel B-2811, Vol. 865, p. 210. List of the Various Contractors on the line of the Rideau Canal.

Section 6. Maitlands Rapids; Lock 4 feet 6 Inc. lift Dam 8 feet high at Maitlands Ferry, contracted for by Mr. Thomson, the excavations for the Lock are proceeding rapidly, and a quantity of good stone is already cut for the Lock.

PAC, RG8, Vol. 45, pp. 26-27. To Gen. Mann from John By, Rideau Canal Office, 23 Jan., 1828

Also

W055, Reel B-2811, Vol. 865, p. 147.

Progress Made During 1827

1. Oct. 25th, 1827 Paid Edw^d W. Thomson Works Maitlands Rapids.

Dec. 3rd, 1827. Paid Edw^d W^m. Thompson Works in Progress Maitlands Rapids.

PAC, RG8, Vol. 45, pp. 46, 48. Lenox Rudyerd Paymaster at this Station, requests an Allowance for the following Sums by him disbursed on Account of the undermentioned Services between the 1st October and 31st Decem^r 1827.

2. Works at Maitlands Rapids chopping, grubbing & Clearing, excavating for Lock Constructing Dam etc... In progress.

PAC, RG8, Vol. 44, pp. 169-170. Progress Report of Works at the Rideau Canal from the 21st September 1826 to the 31st October, 1827.

3. ...At Maitlands Rapids ... the Trees have been felled, piled & burnt to a proper width for the Course of the Canal, & some excavations Commenced

PAC, W044, Reel B-1294, Vol. 19, p. 71.

Progress Made During 1828

Section 6. Maitlands Rapids, Lock 4 feet 6 Inc. lift Dam 8 feet high at Maitlands Ferry, contracted for by Mr. Thomson, the excavations for the Lock are proceeding rapidly, and a quantity of good stone is already cut for the Lock.

PAC, RG8, Vol. 45, pp. 26-27. To Gen. Mann from John By Rideau Canal Office, 23rd January 1828.

Also

PAC, W055, Reel B-2811, Vol. 865, p. 147.

Febr^y 21 Paid Edw^d W. Thompson Works Maitlands Rapids.

PAC, RG8, Vol. 45, p. 182.

Lennox Rudyerd Paymaster at this Station requests an allowance for following Sums by him disbursed on Account of the undermentioned Services between

the 1st January and 31st of March 1828.

Progress Made During 1829

1. Section 6. Maitlands Rapids: Chopping, Clearing etc., finished. Excavation for. Lock pit finished, for line of Canal about 1/2 done, 1/2 of the cut and rough stones required on the spot.

PAC, W055, Reel B-2811, Vol. 866, p. 170.

Also

PAC, W044, Reel B-1294, Vol. 19, p. 40.

Also

PAC, RG8, Vol. 47, p. 244.

Progress Made During 1830

1. Maitland's Rapids: In consequence of extra pumping; Extra Rock excavation etc.

PAC, W055, Reel B-2812, Vol. 867, p. 193 Abridged Abstract Report of the Works on the Line of the Rideau Canal Shewing amount of Original Estimate Sums Expended and amount when Completed.

2. Maitlands Rapids

Alterations & Extra Works

In commencing the works in the Snie, the effluvia arising from disturbing the soil was so offensive, and of such a malignant nature as to occasion great sickness, so much so, that the Labourers refused to Continue the necessary Clearing and Grubbing which had been partly executed; it was also ascertained that the deepening of the Snie in question would be attended with a much heavier expense than foreseen, for instead of Soft Mud the removal of which was Estimated at £194 ,, 8,,0, the Excavation required proved to Consist of very large Boulders more difficult from their hard Nature to remove, than Solid Rock, a much greater extent of Excavation was also required than provided for in the Estimate given to the Committee, arising from the necessity of Cutting off Points in the Snie, and the additional width required in order to form direct Entrances for Steam Boats into the Lock.

In Consequence of the Circumstances above stated, I consider myself authorized in deviating from the original Plan, the more particularly as it did not appear that the Alteration would be attended with an increase on the Estimate given to the Committee, with the amount of the additional Excavation required (the necessity of which is above explained) added to it.

The present Canal as executed Commences immediately out of Deep Water and runs in a direct line to the Lock, the position of which has not been altered.

Cutting and Clearing

Clearing enlarged to Create Circulation of Air, and prevent Sickness.

Also from the having to abandon the Snie, and more clearing of the Upper Entrance of the Lock required, than

provided for in the Estimate of Works given to the Committee.

Grubbing Ditto

Grubbing increased, on account of its being found absolutely necessary to abandon the line on the Snie, on account of sickness.

Rock Excavation

On Breaking ground at this place the quantity of Rock Excavation was found to Exceed what was Anticipated, it was also found totally impracticable to deepen and improve the Snie on account of Sickness occasioned by disturbing the soil and decayed Vegetable Matter, it was therefore indispensably necessary to adopt a new line below the Lock, by which an increase of excavation has unavoidably ensued.

Increase of Expense arises

1st From the alteration from the original Plan, by abandoning the Snie and Cutting from the River in a direct line through Rock to the lower Entrance into the Lock.

2nd From the necessity of Cutting off Points to afford a direct Entrance from the River into the Lock, the necessity of which was not taken into consideration when forming the Estimate given to the Committee.

3rd In Consequence of not being able to raise the water to the height proposed, a much greater extent of Rock Excavation was required at the Upper Entrance from the River into the Lock.

Earth Excavation

See last remark.

Also from the Contract price exceeding the Estimated one, the former being 1/ - the latter 10s Sterling per Cubic Yard, and no provision being made for this increase in the Estimate given to the Committee.

Backing and Puddling

Increase of Expense arises from the not being able to get this Service executed for the prices Estimated.

Coffer Dam

It has been found absolutely necessary to make Several Small Dams (Temporary) as works progressed.

It being ascertained, that the Banks of the River would not admit of the depth of Water, originally proposed being backed up over Edmunds Rapids, it has been necessary to deepen the upper Entrance from the River into the Lock, and in order to execute this Service, Coffer Dams were indispensably necessary, and Occasioned an increase in the Expense.

Pumps & Labour to Keep the Works dry

Included in £1224,,8,,0.

The water Springing in great abundance from the fissure of the Works. Pumps had to be Kept at work all night and day.

In Sinking the Lock pit to the required depth, and in endeavouring to obtain good foundation for the Oak Sills,

each jumper hole proved a Spring, the open Nature of the Rock, admitting the Water from the Upper level; every exertion was made to reduce the Expense arising from this unforeseen Casualty, by pressing the Work as much as possible, but the expense attendant upon its execution has been more than usually great.

The above Circumstances were reported by me for the information of the Hon^{ble} Board, through the Commanding Royal Engineer Canada.

Dam 1309 Yards

An error in the original Estimate calculation was been discovered....

Embankment

Omitted in original Estimate.

See remarks on Stop Gates and Sills for Snie two of each.

Stop Gates & Sills for Snie, Two of each

Omitted in original Estimate.

On a more minute Examination of the Country, then it was possible to give at the period of forming the Estimate of Works required, in Consequence of the extreme thickness of the uncleared Forest; a Swamp on the right Bank of the River was discovered, down which it was ascertained that the Water raised by the Dam would escape into a small Creek entering the Rideau River nearly three fourths of a mile below Maitlands Rapids, unless measures were taken to prevent such an occurrence, a point indispensably necessary.

The average width of the Swamp being about 800 yards, an Embankment across the same would have been attended with so great an expense that I propose to allow the Swamp to be flooded; and to prevent the escape of the water, by Constructing a Waste Weir and Embankments, where a Public Road passes the Creek above alluded to, this point being the most contracted we could discover and where the construction of the Works required would be attended with the least possible expense.

A portion of the Spring floods by passing over the Weir in question will relieve the Dam at Maitlands and the height of Water at this place can at any time be diminished, should it be found necessary from any unforeseen accident occurring; this was a point of importance, the providing for which, as the opportunity of so doing offered itself, I Considered ought not to be neglected, and therefore Estimated for the Works above stated, in the probable amount to complete sent to England in the Spring of 1830 under the head of Extra Works etc.

Since the period when the Estimate of Works was given to the Committee, it has been ascertained that the Banks of the River were too low to admit of the depth of water there-in stated, being backed up over Edmund's Rapids, in Consequence of which, the average height of the Dam at Maitlands is only 5 feet; this necessary alteration, has

occasioned an increase in the expense of the following services, Viz Coffers Dams, Pumps, Pumping and Rock Excavation, to obtain the required depth of Water at the upper Entrance from the River to the Lock, the Mode adopted is less expensive, than if Embankments had been made, (a mile and a half in length) along the Banks of the River which would otherwise have been indispensably necessary.

The following Services have also been performed, not provided for in the Estimate given to the Committee, but indispensably necessary, namely, the forming a Temporary Bridge over the Locks which Cut off a public Communication, Removing floodwood, Levelling Banks and forming dry rubble retaining Wall at the head of the Lock to the River, to prevent the Banks from slipping into the Canal.

PAC, W044, Vol. 18, Reel B-1294, pp. 278-283.

Progress Made During 1831

1. Maitland's Rapids

Section No. 6

Works approved of by the Committee

Maitlands Rapids distant from By Town 54-1/2 Miles and from Merricks Mills 8-1/4 Miles are 186 yards in length, descent in that distance 2 ft. 2-1/2 in., and depth of water over the site where it was proposed to construct a Dam 1 foot.

The plan submitted to, and approved of by the Committee, was to place a Lock of 4.9 feet lift; the Walls and Gates of which were to have an additional height of 3 feet, to guard against the Spring Floods, in a natural Snie, 440 yards in length, situated on the Right Bank of the River. A Dam of 8 feet in height, average length 276 feet, and thickness 16 feet, was to be built across the River at the head of the Rapids, to give five feet depth of water over the Upper Sill of the Lock. A Lock Master's House with the necessary Clearing, Grubbing, Excavations, etc. etc. were also provided for in the Estimate given to the Committee.

The Works described were to back up 4 feet 5 inches into the Chamber of the Lock to be built at Edmonds Rapids, rendering the River navigable for a distance of 8-1/4 miles, and giving an average width to the same of 480 feet.

Deviation from the Plan approved of by the Committee and Extra Works

No. 1 On commencing the Works in the Snie, the effluvia arising from the disturbed soil, was so offensive, and of such malignant nature, as to occasion great sickness, so much so, that the Labourers refused to continue the necessary Clearing and Grubbing, which had been partly executed; it was also ascertained that the deepening of the Snie in question, would be attended with a much heavier expense than foreseen, for instead of soft mud, the removal of which was

Estimated at £194-8 the Excavations required, proved to consist of very large Granite Boulders, the removal of which from their hard nature would have been attended with considerable expense, as Powder must have been used; a greater extent of Excavation was also required than provided for in the Estimate given to the Committee, arising from the necessity of cutting off points in the Snie, and the additional width required, in order to form direct entrances for Steam Boats into the Lock, which was overlooked when forming the Estimate given to the Committee. In consequence of the circumstances above stated, I considered myself authorised in deviating from the original plan, the more particularly, as it did not appear that the alteration contemplated, would be attended with an increase on the Estimate given to the Committee, with the amount of the additional Excavations required added to it.

The Canal as executed, commences immediately out of Deep water, and runs in a direct line to the Lock, the original position of which has not been deviated from.

No. 2 A small detached Embankment situated between the Lock & Dam as shown in the original plan was provided for, and included in the amount of the latter Work, it has since been found necessary to extend the Embankment in question from the Wing Wall of the Lock to the Dam, the ground proving to be lower than at first supposed from the levels taken prior to the swamp being cleared.

No. 3 On a more minute examination of the Country than it was possible to give at the period of forming the Estimate given to the Committee, in consequence of the extreme thickness of the uncleared Forest, a swamp on the right Bank of the River was discovered, down which it was ascertained that the water raised by the Dam, would escape into a small creek which enters the Rideau River, nearly three quarters of a mile below Maitland's Rapids, unless measures were taken to prevent such an occurrence, a point indispensably necessary.

The average width of the Swamp being about 800 Yards, an Embankment across the same would have been attended with so great an expense, that I propose to allow the Swamp to be flooded, and to prevent the escape of the water by constructing a Waste Weir & Embankments, where a public road passes the creek above alluded to, this being the most contracted point which could be discovered, and where the construction of the Works required, would be attended with the least possible expense.

No. 4 A portion of the Spring Floods by passing over the Weir in question, will relieve the Dam at Maitland's, and the height of water at this place can at any time be diminished should it be found necessary from any unforeseen accident occurring. This was a point of importance, the providing for which as the opportunity of so doing offered itself, I considered ought not to be neglected, and

therefore Estimated for the necessary Works in the probable amount to complete sent to England in the Spring of 1830, under the head of Extra Works etc.

No. 5 Since the period when the Estimate of Works was given to the Committee, it has been ascertained that the Banks of the River were too low to admit of the depth of water therein stated, being back up over Edmunds Rapids, in consequence of which, the average height of the Dam at Maitlands is only 5 feet, this necessary alteration, has occasioned an increase in the expense of the following services, viz, Coffe Dams, Pumps, Pumping, and Rock Excavation; to obtain the required depths of water at the upper Entrances from the River to the Lock. The mode adopted is less expensive than if embankments had been made along the Banks of the River, which would otherwise have been indispensably necessary, of 2200 yards in length averaging 5 feet in height, and 13 feet in thickness.

No. 6 The following services have also been performed not provided for in the Estimate given to the Committee, but indispensably necessary, namely, the forming a temporary Bridge over the Locks; (prior to constructing a permanent Draw-Bridge,) which cut off a public communication, Removing Flood Wood, Levelling Banks, and forming a dry rubble retaining Wall at the head of the Lock to the River, to prevent the Banks from slipping into the Canal.

Works at Maitland's Rapids

Cutting and Clearing provided for in the Estimate given to the Committee, and is completed

Increase of Expense has arisen

1st From the having to abandon the Snie.

2^{ly} The necessity of Clearing to create a circulation of Air, to diminish if possible the sickness which prevailed during the summer of 1828.

Grubbing provided for in the Estimate given to the Committee, and is completed

Increase of Expense has arisen from the necessity of abandoning the Snie on account of the sickness which prevailed in the summer of 1828, and the alteration from the original plan.

Rock Excavation provided for in the Estimate given to the Committee, and will be completed by the 31st Aug next

Increase of Expense has arisen

1st From the alteration from the original plan, by abandoning the Snie, and cutting from the River in a direct line through rock to the lower entrance into the Lock.

2nd From the necessity of cutting off points to afford a direct entrance from the River into the Lock, the necessity of which was not taken into consideration when forming the Estimate given to the Committee.

3^{ly} In consequence of not being able to raise the water to

the height proposed, a much greater extent of Rock

Excavation was required at the Upper entrance from the River into the Lock.

Deepening the Snie provided for in the Estimate given to the Committee, and is completed ...

Earth Excavation provided for in the Estimate given to the Committee, and will be completed by the 31st Aug next

Increase of Expense See last remark: also from the Contract price exceeding the Estimated one, the former being 1/-, the latter 10d Sterling per cubic yard, and the omitting to provide for this increase in the Estimate given to the Committee.

Lock Gates, Oak Sills, Sluices, Crabs & Chains etc. provided for in the Estimate given to the Committee, and will be completed by the 31st Aug..next ...

See explanations afforded on the First Eight Locks relative to the above services ...

Masonry provided for in the Estimate given to the Committee, and will be completed by the 30th June next

Increase of Expense has arisen from the being obliged to give additional depth to the foundations of the Chamber Walls of the Lock, in consequence of the unsound nature of the Rock.

Backing & Puddling provided for in the Estimate given to the Committee, and is completed

Increase of Expense has arisen from the not being able to get this Service executed, for the price Estimated

Coffer Dams provided for in the Estimate given to the Committee, and will be completed by the 31st Aug next ...

Increase of Expense It being ascertained that the Banks of the River, would not admit of the depth of water originally proposed, being backed up over Edmonds Rapids, it has been necessary to deepen the Upper Entrance from the River into the Lock, and in order to execute this Service, Cofferdams were indispensably necessary, and occasioned an increase in the expense.

Pumps and Labor to keep the Works dry provided for in the Estimate given to the Committee, and is completed ...

Increase of Expense In sinking the Lock pit to the required depth, and in endeavouring to obtain good foundations for the Oak Sills, each Jumper Hole proved a Spring, the open nature of the rock admitting the water from the upper level, every exertion was made to reduce the expense arising from this unforeseen casualty by pressing the Work as much as possible, but the expense attendant upon its execution has been more than usually great. The above circumstances were reported by me for the information of the Hon'ble Board through the Commanding Royal Engineer, Canada.

Dam provided for in the Estimate given to the Committee, and will be completed by the 31st Aug^t next ...

Purchase of Land provided for in the Estimate given to the Committee ...

Lock Master's House provided for in the Estimate given to the Committee, and will be completed ...

This service has not yet been carried into execution, it not being decided whether the more judicious mode would not be to erect a Block House for the purpose of defence, as well as to serve as a dwelling for the Lock Master and Labourers.

Embankment at the Creek not provided for in the Estimate given to the Committee, and will be completed by the 31st August next ...

Indispensably necessary to retain the water to the required level for reasons afforded, not yet executed ...

Stop Gates and Sills for the Creek not provided for in the Estimate given to the Committee, and will be completed by the 31st August next ...

Required for reasons afforded, but not yet executed ...

Temporary Bridge not provided for in the Estimate given to the Committee, and is completed ...

Required for reasons afforded ...

Removing Flood Wood not provided for in the Estimate given to the Committee, and is completed ...

This Wood was at the head of the Excavation, and required to be removed.

Levelling Banks at the Head of the Lock not provided for in the Estimate given to the Committee, and is completed ...

Required to prevent the natural Banks from slipping into the Canal.

Draw Bridge not provided for in the Estimate given to the Committee, and will be completed by the 31st August next ...

Required as the Canal crosses a public road, omitted to be provided for in the Estimate given to the Committee.

Embankment from the Lock to the Dam. Not provided for in the Estimate given to the Committee, and is completed ...

Required for reasons afforded ...

Dry Rubble Retaining Wall from the head of the Lock to the River not provided for in the Estimate given to the Committee, and is completed ...

Indispensably necessary to prevent the natural Banks from slipping into the Canal ...

PAC, W044, Vol. 20, Reel B-1295, pp. 433-440.

Projected Cost of the Works

Section, No. 6. Maitland's Rapids £5242 .. 14 .. 8-1/4

PAC, W044, Reel B-1294, Vol. 19, p. 21.

Probable Amount of Each Section When Completed

No. 11. Maitlands Rapids £11,102 .. 17 .. 2-3/4

PAC, RG8, Vol. 52, p. 231. Statement to the 31st March, 1831 Shewing the ... the Sum still required to Complete.

Excerpts from Lieutenant Frome's Diary

Maitland's Rapids: a mile and a half above the mouth of the Irish Creek, and 8 miles above the locks at Merrick's, a canal of about 450 yards in length is cut across a low swampy tongue of land, on the right bank of the river, at the extremity of which is a wooden dam, similar in construction to that described above. Its height is about 7 feet, and an earthen embankment, nearly 400 yards in length, in which is a wooden regulating sluice, connects it with the wing-wall of the lock, which is crossed by a rolling bridge;The lock is situated nearly in the centre of the canal, and has a lift of only 2 feet 3 inches thrown on the upper gate, there being no masonry breastwork: - both sills are of wood, bolted to the rock bottom, and the depth in the canal, above and below, is 5 feet 6 inches. An extensive swamp, crossed by a "corduroy bridge," about a mile to the southward, threatened to afford a new channel to the river when raised by the dam, and an embankment has consequently been formed across it, at the narrowest point that could be found.

Lieutenant Frome's Diary. PAC Library, UG7 G72, Vol. I, *Professional Papers of the Corps of Royal Engineers*, pp. 86-87.

Miscellaneous InformationMemorandum of a Journey along the Route of the Rideau Canal

...Hence to another job under Contract to a Mr. Thompson - little is done at either and but little is required. ...

PAC, MG24, 19, Vol. 7, p. 2052. Memoranda of a Journey from Kingston to Bytown made along the Route of the Rideau Canal, in February, 1830.

Various Particulars of Interest Concerning the Rideau Canal

The sixth section relates to the works at Maitland's Rapids. The Canal proceeds without interruption for 8 miles, till it meets the obstruction offered by Maitland's Rapids, (where the water varies from 1 to 2 feet), which are to be surmounted by the erection of a dam 8 feet high, and a lock of 4 feet 6 inches lift. The banks are low and swampy, and limestone, though rare, is to be found in sufficient quantity for the works required. The dam (which has a good foundation in the rock itself) stretches across the main channel of the river to an island, while the Canal adopts the smaller channel, where the lock is erected. By these works, the rapids will be entirely drowned, and the waters of the Canal thrown back to Edmond's Rapids, 5 miles higher up. ...Mr. Thompson has become contractor.

PAC, *The Montreal Herald*, Saturday, Sept. 22, 1832 'Rideau Canal' MG24, A12, Vol. 38.

Geological Information

From the upper or first rapids to Burritts rapids the

country is chiefly paved (at least near the river) with a grey silicious limestone - in many places this rock is any gelaloidal the cavities being filled with sulphate of iron and dogtooth spar - a highly calcareous limestone is also to be met with in this section.

PAC, MG29, A24, Vol. I, K. p. 5. "Rideau Canal...Geological Features of the line of the Rideau Canal from the report of Mr. Burrows, Civil Engineers 1832."

Name of Canal Section

Edmonds' Rapids including Phillips' Bay.

Number of Canal Section

Section Number 7. Section Number 8.

Interest Shown, Advertisements and Application for Contracts

1. Rideau Canal - Persons desirous of contracting to execute the under-mentioned portions of the intended RIDEAU CANAL, are requested to send TENDERS stating the terms on which they are willing to undertake the same, to this Office until FRIDAY the FIRST of FEBRUARY next.

...

2. To construct a DAM and LOCK on Edmond's Rapids. Dam 8 feet high, 400 feet long; and Lock 6 feet lift. Considerable Excavations of Rock and Clay will be at this place.

3. To construct a DAM and LOCK near to Phillip's Bay, Edmond's Rapids. The Dam to be 8 feet high and 250 feet long; the Lock 6 feet lift.

Montreal Herald, Sat. Dec. 15th, 1827. No. 13., Vol. XVII.

Contractors

1. 1st Feb. 1828. Bell Richardson & Co., Section 7, 8, 9, Edmonds Rapids, Phillip's Bay, Old Slys Rapids.

PAC, W055, Reel B-2811, Vol. 865, p. 210. List of the Various Contractors on the line of the Rideau Canal.

Progress Made During 1827

1. Edmund's Rapids, chopping grubbing and Clearing, deepening entrance of Lock & Excavating & forming Dam. In Progress.

Works at Phillip's Bay, chopping clearing & grubbing, excavating for Lock constructing Dam etc... In Progress.

PAC, RG8, Vol. 44, pp. 169-170. Progress Report of Works at the Rideau Canal from the 1st September, 1826 to the 31st October, 1827.

Progress Made During 1828

1. Section 7. Edmund's Rapids. Lock 6 feet lift. Dam 8 feet high advertised and tenders to be opened 1st February at the Com^y Generals Office, Montreal.

Section 8. Phillips Bay. Lock 6 Lift. Dam 8 feet high advertised & tenders to be opened 1st February at the Com^y

Generals Office, Montreal.

PAC, RG8, Vol. 45, p. 26. To Gen. Mann from John By, Rideau Canal Office, 23rd Jan., 1828.

Also

W055, Reel B-2811, Vol. 865, p. 147.

Progress Made During 1829

1. Section No. 7. Edmonds Rapids. Clearing about 1/2 finished. ... Section No. 8. Phillip's Bay. Not commenced.

PAC, W055, Reel B-2811, Vol. 866, p. 170.

Also

PAC, RG8, Vol. 47, p. 244.

Also

PAC, W044, Reel B-1294, Vol. 19, p. 40.

Progress Made During 1830

1. Edmond's Rapids including Phillip's Bay -Saving.

In consequence of doing away with works at Phillips Bay & putting whole Lift on Edmonds.

PAC, W055, Reel B-2812, Vol. 867, p. 193. Abridged Abstract Report of the Works on the Line of the Rideau Canal Shewing amount of Original Estimate Sums Expended and amount when Completed.

2. Alterations and Extra Works

Upon a more careful Examination of the Banks of the River than it was possible to give (in consequence of the thickness of the woods) prior to forming the Estimate of Works which the Committee approved of, it was ascertained, that the Lift of the Lock, and height of the Dam at Edmonds might be increased so as to do away with the works required at Phillips Bay, not only with the greatest Security, the total Rise to be surmounted being 10" 10 feet instead of 12 feet, but that from the alteration, a saving would also accrue. In consequence, I considered myself fully authorised to deviate from the Original plan and to adopt the mode above stated, and by the addition of a Waste Weir to preserve the Dam from the effects of the Spring Floods. I consider that perfect Security to the Works at Edmonds Rapids has been obtained and the Original Plan much improved upon.

Cutting and Clearing Land

This Excess arises from its being found practicable to do away with the Works at Phillips Bay, by increasing the height of the Works at Edmonds Rapids by extending the Embankment; more clearing and less Grubbing became necessary.

Earth Excavation

This Excess arises from increased length of Embankment.

It being necessary to take off a certain Extent of the Surface soil, to obtain a sound foundation for the

Embankments, and also to Excavate a Drain in the Centre of the same, in order to admit Puddle.

Sluice Gates - Four Complete

Crabs and Chains being substituted for Rocks & Pinions, and Cast Iron Valves for Wood.

Backing & Puddling behind the Wall

Excess occasioned by additional height of Lock.

In consequence of alteration from the Original Plan as explained, and from the Contract Price exceeding the Estimated one, the former being 1/3 per Cubic Yard and the latter 6d.

Dam

Excess in quantity, by increased height and length of Dam. Extra Price from its being constructed almost entirely of Arched Keyed Work.

It was necessary to give an additional height and thickness to the Dam to prevent the Water flowing over it. Independant of the Increase in its height and Volume required in consequence of doing away with the Works at Phillips Bay.

Embankments

From increased height of Dam, cause great length of Embankment, the height also had to be increased in consequence of alteration from the original Plan as explained.

Stop Gates

Two Stop Gates are thought necessary.

It has been considered advisable to provide Stop Gates in Order that repairs may be made to the Lock Gates, Sluices etc. without the necessity of constructing a Coffier Dam.

Deepening Entrance to Lock

Extra Excavations are found requisite as the Water cannot be raised so high as was intended by the Dam at Maitlands Rapids.

Masonry of Sluice

This gives a complete Control over the Water and enables a greater quantity to be let off in time of Floods, to prevent injury to the Works.

A Waste Weir was considered indispensably necessary for the Security of the Dam.

Gate

See Remark on the Masonry of Sluice.

Required for the Waste Weir to regulate the Depth of Water.

Floor of Lock

It is proposed to Floor the Locks with Hemlock Timber.

A Wooden Floor is considered sufficiently durable when constantly under Water and less Expensive than an Invert Arch.

Building Log House for Eng^{rs} Office

For the use of the Works.

The Officer at this Station having charge of the Work

of Four Sections, an. Office for the Deposit of Books, Papers, etc... was required.

PAC, W044, Vol. 18, Reel B-1294, pp. 283-286.

Progress Made During 1831

1. Edmund's Rapids

Sections No. 7 & 8

Works approved of by the Committee

Edmund's Rapids distant from By Town 59 miles and from the Works at Maitland's Rapids 4-1/2 miles, are 823 yards in length, descent in that distance 12-1/4 feet, and depth of water over the site where it was proposed to construct a Dam one foot.

The plan submitted to, and approved of by the Committee, was to place a Lock of 6 feet lift, the Walls and Gates of which were to have an additional height of 3 feet, to guard against the Spring Floods at the foot of the Rapids on the right Bank of the River. Two Dams of 8 feet in height averaging 190 feet in length, and 19-3/4 feet in thickness, to serve also as a Waste Weir, were to be constructed across the Rapids, where a small Island divides the River into two Channels, to back up 5 feet depth of water over the Upper Sill of the Lock. A Lock Master's House with the necessary Clearing, Grubbing, Excavations, etc. etc. were also provided for in the Estimate given to the Committee.

The Works described were to back up 3 feet of water into the Chamber of the Lock to be built at Phillip's Bay, rendering the River navigable for a distance of 1-1/4 Mile, and giving a medium width to the same of 270 feet.

Deviations from the Plan approved of by the Committee and Extra Works

No. 1 Upon a more careful examination of the Banks of the River than it was possible to give / in consequence of the thickness of the woods / prior to forming the Estimate of Works which the Committee approved of, it was ascertained that the lift of the Lock, and height of the Dam at Edmunds might be increased so as to do away with the Works required at Phillip's Bay, consisting of a Lock of 6 feet lift, Dam of 8 feet in height, and a Lock Master's House, with the necessary Clearing, Grubbing etc. not only with the greatest security, the total rise to be surmounted being 10 feet 10 inches, instead of 12 feet, but that from the alteration a saving would also accrue; In consequence I considered myself fully authorised to deviate from the original plan, and to adopt the mode above stated, and by the addition of a Waste Weir to preserve the Dam from the effects of the Spring floods. I consider that perfect security to the Works at Edmund's Rapids has been obtained, and the original plan much improved upon.

No. 2 A Draw Bridge was also required, the Works rendering a ford, the communication between a public road impassable, which circumstances was omitted to be taken into consideration at the period of forming the Estimate given to the Committee.

Works at Edmund's Rapids

Cutting & Clearing Land provided for in the Estimate given to the Committee, and will be completed by the 31st August next ...

Increase of Expense has arisen from the alteration above explained ...

Grubbing provided for in the Estimate given to the Committee, and will be completed by the 31st August next ...

Rock Excavation provided for in the Estimate given to the Committee, and will be completed by the 31st August next ...

Earth Excavation provided for in the Estimate given to the Committee, and is completed....

Increase of Expense has arisen from deviating from the Original plan....

Masonry provided for in the Estimate given to the Committee, and will be completed by the 30th June next....

See last remark.

Lock Gates, Oak Sills, Sluices, Crabs & Chains etc. provided for in the Estimate given to the Committee, and will be completed by the 31 August next ...

See explanations afforded on the First Eight Locks, relative to the above services....

Backing and Puddling provided for in the Estimate given to the Committee, and will be completed by the 30th June next ...

Increase of Expense has arisen from the contract price exceeding the Estimated one, the former being is/3d per cubic yard, the latter 6d; which increase was omitted to be provided for in the Estimate given to the Committee.

Dam provided for in the Estimate given to the Committee, and will be completed by the 31st August next ...

Increase of Expense has arisen from the deviating from the original plan for reasons afforded ...

Embankment provided for in the Estimate given to the Committee, and will be completed by the 31st August next ...

Increase of Expense has arisen from deviating from the original plan which rendered a greater extent of Embankment necessary.

Coffer Dam including Pumping provided for in the Estimate given to the Committee, and will be completed by the 31st August next ...

Deepening Entrance to Lock provided for in the Estimate given to the Committee, and will be completed by the 31st

August next ...

Increase has arisen from more excavation being found necessary than provided for.

Lock Master's House provided for in the Estimate given to the Committee, and will be completed....

This service has not yet been carried into execution, it not being decided whether the more judicious mode would not be, to erect a Block House for the purpose of defence, as well as to serve as a dwelling for the Lock Master and Labourers.

Purchase of Land provided for in the Estimate given to the Committee....

See purchase of Land at the end of the report...

Masonry of Sluice Not provided for in the Estimate given to the Committee, and will be completed by the 31st August next....

Required for reasons afforded....

Floor of the Lock Not provided for in the estimate given to the Committee, and will be completed by the 30th June next....

The necessity of this Work was not ascertained at the period of forming the Estimate given to the Committee, in consequence of the bottom of the Lock proving to be hard Clay instead of Rock, which latter, from the circumstance of its appearing immediately below the entrance of the Lock, it was fully expected would have been met with.

Log House for Engineer Office not provided for in the Estimate given to the Committee, and is completed....

I considered it expedient to have an Office at this Station, for the due carrying on of the Service.

Draw Bridge not provided for in the Estimate given to the Committee, and will be completed by the 31st August next....

Required for reasons afforded ...

PAC, WO44, Vol. 20, Reel B-1295, pp. 440-445

Projected Cost of the Works

Section, No. 7. Edmund's Rapids	£6868,,1,,1
Section, No. 8 Phillip's Bay	£6172,-,,9-1/2

Probable Amount of Each Section When Completed

No. 12. Edmonds Rapids & Phillips's Bay.

£12,039 ,, 4 ,, 1/4.

PAC, RG8, Vol. 52, pp. 229-234. Statement to the 31st March, 1831.

Lieutenant Frome's Report

Four miles above is another single lock and dam, at Edmonds' Rapids, also on the right bank. The lock is built close to the river, on a stiff clay foundation. ...

Lieutenant Frome's Report, PAC Library Ug7 G72, Vol. I, *Professional Papers of the Corps of Royal Engineers*, p. 87.

Miscellaneous InformationMemorandum of a Journey from Kingston to Bytown along the Route of the Rideau Canal:

...From this place we proceed to Edmunds Rapids where a trifling effort of art will be required to assist nature in completing the Navigation. ...

PAC, MG24, 19, Vol. 7, p. 2052. Memoranda of a Journey from Kingston to Bytown made along the Route of the Rideau Canal, in February 1830.

Various Particulars of Interest Concerning the Rideau Canal

The works at Edmond's Rapids comprise the seventh section. At Edmond's Rapids, five miles beyond ... the Canal meets with an obstruction in the shape of small rapids of 1 to 2 feet water. To obviate this difficulty a dam of 8 feet high and a lock of 6 feet lift are required. The dam stretches across the two channels of the river, formed by a rocky island in the centre, and over the island itself. The Canal is carried through the left bank of the rapids, by rock and earth excavation. From the banks of the river being rather low at this place the lift of the Canal is but trifling. Good limestone for building is to be obtained here. ... These works will make the Rideau navigable for 3 miles above, to the lock at Philip's Bay Messrs. Bell & Richardson have contracted.

Philip's Bay and the works there, from the eighth section. At Philip's Bay ... a fall in the level of the river is met with, which it is necessary to obviate by the erection of a dam and lock of similar dimensions to those of Edmond's Rapids - dam 8 feet high and lock of 6 feet lift. This dam extends across the whole river while the Canal and lock are situated on the left bank, through some rock and earth excavation. ... and the waters of the Canal will be dammed back as far as Old Sly's house 2 miles above.Messrs. Bell & Richardson have contracted.

PAC, MG24, A12, Vol. 38. *The Montreal Herald*. Sat. Sept. 22, 1832 "Rideau Canal."

Geological Information

From the upper or first rapids to Burritts rapids the country is chiefly paved (at least near the river) with a grey silicious limestone - in many places this rock is any gelaloidal, the cavities being filled with sulphate of iron and dogtooth spar - a highly calcareous limestone is also to be met with in this section.

PAC, MG29, A24, Vol. I, K p.54. "Geological Features of the line of the Rideau Canal from the Report of Mr. Burrows, Civil Engineer, 1832."

Name of Canal Section

Old Sly's Rapids.

Number of Canal Section

Section Number 9.

Interest Shown, Advertisements & Application of Contracts:

1. ...
4. To construct a Dam and two Locks at Old Slys, Rapids ... The Dam to be 18 feet high, 210 feet long; the Locks to be 8 feet lift each. ...

The Albion Vol. 6, No. 28, p. 223, New York Dec. 22, 1827.

Contractors

1st February, 1828: Bell Richardson & Co. Sections 7.8.9 Edmunds Rapids, Phillip's Bay, Old Slys Rapids,

PAC, W055, Reel B-2811, Vol. 865, p. 210. List of the Various Contractors on the line of the Rideau Canal.

Progress Made During 1827

1. Works at Old Sly's Rapids chopping grubbing & clearing excavating for Locks Constructing Dam etc...

PAC, RG8, Vol. 44, p. 169. Progress Report of Works at the Rideau Canal from the 21st September, 1826 to the 31st October, 1827.

Progress Made During 1828

1. Section 9. Old Snie. Two Locks of 8 & 9 feet lifts Dam 19 feet high, with considerable embankments. Advertised & tenders to be opened on 1st February at the ComY Generals Office Montreal.

PAC, RG8, Vol. 45, p. 26. To Gen. Mann from John By Rideau Canal Office, 23rd Jan, 1828

Also

W055, Reel B-2811, Vol. 865, p. 147.

Progress Made During 1829

1. Section 9. Old Slys Rapids: Dam nearly finished; foundation of Upper breast work laid, but stone for the two Locks drawn to the spot. Clearing completed. Excavations for Locks finished - ditto through point of Land below the Locks about 1/2 done.

PAC, W055, Reel B-2811, Vol. 866, pp. 168-171.

Also

PAC, RG8, Vol. 47, p. 244.

Also

W044, Vol. 19, Reel B-1294, p. 40. Progress Report up to March 1st, 1829.

2.... I hope all my other Dams will stand the test of ages, but I must confess that I have ever had great doubts of the Dam at Old Slys Rapids, and have taken the precaution of forming a waste weir to prevent any extraordinary rise of water, which I am happy to find by Lt Pooley's report has had the desired effect.

PAC, RG8, Vol. 48, p. 80. To His Excellency, Lt General Sir James Kempt, from John By, Royal Engineers Office, Rideau Canal April 25th, 1829.

Progress Made During 1830

1. Old Sly's Rapids: - Extra Clearing, Extra Rock excavation. Strengthening entrance from side of Lock next River with ashlar, increased dimensions of Dam, Construction of Waste Weir etc.

PAC, W055, Reel B-2812, Vol. 867, p. 193. Abridged Abstract Report of the Works on the Line of the Rideau Canal Showing amount of Original Estimate Sums Expended and amount when Completed.

2. Alterations and Extra Works

Having commenced laying out the Works upon the Increased Scale approved of by the Committee, it was ascertained that a Deviation from the Original Plan, with respect to the direction & Site of the Locks, was indispensably necessary to provide for a Steam Boat Navigation, from the following circumstances.

1st. The position of the Breast Work of the Upper Lock did not allow of a sufficient space between it and the Bank immediately in front of the same, for a Steam Boat, without cutting away a large portion of the Bank in question and deepening the Bed of the River, Services the Execution of which would have caused a much greater Expenditure than the alterations adopted and the Entrance would still have been extremely confined.

2nd. The direction of the Lock, as originally proposed, formed an Angle with the River to enter the Lower Lock, a Steam Boat must therefore have first gone nearly into the Centre of the River, but as the Dam which it was proposed to place at Phillips Bay would not back up a Depth of Water sufficient to provide for the event, the removal of large Boulders and Rock Excavation to form the required Channel would have been necessary, entailing an almost endless expense in Cofferdams, Pumps & Pumping.

To obviate the above defects, I have placed the Locks in a parallel direction, with the North Bank Excavating the Canal from the River nearly in a direct Line to the Lower Lock.

I have also considered a Waste Weir indispensably necessary for the permanent Security of the Dam.

Cutting and Clearing

Clearing enlarged to give circulation of Air to prevent Sickness.

The increase of Expense arises from the necessity of deviating from the Original Plan and Clearing more ground than was required for the immediate bed of the Canal to create a free Circulation of Air.

Grubbing Ditto

These excesses arise from Cutting through a ... to give

a better Entrance to Lock below for reasons explained.

Rock Excavation

Increase of Expense arises from the necessity of Deviating from the Original Plan.

Masonry for Two Locks

It has been found necessary to face one of the Outer Sides of these Locks with Cut Stone as it rises considerably above the Natural surface of the ground and to increase the substance of the Masonry to resist the pressure of Water in the Lock, and Extra 1/5-1/2 or in all 2/6-1/2 per Cubic foot for 3 feet thick has been paid for Extra Work in facing this Wall.

Also from the additional height given to the Chamber Wall of the Upper Lock to turn the Water through the Waste Channel.

Backing & Puddling

Increase in Backing arises in placing the Locks further from high Banks on West Side of River. Also from the additional height given to the Chamber Wall of the Upper Lock for reasons explained - also from the Contract Price exceeding the Estimated one, the former being 1/ Currency the latter 6d Sterling.

Sluice Gates - Six Complete

Excess from using Crabs and Chains instead of Racks and Pinions, and Cast Iron valves for Wood.

Dam

The Dam is materially increased on account of the badness of the Rock at Bottom and Side of River, the unsound Rock having been excavated, and Dam increased in height to prevent water passing over it.

Coffer Dam for Deepening Mouth of Lock

It was deemed advisable to place the Breast Work of the Upper Lock higher up the River than originally proposed, which carried the Wing Walls into deeper Water and caused an Increase in the above Service.

Pumps and Labor to keep the Works Dry while in Progress

From Springs proving more Abundant than anticipated and the open nature of the Rock admitting Water from the River on a higher level. See also Remark on Coffer Dam - the above circumstance rendered the Erection of a Horse Pump necessary.

Lock Masters House

Provided for in the Estimate given to the Committee.

A Block House is proposed, which will answer as a Dwelling for the Lock Master and Labourers, and which if executed immediately will Cost £800 Sterling.

Deepening Bed of River from Phillips Bay to Entrance of Cut

In consequence of doing away with the Dam and Lock at Phillips Bay some deepening is required.

The Entrance from the River into the River Lock required to be deepened.

Clearing Basin above Dam of Floating Timber

Removal of Float Wood which lay aground on the Rapids and has been flooded by the Water....Dam its removal is indispensably necessary to prevent Accidents in the Navigation.

Removing Coffer Dam above Locks

This Dam was constructed by the Contractors to turn off the Water whilst constructing the Locks; its removal will become necessary when the Locks are completed.

Removing & Levelling Rubbish on South Side of Locks

To prevent its being carried down the River in time of Floods and obstruct Navigation.

Drain behind Locks

To carry off the Water oozing through the open fissures of the Rock at the Foundation of the Locks, and to prevent the Water forcing its way under the Masonry.

Waste Weir

Indispensably necessary for the security of the Dam.

PAC, W044, Vol. 18, Reel B-1294, pp. 288-291.

Progress Made During 18311. Sly's RapidsSection No. 9

Works approved of by the Committee:...

Slys Rapids distant from ByTown 60 1/16 Miles, and from the Works at Edmund's Rapids 1 1/16 mile, are 720 yards in length, descent in that distance 15-1/2 feet, and 1-1/2 foot depth of water over the site where it was proposed to construct a Dam.

The plan submitted to, and approved of by the Committee, was to place Two Locks, the one of eight feet, the other of 7 feet lift, the Walls and Gates of the Upper Lock having 3 feet additional height to guard against the Spring Floods, in connection on the left Bank of the River; a Dam of 20 feet in height, averaging 150 feet in length and 34 feet in thickness, to serve also as a Waste Weir was to be constructed across the foot of the Rapids, abutting in the Wing Walls of the Upper Lock. A Lock Master's House with the necessary Clearing, Grubbing, Excavations etc. were also provided for in the Estimate given to the Committee.

Deviations from the Plan approved of by the Committee and Extra Works

Having commenced laying out the Works upon the increased scale approved of by the Committee, it was ascertained that a deviation from the original plan with respect to the direction and site of the Locks, was indispensably necessary to provide for a Steam Boat Navigation from the following circumstances.-

No. 1 1st the position of the Breast Work of the Upper Lock, did not allow of a sufficient space between it and the Bank immediately in front of the same, for a Steam boat to Work Freely, without cutting away a large portion of the

Bank in question, and Deepening the Bed of the River, services, the execution of which would have caused a much greater expenditure, than the alterations adopted, and the entrance would still have been extremely confined.

No. 2^{ly} The direction of the Lock as originally proposed formed an angle with the River; to enter the lower Lock, a Steam Boat must therefore have first gone nearly into the centre of the River, but as the Dam which it was proposed to place at Phillip's Bay would not back up a depth of water sufficient to provide for this event, the removal of Large Boulders, and Rock Excavation to form the required Channel would have been necessary, entailing an almost endless expense in Coffor Dams, Pumps and Pumping.

No. 3 To obviate the above defects I have placed the Locks in a parallel direction with the left Bank, Excavating the Canal from the River, nearly in a direct line to the Lower Lock.

No. 4 I have considered a Waste Weir indispensably necessary for the permanent security of the Dam, the rock forming the Bed of the River being very unsound.

Works at Sly's Rapids

Cutting and Clearing provided for in the Estimate given to the Committee and is completed

Increase of Expense has arisen from the necessity of deviating from the original plan, and Clearing more ground than was required for the immediate bed of the Canal, to create a free circulation of air, with the hope of mitigating the sickness which prevailed in the autumn of the Year 1828.

Grubbing provided for in the Estimate given to the Committee, and is completed ...

Increase of Expense has arisen from the necessity of deviating from the original plan.

Earth Excavation provided for in the Estimate given to the Committee, and will be completed by the 30th June next ...

Increase of Expense has arisen from the necessity of deviating from the original plan, particularly in the formation of a Waste Channel.

Rock Excavation provided for in the Estimate given to the Committee, and will be completed by the 31st August next ...

Increase of Expense occasion of, see last remark.

Masonry of Lock provided for in the Estimate given to the Committee, and is completed ...

Increase of Expense has arisen from the being obliged to face the sides of the Locks next the River with Cut Stone, the same being superstructure, and for which an extra price had to be allowed the Contractors; also from the additional height given to the Chamber Walls of the Locks, to turn the water over the Waste Weir, and extra foundation to the Breast-Work of the Upper Lock.

Backing & Puddling provided for in the Estimate given to the Committee, and will be completed by the 30th June next ...

Increase of Expense has arisen from deviating from the original plan, which rendered a great quantity of Backing necessary, also from the Contract price exceeding the Estimated one, the former 1/- Currency, and the latter 6d per cubic yard.

Lock Gates, Oak Sills, Sluices, Crabs & Chains etc. provided for in the Estimate given to the Committee, and will be completed by the 31st August next ...

See explanations afforded on the First Eight Locks relative to the above services...

Dam provided for in the Estimate given to the Committee, and is completed ...

Increase of Expense has arisen from the open nature of the rock forming the Bed of the River, which rendered an increase in the thickness of the Dam at its base necessary; also from an additional height being given to that Work, to turn the water down the Waste Channel.

Embankment provided for in the Estimate given to the Committee ...

Not yet executed.

Coffer Dam for Deepening Mouth of Lock provided for in the Estimate given to the Committee, and will be completed by the 31st August next ...

Increase of Expense. It was deemed advisable to place the Breast Work of the Upper Lock, higher up the River than originally proposed, in order that the Sluice Pier might form one of the abutments of the Dam; in consequence the Upper Wing Walls were carried into deeper water causing an increase in the above service, also in Pumps & Labor.

Paving the bottom of Locks with Stone on Edge provided for in the Estimate given to the Committee ...

The execution of this Work has not been found necessary.

Pumps and Labour to keep the Works dry provided for in the Estimate given to the Committee, and is completed ...

Increase of Expense has arisen from the open nature of the Rock admitting water from the River, the numerous land springs met with, and the carrying the Wing Walls of the Upper Lock into deeper water than originally intended, which circumstance rendered the construction of a Horse pump necessary.

Removing Old Sly's House provided for in the Estimate given to the Committee ...

From altering the site of the Locks it has not been necessary to remove the House in question. ...

See purchase of Land at the end of the Report...

Lock Master's House provided for in the Estimate given to the Committee, and will be completed ...

This Service has not yet been carried into execution, it not being decided whether the more judicious mode would

not be, to erect a Block House for the purpose of defence, as well as to serve as a dwelling for the Lock Master and Labourers.

Deepening the Bed of the River at the Lower Entrance into the Lock not provided for in the Estimate given to the Committee, and is completed ...

Required as the Dam at Edmunds does not back up the required depth of water into the Chamber of the Lower Lock, in consequence of its being placed higher up the River.

Clearing Bason above Dam of Floating Timber not provided for in the Estimate given to the Committee, and will be completed by the 31st Aug^t next ...

It was indispensably necessary to clear away an accumulation of Wood at the head of the Locks, which would otherwise have obstructed the Navigation.

Removing and levelling Rubbish on the South Side of the Locks not provided for in the Estimate given to the Committee, and will be completed by the 30th June next ...

I considered it expedient to remove and level an accumulation of Gravel etc. from the edge of the Cut, below the Locks, from the consideration that it might slip, or be forced into the Canal, ultimately occasioning a much greater expense than its removal would incur.

Removing Coffor Dam above Locks not provided for in the Estimate given to the Committee. Expenditure Included under the head of Coffor Dam for deepening Mouth of Lock ...

Omitted to be provided for in the Estimate given to the Committee.

Drains behind Locks, not provided for in the Estimate given to the Committee, and is completed ...

Required for the security of the Works.

Waste Weir not provided for in the Estimate given to the Committee, and is completed ...

Required for reasons afforded

PAC, W044, Vol. 20, Reel B-1295, pp. 445-451.

Projected Cost of the Works

Section, No. 9. Old Sly's Rapids £10,768 ,, 10 ,, 10E1/2

PAC, W044, Vol. 19, Reel B-1294, p. 21.

Probable Amount of Each Section When Completed:

No. 19. Old Slys £19,527 ,, 0 ,, 6-3/4

PAC, RG8, Vol. 52, pp. 231-232. Statement to the 31st March, 1831...

Excerpts from Lieutenant Frome's Report

At Old Sly Rapids, one mile and three-quarters distant, are two combined locks on the left bank of the river, founded on rock, the walls on the river side are built of an extra thickness of 3 feet of masonry, and faced with ashlar, instead of having any backing of earth behind them.

– The

total lift is 16 feet 6 inches allowing 5 feet 6 inches water below, and 7 feet on the upper sill - Both the stone sills are laid in cement, as at Edmons'. The rock floor of the upper lock having been much shaken by the blasting during the excavation, pieces of timber were shaped to fit the rock between the piers, and bolted to it. The dam, about 250 yards long, abutting on the wing-wall and pier of the upper lock, was constructed on the original plan on which it was commenced, but was raised to prevent any water flowing over it, and a channel 60 feet wide cut through the rock, on the opposite side of the river, to the level of the bottom of the required navigation, in which was placed a wooden waste-weir with moveable logs as a regulating sluice and an embankment carried from the dam to join it. Immediately below the locks is a basin large enough for steam-boats to pass each other, and the extension below to the river averaged 8 or 9 feet cutting, for a length of 450 yards, through a hard gritty sandstone.

Lieutenant Frome's Report. PAC Library, UG7 G72, Vol. I, *Professional Papers of the Corps of Royal Engineers*, pp. 817-888.

Miscellaneous Information

Memoranda of a Journey from Kingston to Bytown

Old Slies: These is a small job let under Contract to a plain blunt Englishman of the name of Richardson. The work to be performed consists of Two Locks one of 8 feet 5 inches lift and the second of 7 feet lift; with a Dam of 135 feet height to back the water up to Smith's Falls. The stones for the construction of the Locks are a bluish bastard sandstone brought from the distance of eleven miles. Here, as generally happens where honest men find themselves watched with too great a degree of jealousy, the work is not done with that conscientious care which a generous and unfettered mind would execute. The Locks to be sure appear to be well built, but the Dam will hardly pass muster even in a rear rank and among that of the second grade. Nor is this altogether owing to the Contractor change upon change in the plan has been made. More than once the Dam has been finished and the workmen subjected to the vexatious duty of undoing the copping and augmenting the height of it. If this part of the work be delayed no blame can be attached to the Contractor - he appears to be a hard working industrious man and capable of executing plans when they are correctly given to him.

PAC, MG24, 19, Vol. 7, pp. 2051-2052. Memorandum of a Journey from Kingston to Bytown along the Route of the Rideau Canal, Feb. 1830.

Various Particulars of Interest Concerning the Rideau Canal

The ninth section consists of the works at Old Sly's

Rapids. The Canal proceeds without interruption ... a distance of 2 miles when a considerable fall in the level of the river is met with. To overcome it, it is proposed to erect a dam 19 feet high, stretching across the whole channel, and two locks of 8 feet and 7 feet lift, on the right bank of the river. Limestone, sand, etc. abound here in quantity and quality suitable for the locks. These works will render the river navigable as far as Smith's Falls, 2 miles above this place, and will cause the rapids, where now only 2-1/2 to 3 feet water is found, entirely to disappear. ...Messrs. Bell & Richardson have contracted.

PAC, MG24, A12, Vol. 38. The Montreal Herald, Saturday, Sept. 22, 1832 "Rideau Canal".

Geological Information

From the upper of first rapids to Burritts rapids the country is chiefly paved (at least near the river) with a grey silicious limestone - in many places this rock is any gelaloidal the cavities being filled with sulphate of iron and dogtooth spar - a highly calcareous limestone is also to be met with in this section.

PAC, MG29, A24, Vol. I, K, p. 5. "Geological Features of the line of the Rideau Canal from the Report of Mr. Burrows Civil Engineer, 1832."

Name of Canal Section

Smith's Falls.

Number of Canal Section

Section Number 10.

Interest Shown, Advertisements & Application for Contracts:

1. Rideau Canal - Persons desirous of contracting to execute the undermentioned portion of the intended Rideau Canal, are requested to send tenders stating the terms on which they are willing to undertake the same, to this Office until Friday the first of February next ...
4. ...To construct a Dam and two Locks at ... Rapids of Smith's Falls. The Dam to be 18 feet high, 210 feet long; the Locks to be 8 feet lift each ...

The power of rejecting the whole of the Tenders will be reserved if they should be found too high, on reference to the professional opinion of the officer of the Royal Engineers, superintending the works.

Further particulars of the above mentioned works, as also the amount of security required for the due fulfilment of each, for which two competent individuals residing in Canada must be responsible, may be obtained at the Commissariat Office, and also at the Office of LIEUT.-COL. By, St. James-street.

Deputy Commissary General's Office, Montreal, Dec. 3rd., 1827.

The Albion, Vol. 6, No. 28, p. 223, New York, Dec. 22, 1827.

Proposals for constructing a Dam at Smith's Falls, and three Locks in the "Hornet's Snie" near the said Falls on the Rideau River, being part of the Rideau Canal.

We, Rykert Simpson & Adams do hereby propose to construct, erect and perform the above works according to the plans, elevations and Sections of the Same exhibited at the Royal Engineers Office at this place, and according to the Specifications of those works already exhibited and explained as follows, viz,

At Smiths' Falls on the Rideau River the following works are found necessary to be constructed - "A Dam of about 96 feet long at the bottom, 200 at top and 23 feet high about the middle of the Rapids, nearly opposite to Mr. Rykerts' Storehouse. This Dam is intended to raise the water So as to throw back 2 feet 7 in. on the Still water above, and also to lift it into "Hornets Snie" in which it is intended to place the Locks.

Three Locks of 11 feet 2 inches lift each are proposed to be built in the above named Snie to Surmount the Dam and that part of the Rapids below it.

About 420 feet in length of the East Side of the Snie will require an embankment faced with rough masonry with a puddle in the rear its whole length.

The excavations necessary for the above works to be made to the required extent as will be pointed out, and also the necessary chopping, clearing and grubbing of the land required for use of the Canal at this place.

The above works are to be constructed in the manner hereinafter described or referred to and according to the Plans, Sections and other drawings of the same which will be furnished to the Contractors by the Royal Engineer Department. The Dam is to be constructed as follows: - The bed of the river is to be cleared out to form a Solid foundation for the front or retaining walls of the Dam to the depth of 2 feet in the Solid Rock. This wall is to be built of large rough Stones as taken from the quarry - these are to be placed on their edges with their ends to the face of the work, they are not to be less than 3 feet long and are to be filled in with Such Stones as can be driven down between them where the angles or other parts are imperfect, So as to render the whole mass as compact as possible, or as the nature of the materials will admit; this wall is to be 18 feet thick at the base and 8 feet thick at top; the upper course is to be continued 20 feet back towards the reverse Slope of the Dam forming the top of it and Serving to cover and secure the puddle behind the retaining wall which is to be 10 feet thick, made of Clay put in the best possible manner to Secure the Dam from leaking or to render it water tight. That part of the Dam in rear of the puddle may be composed of rubble, Stones, boulders, etc etc. mixed with

clay, and earth, in such proportions as shall be directed, the whole of these materials, are to be covered with at least 2 feet in thickness of good large rubble Stones laid closely together, So as to Secure the materials placed below them from being washed away. The Contractors are distinctly to understand that the said dam is to be water tight, and for the due fulfilment of this part of the agreement the recognizances will be held responsible until two Spring floods shall have passed over the dam to prove the Same after the works are finished and the Canal in operation.

The 3 Locks of 11 feet 2 inches lift each are to be constructed in the Same manner as the Locks of the Lachine Canal and as the other Locks of the Rideau Canal, the necessary plans, Sections and drawings of which will be furnished by the Royal Engineer Department, and the general Specification of the Locks as given to the Several Contractors is to be acted upon in all its particulars.

The embankment at the head of the Snie is to be faced with rough Stones about 3 feet thick as described, and as Shewn in the drawings of the same, to be well Secured by a puddle in the rear one foot thick - to be backed up with earth and the whole to be 15 feet wide at top; rear to Stand at an angle of 45° Slope according to the height. The Several excavations for the Canal to be made to the extent required as will be pointed out on the Spot, also the necessary chopping and clearing of the Lands and the grubbing Such parts as are necessary.

The foregoing works we propose to Construct erect and perform for the following prices viz:-

For the Dam four Shillings per cubic yard for the Locks is/3d per cubic foot of masonry.

For the embankments at the head of the Snie Sixpence per cubic yard. - for the Dry wall 3s/ per cubic yard, 6d for the puddle & Sixpence per cubic yard for the backing of earth required in rear of the wall which is to be formed so as to be 15 feet wide at top, the Slope in rear being 45°. For the excavations made to the required extent 3s/6d for the Several kinds of Rick that may occur and fourpence per cubic yard for the several sorts of earths, Clays sand etc.. etc. These prices are to include all extra wheeling and other contingencies, and for the clearing Such land as may be found necessary for the Service of the Rideau Canal at this place. Four pounds per English acre, and for such parts of it Shall be found necessary to rub out the roots £15 ,, 15 ,, 0 per acre additional making a total Sum of £19 ,, 15 ,, 0 for the parts grubbed - all the above prices in Sterling money.

The whole of the above works are to be done and executed in a masterly and workmanlike manner and to be Subject to the inspection and approbation of Lieut. Colonel By Commanding Royal Engineer Rideau Canal or to that of Such officer as he Shall appoint to inspect and superintend the

Same - it being understood that only Such part or parts of the above works are from time to time to be executed as the Commanding Royal Engineer Shall think proper - and further that if in the execution of the aforesaid works, it Shall be deemed necessary to make any alteration from the original plans and Specifications, the Same is to be done at the discretion of the Commanding Royal Engineer, - the Contractors being compensated for any damage or loss they may Sustain thereby, and if any disputes or misunderstandings Should arise, the same is to be left to the decision of the Commanding Royal Engineer, which Shall be considered final and binding on all parties.

The whole of these Several works herein detailed are to be completed by the first day of June 1829, and for the due fulfilment of these agreements, we offer as Security to the amount of Two thousand pounds Sterling.

PAC, RG8, Vol. 435, pp. 168-174. Dated Nepean Rideau Canal, 16th May, 1827.

Contractors

1. 10 May, 1827 Rykert, Simpson & Co. Section 10. Smith's Falls.

PAC, W055, Reel B-2811, Vol. 865, p. 210. List of the Various Contractors on the line of the Rideau Canal.

2. Section 10; Smith Falls. 3 Locks 11 feet 2 Inc. lift each, Dam 23 feet high, with considerable side walls; contracted for by Messrs. Rykarts & Co.,

PAC, RG8, Vol. 45, p. 26. To Gen. Mann from John By Rideau Canal Office, 23rd Jan. 1828.

Also

PAC, W055, Reel B-2811, Vol. 865, p. 147.

Progress Made During 1827

J.W. has not yet arrived from Kingston Col. By arrived yesterday report says he has taken the Job which was commenced by Sherwood at Smith Falls but we do not know, whether true or not but I am inclined to think it is true for he was at Kingston on Sunday last and he told me he should not go there unless he concluded to commence upon the Sherwood Job. The job at Smith Falls consists of a dam and locks like that taken by inland here at the three Locks. I can probably give you the particulars by next post. ... PAC, MG24, D8, p. 6073. To Ruggles Wright from Thomas Brigham, 19 Oct., 1827.

2. Works at Smiths Falls, chopping & clearing the Hornets Snie, removing the Large Stones, Tree roots etc. excavation of three Lock Pits for the Locks, constructing Dam, etc. In progress.

PAC, RG8, Vol. 44, pp. 169-170. Progress Report of Works at the Rideau Canal from the 21st September, 1826 to the 31st October, 1827.

3. At the ... Smith's Falls ... Quarries have been

extensively opened & a quantity of Cut stone prepared for the Locks. The dams & excavations for the locks & Cuts at these Stations are in a forward State of progress.

PAC, W044, Reel B-1294, Vol. 19, p. 70.

Progress Made During 1828

1. Section 10. Smith Falls. 3 Locks 11 feet 2 Inc. lift each, Dam 23 feet high, with considerable side walls; contracted for by Messrs. Rykarts & Co.; these works are proceeding rapidly, they have cleared the land quarried a large quantity of good stone, and have the Dam more than two-thirds built, the side walls to retain the water to its level are in a forward state.

PAC, RG8, Vol. 45, p. 26. To Gen. Mann from John By Rideau Canal Office, 23 Jan., 1828.

Also

W055, Reel B-2811, Vol. 865, p. 145-157.

Progress Made During 1829

1. Section 10. Smiths Falls. Clearing, Grubbing etc., completed. Dam about 3/4ths finished. Excavation for Lock pits only commenced Embankments at head of Hornets Snie 1/2 done. 1/2 of the quantity of cut stone drawn to the spot and 1/8 of ditto in the quarries.

PAC, W055, Reel B-2811, Vol. 866, p. 170.

Also

PAC, RG8, Vol. 47, p. 244.

Also

W044, Vol. 19, Reel B-1294, p. 41.

2. I think it is my duty to report to you, by a messenger express, the dangerous state in which I fear the dam at Smith's Falls is at present. About five o'clock, P.M. of the 20th Instant, a leakage was first observed through the arch key work, issuing from it about the top of the lower course, two feet six inches or three feet from the bottom, and extending from west abutment across, to about centre of course, coming through muddy, evidently washing away the puddle. Upon this alarm, a body of about thirty men set to work, excavating behind the key work, in order, by sinking a trench, to discover where the run of water proceeds from, and then to choke and repuddle it; the clay being hard frozen about six or seven feet deep, little progress was made; the working parties were regularly relieved all night, but the thunder storm and heavy rains precluded the possibility of doing much work. By three o'clock in the morning the rush of water through the key work had considerably increased since first discovered, and by day-light, when I visited it, the leak extended along the lower course from west abutment, two-thirds across the dam, the greatest quantity issuing from about the centre, muddy with the puddle; level of water above dam not perceptibly lowered. Mr. Rykert being absent at Brockville, I directed

his foreman to persevere sinking behind the key work, over the principal rush of water, and to collect at hand a quantity of fresh puddle, brushwood, sheeting poles, horse dung, etc. to choke it as expeditiously as possible on discovering the run of it; other parties were at work wheeling in clay in front of the dam, opposite the leaks, but with no effect; they continued to work yesterday, and last night. Today Mr. Rykert having returned, I found his pursuing the same plan, but there is so little energy manifested by his workmen or foremen, who do not appear to be competent to conduct a work of this nature, and so indifferently supplied with tools, that I cannot refrain from expressing my apprehension as to the result. The excavating party had not got down below frost, although about seven feet deep, and had been blasting all the morning. The rush of water had not however much increased, although this evening I thought it was rather gaining ground. Mr. Rykert is of opinion, that the water issues from the fissures of the rock forming west abutments of dam, and from thence follow the line of puddles until it escapes through a key work, or insinuates itself between the artificial work and natural bank, and circumstances seem rather to favour such an opinion; and a considerable stream certainly rushes from the rock or natural bank of river just below this abutment, through the numerous fissures to be seen on surface of the rock in river just above Rykert's store. A small clay dam having been run across the little bight from corner of Rykert's store to dam the water inside, it all escaped through the fissures and left it perfectly dry, but made no perceptible difference in the run of water, either through the rocky bank below the dam or the key work.

This Section will explain where the water is making its escape through the key work about nine feet at least below the level of surface water above the dam, and as no alteration has yet taken place in its position, or no additional leaks burst out above the points there represented, I am inclined to think it will be found to get through the puddle at abutment, in which case, I request your instructions as to the means you wish to be adopted, permanently to protect the line of puddle at that point; for any attempt to choke the numberless fissures in the rock would; in my humble opinion, be attended with no hope of success.

I have the honour to inform you, that the dam at Old Sly's seems perfectly secure, no water gets through it at any part ...

P.S. 23rd April, 1829. - Having visited the work at Smith's Falls early this morning, I found it much in the same state as yesterday, the water through the key work not abated, coming through occasionally coloured by the earth

and thrown in above the dam; level of water above dam has varying scarcely any in height since 21st instant. Trench behind key work sunk about ten feet. I lose no time in despatching this communication to you.

PAC, W044, Reel B-1294, Vol. 19, p. 38. No. 76-REPORT on the precarious state of the Dam at Smith's Falls. Lieutenant Pooley to Lt. Col. By, Royal Engineer Office, Edmund's Rapids, 23rd April 1829.

3. ...The enclosed report from Lt. Pooley, R1 Engs., I received this morning; the only satisfaction I have is that the Dam at the Hogs Back and that at Smith's Falls were the first commenced; at which time there was not a man in the country that had ever done any Key work, and I had repeatedly to pull down their work before they thoroughly understood it...

PAC, RG8, Vol. 48, pp. 79-80. To His Excellency L. General Sir James Kempt, K.C.B. from John By, Royal Engineer Office, Rideau Canal, 25th April 1829.

Progress Made During 1830

1. Smiths Falls - From impracticability of raising water to intended height construction of detached Lock. Extra Rock excavation etc....

PAC, W055, Reel B-2812, Vol. 867, p. 193, Abridged Abstract Report of the Works on the Line of the Rideau Canal Shewing amount of Original Estimate Sums Expended and amount when Completed.

2. Alterations and Extra Works

On taking fresh levels and more carefully examining the Country than it was possible to do prior to forming the Plan and Estimate approved of by the Committee it was ascertained that the surmounting of the total rise of 33-1/2 feet by placing three Locks in the Hornets Snie as at first proposed was impracticable arising from the low nature of the Banks of the River, the great quantity of Land which would be flooded; and the high and extensive Embankments required to retain the Water, the exact nature and quantity of which could not from the impenetrable state of the Swamps be accurately ascertained, but it was evident, that their Construction would in the first instance be attended with an immense additional expense and that their ultimate security could not be relied upon, from the fact that Works of the description alluded to, are at all times precarious, Subject to casualties of various descriptions and entailing a constant and endless expense in order to Keep them in proper repair. It was equally evident that the Hornets Snie was too Confined and not at all adapted for the Locks on the increased Scale its lower entrance was also so contracted and bound by the opposite banks of the River, that Steam Boats could not possibly have entered without incurring considerable expense by Cutting off a rocky point, and even then, the object required would not have been fully

obtained, and the original Plan was in this point of view alone, a defective one.

The Rock forming the bed of the River proving very unsound a Waste Weir is necessary to provide for the safety of the Dam.

Taking the above Circumstances into Consideration but more particularly the low nature of the Banks of the River and the Consequent extensive Embankments required, I felt it my duty to deviate from the original Plan, being at the same time fully Convinced that it could not be carried into effect without incurring an enormous additional expense and what is of more importance, that it did not provide for the permanent security of the Works or afford the necessary facilities for a Steam Boat navigation, facts not Known at the period when the Committee went through the line of the Canal but having subsequently been ascertained it was indissolubly necessary to provide for, and the attainment of which ought not for one moment to be placed in comparison with the apparent increase which the deviation in question has occasioned at the same time, I feel convinced that the extensive Embankments above alluded to, Which would have been required to carry into execution the original Plan, the final expense of the same would have exceeded the amount of the Works as at present Constructing when Completed, and have been at the same time an inferior design.

The following alterations have been adopted namely, Three Locks of 8 feet 5 inches lift each are placed in Connection to the South of the Hornets Snie which now forms a Waste Channel, a fourth detached Lock is to be Constructed at the foot of the Rapids of 8-1/2 feet lift in Consequence of this arrangement, the bed of the River between the combined Locks and the detached one, has to be deepened and an Embankment from the head of the latter to the high Land on the right bank is required which must also have been formed had the original Plan been Carried into execution: a Dam to serve also as a Waste Weir has to be Constructed across the north Branch of the River to give 5 feet depth of Water over the Upper Sill of the detached Lock.

Rock Excavation of Three Lock Pits

This excess arises from its being found impracticable to raise the Water to the required height by 3 feet 6 inch Locks as was originally Estimated.

The lifts being diminished caused increase of Excavation also from a much better line being discovered ... the Country was cleared.

In consequence of altering the line of Canal from the Horner's Snie, the lock Pits had to be excavated in Rock.

Masonry for Side retaining Walls

It has been found absolutely necessary to make a detached Lock at this place from the very flat nature of the Wilderness above the Falls.

This arises in consequence of adopting the improved

Line of Canal, the Walls in question would have been necessary under any Circumstances.

Backing and Puddling

This Excess arises from Alterations of line of Locks from Hornet's Snie, and from the extreme Scarcity of backing and Puddling, a higher rate per Cubic Yard had to be allowed than the Estimated price.

Sluice Gate, Complete

Excess arises from Substituting Chains and Crabs for Racks and Pinions, and Cast Iron Valves for Wood.

Dam

This arises from the necessity of Excavating loose Rock to form a Sufficient foundation for Dam and increasing the pressure of Dam to check the Water going through the numerous fissures of these Rocks.

Embankment

...alteration of Line of Canal.

See also general Remark upon the necessity of deviating from the original Plan.

Stop Gate

Increase arises from an additional Sum for this Service, in Consequence of an increase in the dimensions of the Lock not being provided in the Estimate given to the Committee which ought to have been the Case.

Masonry of One Lock

This and following Item of Extra arises from its being found absolutely necessary to make a detached Lock at this place from the very flat nature of the Wilderness around above the forest (?), and from the impracticality of raising the Water to the required height at once by the three combined Locks and Dam.

Rock Excavation

See Remark on Masonry applicable to this and following Item between the Combined and detached Lock.

Oak Cill

See former Remark.

Required for the detached Lock.

Lock Gates

See former Remark.

Chopping and Clearing

See last Remark.

Required in consequence of deviating from original Plan.

Grubbing

See Remark on ...

Required in consequence of deviating from the original Plan.

Waste Weir

To the former general Remark may be added.

Considered indispensably necessary to prevent the Water flowing over the Dam, the Rock forming the bed of the River not being sufficiently sound, to resist the action of water falling from the height of the Dam.

Earth Excavation

See remark on Masonry.

In consequence of alteration from general Plan.

Excavation of loose Rock

In consequence of alteration from original Plan, loose Rock was met with immediately at the head of the Combined Locks, and had to be removed to afford the required depth of Water.

Puddling and Embankment

...The Embankments in question are required in Consequence of deviating from the original Plan. Grouting fissures of Rock in foundation

This is found necessary to prevent the Water finding a passage under Chamber Walls of Locks.

Drain behind Locks

To carry off the Water of numerous Springs, behind Lock Walls.

Coffer Dam including Pumping

This was necessary to enable the Rock Excavation of the Entrance to be performed. This includes expense of Pumps and Labor.

Two Stop Gates

Required for the detached Lock.

Required to enable repairs to be made to the Lock Gates, Cills, etc. without each time forming Coffer Dams, which would otherwise be necessary.

Sluices

Detached Lock.

Purchase of Log House for Eng Office

Ditto " ditto being in the Way of the Works

... A Log House was required to serve as an office for the Overseer in charge of the Work, and for the Security of the Stores, one was purchased accordingly.

A log building which would be flooded by raising the Water, had to be paid for, these Services were omitted in the Estimate given to the Committee, their necessity not being foreseen.

PAC, W044, Vol. 18, Reel B-1294, pp. 293-298.

Progress Made During 1831

1. Smith Falls,

Section No. 10.

Works approved of by the Committee ...

Smith Falls or Rapids distant from ByTown 61 miles, and from the Works at Sly's Rapids 15/16 of a mile, are 1212 yards in length, descent in that distance 36 feet, and depth of water over the Site where it was proposed to construct a Dam 1 foot.

The plan submitted to, and approved of, by the Committee, was to place Three Locks in connection, of 11 feet 2 inches lift each, the Walls and Gates of the Upper

Lock having 3 feet additional height, to guard against the Spring Floods, in a natural Snie, situated on the right Bank of the River. A Dam of 20 feet in height was to be built across the Rapids, averaging 150 feet in length, and 34 feet in thickness, to serve also as a Waste Weir; this Work was nearly completed prior to the arrival of the Committee. A Lock Master's House with the necessary Clearing, Grubbing, Excavations, etc were also provided for, and an Embankment with retaining Walls, to be carried from the Wing Wall of the Upper Lock to the high land.

The Works described were to back up 5 feet depth of water over the Upper Sill of the combined Locks, and 5 feet into the Chamber of the Lock to be built at the First Rapids; rendering the River navigable for the distance of 2-1/2 miles, giving a medium width to the same of 260 feet.

Deviations from the Plan approved of by the Committee, and Extra Works

No. 1 On taking fresh levels, and more carefully examining the Country, than it was possible to do, prior to forming the plan and Estimate approved of by the Committee, it was ascertained that the surmounting of the total rise of 33-1/2 feet, by placing [Three Locks in the Hornets Snie, as at first proposed, was] impracticable, arising from the low nature of the Banks of the River, the great quantity of Land which would be flooded, and the high and extensive Embankments required to retain the water, the exact nature and quantity of which could not from the impenetrable state of the swamps be accurately ascertained, but it was evident that their construction would in the first instance be attended with an immense additional expense and that their ultimate security could not be relied upon, from the fact, that Works of the description alluded to, are at all times precarious, subject to casualties of various descriptions, and entailing a constant and endless expense in order to keep them in proper repair.

No. 2 It was equally evident that the Hornets Snie was too confined, and not at all adapted for the Locks on the increased scale, its lower entrance was also so contracted and bound by the opposite Bank of the River, that Steam Boats could not possibly have entered, without incurring considerable expense by cutting off a rocky point, and even then the object required would not have been fully obtained, and the original plan was in this point of view alone a defective one.

No. 3 The rock forming the Bed of the River, proving very unsound, a Waste Weir is necessary to provide for the security of the Dam.

Taking the above circumstance into consideration, but more particularly, the low nature of the Banks of the River, and the consequent extensive Embankments required, I felt it my duty to deviate from the original plan, being at the same

time fully convinced that it could not be carried into effect without incurring an enormous additional expense, and what is of more importance; that it did not provide for the permanent security of the Works, or afford the necessary facilities for a Steam Boat Navigation, facts not known at the period when the Committee went through the Line of the Canal, but having subsequently been ascertained, it was indispensably necessary to provide for, and the attainment of which, ought not for one moment to be placed in comparison with the apparent increase, which the deviation in question has occasioned; at the same time I feel convinced, that from the extensive Embankments above alluded to, which would have been required, to carry into execution the original plan, the final expense of the same, would have exceeded the plan, the final expense of the same, would have exceeded the amount of the Works, as at present constructing when completed, and have been at the same time an inferior design.

No. 4 The following alterations have been adopted, namely Three Locks of 8 feet 5 inches lift each, are placed in connection to the South of the Hornets Snie, which now forms a Waste Channel; a fourth detached Lock is constructed at the foot of the Upper Rapids of 8-1/2 feet lift; in consequence of this arrangement the Bed of the River between the combined Locks, and the detached one, has to be deepened, and an Embankment from the head of the latter to the high land on the right Bank is required, which must also have been formed, had the original plan been carried into execution.

No. 5 A Dam to serve also as a Waste Weir, has to be constructed across the North Branch of the River, to give five feet depth of water over the Upper Sill of the detached Lock.

No. 6 A Draw Bridge is also required the Works cutting off a public communication; omitted to be provided for in the Estimate given to the Committee.

Works at Smiths Falls

Chopping & Clearing provided for in the Estimate given to the Committee, and will be completed by the 30th June next....

Increase of Expense, has arisen from deviating from the original plan.

Rock Excavation provided for in the Estimate given to the Committee, and will be completed by the 31st Augt next.... Increase of Expense has arisen from deviating from the original plan.

Masonry of Locks provided for in the Estimate given to the Committee, and will be completed by the 31st August next.

Increase of Expense See last remark.

Masonry of side retaining Walls provided for in the Estimate

given to the Committee, and is completed....

Increase of Expense, has arisen from a greater extent of Embankment being required, than provided for in the Estimate given to the Committee, which it was necessary to face with stone.

Backing & Puddling provided for in the Estimate given to the Committee, and will be completed by the 31st August next....

Increase of Expense has arisen from deviating from the original plan, and from the necessity of paying a higher price for these Services, than the Estimated one, in consequence of the difficulty of procuring earth and clay.

Lock Gates, Oak Sills, Sluices, Crabs & Chains etc. provided for in the Estimate given to the Committee, and will be completed by the 31st August next....

See remark on Lock Gates etc, First Eight Locks....

Paving the bottom of the Locks provided for in the Estimate given to the Committee....

In consequence of deviating from the original plan, this Service is not required.

Dam provided for in the Estimate given to the Committee, and will be completed by the 31st August next....

Increase of Expense has arisen from the necessity of having Two Dams for reasons afforded....

Embankments provided for in the Estimate given to the Committee, and will be completed by the 31st August next....

Increase of Expense has arisen from the necessity of having an Embankment from the Wing Wall of the Upper Combined Lock to the Waste Weir, and from the detached Lock to the high land....

Lock Master's House provided for in the Estimate given to the Committee, and will be completed....

This service has not yet been carried into execution, it not being decided whether the more judicious mode would not be to erect a Block House for the purpose of defence, as well as to serve as a dwelling for the Lock Master and Labourers.

Grubbing not provided for in the Estimate given to the Committee, and will be completed by the 31st August next.... Required for reasons afforded....

Waste Weir not provided for in the Estimate given to the Committee, and will be completed by the 31st August next.... Required for reasons afforded....

Earth Excavation not provided for in the Estimate given to the Committee, and will be completed by the 31st Aug^t next....

Required in consequence of deviating from the original plan....

Excavating loose Rock not provided for in the Estimate given to the Committee, and will be completed by the 31st August next....

Required in order to construct a Waste Weir, and Channel.

Grouting fissures in the Rock provided for in the Estimate given to the Committee, and will be completed by the 31st August next....

Required to prevent the escape of the water.

Drains behind the Locks not provided in the Estimate given to the Committee, and will be completed by the 31st August next....

Springs being met with, it was deemed advisable to carry off the water produced by them, as it might otherwise have caused injury to the Works.

Coffer Dams including Pumping not provided for in the Estimate given to the Committee, and will be completed by the 31st August next....

Required in consequence of deviating from the original plan for reasons afforded.

Purchase of a Log House provided for in the Estimate given to the Committee, and is completed....

A House was required for the Overseer of Works, and the security of the Engineer Stores, also to serve as an Office.

Bridge not provided for in the Estimate given to the Committee, and will be completed by the 31st August next....

Required for reasons afforded....

PAC, W044, Vol. 20, Reel B-1295, pp. 452-457.

Projected Cost of the Works

Section, No. 10. Smith's Falls: £18,193 ,, 7 ,, 7-3/4

PAC, W044, Vol. 19, Reel B-1294, p. 21.

Probable Amount of Each Section When Completed

No. 14. Smiths Falls. £33,217 ,, 3 ,, 3-3/4.

PAC, RG8, Vol. 52, pp. 231-232. Statement to the 31st March, 1831

Excerpts from Lieutenant Frome's Report:

The works at Smith's Falls, three-quarters of a mile above, consist of three combined and one detached lock, with a stone dam and waste-weir at the head of the first, and a small wooden waste-weir to raise the water to the level of the canal above the latter. The locks are all on the right bank of the river, and the excavation was through an irregular mass of rock, full of fissures and springs. Upon this foundation the three locks are built; their combined lifts being 25 feet, with 7-feet water below, and 5 feet 6 inches on the sill of the upper; across the chamber walls of the centre lock is a rolling bridge, and immediately above the locks a large basin is formed by embankments, extending on the south side 850 feet from the wing-wall, to meet the canal below the detached lock; and on the other, 180 feet to a cut stone pier, which forms the abutment to a waste-weir constructed of timber, with four sluices to regulate the height of water, and extending 200 feet, to a rocky island,

from the opposite side of which the stone dam crosses the river. This was built on the same plan as that at the work below, and was in some danger during its construction: its height is 23 feet, having been raised 6 feet above the required surface of the canal, to prevent the water flowing over it, as was at first intended. The depth of water in the basin, and in the canal, to the single lock, about 600 yards above, is 5 feet 6 inches and the lift of this lock, which is built upon a solid rock foundation is 8 feet, allowing 7-foot water on the upper sill, which is retained to that level by a low wooden dam or waste-weir about 4 feet high, crossing the river nearly abreast of the upper wing-walls of the lock, from which on the south side an embankment extends, till it meets the high land, formed by two rough stone walls with puddle between them, and a slope of earth on each side, guarded of course against the rise of the river. The canal excavation extends about 300 yards above, and the same distance below this single lock. ...

Lieutenant Frome's Report. PAC Library UG7 G72, Vol. I, *Professional Papers of the Corps of Royal Engineers*, p. 88.

Miscellaneous Information

Memorandum of a Journey along the route of the Rideau Canal:

Smith's Falls. The Job here consisting of a Dam 27 feet high and three Locks of a 8 ft. 5 in. lift each & a detached lock about 6 ft. 2 in. is proposed under contract to Messrs. Simpson & Richards. The Dam is not of the first rate masonry but may stand. The Locks are good workmanship built of sandstone brought from the distance of 7 miles; and as nearly all the stones are on the spot, no delay beyond the stipulated period is expected here. Mr. Simpson seems to be a man of considerable enterprise he has erected a very neat flour mill at this place - with two pairs of stones - one of which is made from a granite Boulder found near the place and answers perfectly well for any kind of grain excepting wheat. ...

PAC, MG24, 19, Vol. 7, p. 2051. Memoranda of a Journey from Kingston to Bytown made along the Route of the Rideau Canal, in February 1830.

Various Particulars of Interest Concerning the Rideau Canal:

The tenth section consists of the works at Smith's Falls. The canal after proceeding from Old Sly's Rapids for 2 miles in the deep water formed by the backing of the river, by the works below, is met with by Smith's Falls, where a difference in level in the waters of the river, of 36 feet, within one quarter of a mile, is found. They are composed to a series of rapids. ... To obviate this, a dam 23 feet high is erected across one of the channels to a large rocky island in the stream, by which the rapids are entirely

drowned. The remaining channel, on the left bank, ... contains the line of the Canal and 3 locks of 11 feet 2 inches each in lift. Limestone of very hard quality abounds here, which will answer to construct the works with, but will be difficult to cut and dress. The rest of the works at this place consist in rock excavation, clearing the snie of large stones, roots, and in the erection of necessary embankments. ... These works will render the Rideau navigable as far as the first rapids at the foot of the Rideau Lake, 3 miles above. ...

MG24, A12, Vol. 38. *The Montreal Herald*, Saturday, Sept. 22, 1832. "Rideau Canal".

Geological Details of the Rideau Canal

From the upper or first rapids to Burritts rapids the country is chiefly paved (at least near the river) with a grey silicious limestone - in many places this rock is any gelaloidal the cavities being filled with sulphate of iron and dogtooth spar - a highly calcareous limestone is also to be met with in this section.

PAC, MG29, A24, Vol. I, K. p. 51. "Rideau Canal.... Geological Features of the line of the Rideau Canal from the Report of Mr. Burrows, Civil Engineer, 1832."

Name of Canal Section

First Rapids (Poonamalee)

Number of Canal Section

Section Number 11.

Interest Shown, Advertisements & Application for Contracts

Rideau Canal - Persons desirous of contracting to execute the undermentioned portion of the intended Rideau Canal, are requested to send tenders stating the terms on which they are willing to undertake the same, to this office until Friday the first of February next....

5. To construct a Dam, Lock and embankments at First Rapids. Dam 9 feet high, 250 feet long; Lock 7 feet lift; and embankments of wood and clay, two miles long....

The Albion, Vol. 6, No. 28, p. 223, New York, Dec. 22, 1827.

Contractors:

1st Feby 1828. John Furgunson. Section 11. First Rapids. PAC, W055, Reel B-2811, Vol. 865, p. 210. List of the Various Contractors on the line of the Rideau Canal.

Progress Made During 1827

Works at first Rapids Rideau River chopping clearing & grubbing excavating, for lock Constructing Dam. In progress.

PAC, RG8, Vol. 44, pp. 171-172. Progress Report of Works at the Rideau Canal from the 21st September, 1826 to the 31st

October, 1827.

Progress Made During 1828

1. Section 11. First Rapids Lock 7 feet lift and Dam 8 feet high, with considerable embankments, advertized & tenders to be opened 1st Feb^y. at the Com^y Generals Office Montreal.

PAC, RG8, Vol. 45, p. 26. To Gen. Mann from John By, Rideau Canal Office, 23 Jan., 1828.

Also

W055, Reel B-2811, Vol. 865, p. 147.

2. ... and the works ... at other parts of the line by Messrs. Ferguson and Wylie, are advancing with all necessary despatch. ...

The Loyalist, August 7, 1828. p. 71.

Progress Made During 1829

Section 11. First Rapids on the Rideau: Clearing nearly completed. Grubbing 1/10 done. Excavation 1/12 a small quantity of cut & rough stone for Lock drawn to the Spot, not measured; some in the quarries; Dam not commenced. PAC, W055, Reel B-2811, Vol. 866, p. 170.

Also

W044, Reel B-1294, Vol. 19, p. 41.

Also

RG8, Vol. 47, p. 244.

Progress Made During 1830

1. First Rapids - In consequence of extra clearing of Land for free circulation of air; increased width of excavation in consequence of impracticability of raising water so high as intended by Smiths Falls Dam thereby incurring more excavation....

PAC, W055, Reel B-2812, Vol. 867, p. 193. Abridged Abstract Report of the Works on the Line of the Rideau Canal Showing amount of Original Estimate Sums Expended and amount when Completed.

2. Alterations and Extra Works

Having cleared- the Ground and Re-levelled the line of Canal, it appeared that the Original Levels were Erroneous, and that Embankments to a very considerable extent would not only be required, but that their proposed Sites being Rock of an open Shelving nature, the rendering them Water tight, would be attended with great difficulty if not impracticable and also that their required height was such, that an additional thickness would be necessary, incurring thereby a considerable additional expense from the circumstance of their being very little Earth and no Puddle within a reasonable distance of the works; having ascertained the facts above stated, I considered it indispensably necessary to deviate from the original plan, and the following alterations have been in consequence adopted. viz. -

The present Line of Canal Commences at the foot of the Rapids, and is carried South of the originally proposed one to the head of the same, and to meet the Section of the Ground, as also to avoid building Masonry upon open Shelving Rock, the Lock is placed nearly in the Centre of the Cut, its Lift having been increased 9 Inches, the total Rise to be overcome being 7 feet 9 Inches.

In consequence of the alterations, the Bed of the Lake immediately in front of the Upper Entrance into the Canal has to be Deepened, it being found impracticable from the low Nature of the Banks of the River to increase the height of the Dam, this latter circumstance, has also rendered it advisable to allow of the whole breadth of the River to serve as a Waste Weir, to lessen the rush of the Spring floods and that the Dam should be built in such a manner as to enable the Water to be lowered when required to repair the Banks should they meet with any unforeseen accident, I am therefore constructing a Dam of Wood with Stone Piers for Abutments as shown in the accompanying Plan, which I anticipate will prove perfectly durable, considering that it is only 4 feet in height, and at the same time allow of a complete control over the Water of the Rideau Lake.

From the low Nature of the Banks of the River it has been found impossible to back up from Smith Falls, the Depth of Water required, in consequence the Bed of the River at the Lower Entrance into the Canal has to be deepened beyond what was anticipated, causing an extension of the Coffer Dam necessary, and an increase of Labor in Pumping, whilst getting out the Excavation in question.

Either a floor of Wood or an Invert Arch was required for the Lock, the former is proposed as being less Expensive, and from the circumstance of being always under Water, sufficiently durable. A Stop Gate is also required to enable repairs to be made to the Lock Gates, Sluices etc. and to do away with the Expense of forming Coffer Dams which would otherwise be necessary.

Chopping and Clearing

Excess arises from its being found necessary to enlarge a clearance for circulation of Air; also from adopting a New Line of Canal.

Grubbing Land

Increase arises from alteration of line from River to more Inland Cutting.

Coffer Dam and Pumping

It was found impracticable from the low Nature of the Banks of the River, to back up the Depth of Water required from Smiths Falls, in consequence the Bed of the River had to be Excavated to a greater extent, causing an increase in the above Service.

Rock Excavation

See last remark. ...

Increase of Expense arises from adopting a new Line of

Canal, and the removal of the Lock from the lower Entrance to the Centre of the Cut, also from more Rock being met with than anticipated from the appearance of the ground, prior to its being cleared, and the Extra Rock Excavation required at the Upper and lower Entrances into the Canal.

Earth Excavation

See remark on Cofferdams etc....

Increase of Expense arises from adopting a new Line of Canal, to avoid extensive Embankments which occasioned a greater Depth of Cutting than provided for in the Estimate given to the Committee.

Backing and Puddling

From the circumstances of the Puddle having to be procured from a greater Distance than was anticipated.

From the difference between the Estimated and Contract prices, the former being 6d the latter 7d per Cubic Yard arising from the difficulty of procuring Puddle there being none within a reasonable distance of the Works.

Sluice Gates, Four Complete

.... Excess from using Crabs and Chains instead of Racks and Pinions.

Dam

Increase when completed. ...

A Dam of Wood to be substituted for one of Arch'd Key'd Work, to enable a complete control being had over the Walls of Rideau Lake, and to draw down in time of floods or when repairs or clearing Bed of Upper Portion of River may be necessary.

Embankment

.... Occasioned by an Improvement in the Line of Canal which was not discovered till the Woods were closed off.

Increase of Expense arises from an Error in the Original Levels, for although the Line of Canal was changed, Embankments were necessary, and the difficulty of procuring puddle Tended also to increase the Expense.

Stop Gate

...Required to enable repairs to be made to the Lock Gates, Sluices and Sill without the necessity of making Cofferdams for the purpose.

Pumps & Labour to keep the Works Dry

...

Caused in consequence of having to Excavate deeper as it was found impracticable to raise the Water between this place and Smiths Falls to the height intended.

See Remark on Smiths Falls.

This Service was rendered indispensably necessary from the open Nature of the Rock admitting the Water from the Upper Level which could not have been foreseen at the period of forming the Estimate given to the Committee, the expense of the above Service has also been increased from the necessity of Deepening the Bed of the Lake at the Upper Entrance of the Canal.

Coffer Dam above the Cut

This Coffer Dam is found requisite where Canal enters the River above, as it is to keep the Canal bottom as low as the Bed of the River. The Banks not being high enough to admit of a Dam to throw 5 feet water over it.

Loose Rock

These are large loose Masses of Rock laying on the surface of the Compact Rock and which could not be foreseen until the Surface of the ground was broken consequently were not included in Original Estimate.

Masonry

These Piers or Abutments to Dam are ...to Abut the Wood Work and prevent injury to Embankment by Wash of Water.

Indispensably necessary and would have been equally required from the Nature of the Banks of the River, had the Dam been constructed with Stone instead of wood.

Wooden Floor of Lock

This is found to answer in certain situations in place of an Invert Arch.

Either an Invert Arch or a Wooden Floor was indispensably necessary, the latter has been proposed being Cheaper then Stone and Sufficiently durable.

PAC, W044, B, Vol. 18, Reel B-1294, pp. 300-303.

Progress Made During 1831

1. First Rapids,

Section No. 11

Works approved of by the Committee....

First Rapids distant from ByTown 63-1/2 Miles, and from the head of the detached Lock at Smiths Falls 2-1/2 Miles are 240 yards in length, descent in that distance 8 feet 5 inches, and depth of water over the site where it was proposed to construct a Dam 1 foot 3 inches.

The plan submitted to, and approved of by the Committee, was to place a Lock of 7 feet lift, the Walls and Gates of which were to have an additional height of 3 feet, to guard against the Spring Floods, on the right Bank of the River, at the foot of the Rapids, and to form the Canal by Embankments and cutting, to the head of the same, where a Dam of 4 feet in height averaging 260 feet in length, and 8 feet in thickness, to give 5 feet depth of water over the Upper Sill of the Lock, and to serve also as a Waste Weir was to be constructed. A Lock Master's House with the necessary Clearing, Grubbing, Excavations etc. were also provided for in the Estimate given to the Committee.

The Works described were to back up 3 feet additional depth of water over the Shallows at the Entrance into the Lakes, rendering the Lakes navigable to the Upper Narrows a distance of 19 5/8 Miles.

Deviations from the Plan approved of by the Committee and Extra Works

No. 1 Having cleared the ground, and relevelled the

Line of Canal, it appeared that the original levels were erroneous, and that Embankments to a very considerable extent would not only be required, but that their proposed sites, being rock of an open shelving nature, the rendering them watertight, would be attended with great difficulty, if not impracticable, and also that their required height was such, that an additional thickness would be necessary, incurring thereby a considerable additional expense, from the circumstance of there being very little earth, and no puddle within a reasonable distance of the Works; having ascertained the facts above stated, I considered it indispensably necessary, to deviate from the Original plan, and the following alternations have been in consequence adopted, viz, The present Line of Canal commences at the foot of the Rapids, and is carried South of the originally proposed one, to the head of the same, and to meet the section of the ground, as also to avoid building Masonry upon open shelving rock; the Lock is placed nearly in the centre of the Cut, its lift having been increased 9 inches, the total rise to be overcome being 7 feet 9 inches.

No. 2 In consequence of the alterations, the Bed of the Lake immediately in front of the Upper Entrance into the Canal has to be deepened, it being found impracticable from the low nature of the Banks of the River, to increase the height of the Dam; this latter circumstance has also rendered it advisable to allow of the whole breadth of the River to serve as a Waste Weir, to lessen the rush of the Spring Floods, and that the Dam should be built in such a manner as to enable the water to be lowered when required, to repair the Banks, should they meet with any unforeseen accident, I am therefore constructing a Dam of Wood with Stone Piers for abutments, as shown in the accompanying plan, which I anticipate will prove perfectly durable, considering that it is only 6 feet in height, and at the same time allow of a complete control over the water of the Rideau Lake.

No. 3 From the low nature of the Banks of the River, it has been found impossible to back up from Smiths Falls, the depth of water required, in consequence the Bed of the River at the lower Entrance into the Canal has to be deepened beyond what was anticipated, causing an extension of the Cofferdam necessary, and an increase of labor in pumping, whilst getting out the Excavations in question.

No. 4 Either a floor of wood or Invert Arch was required for the Lock, the former is proposed as being less expensive, and from the circumstance of being always under water sufficiently durable. A Stop Gate is also required to enable repairs to be made to the Lock Gates, Sluices etc. and to do away with the expense of forming Cofferdams which would otherwise be necessary.

The alterations above stated, have caused an increase

upon the following services, viz. Chopping and Clearing, Grubbing Land, Rock Excavation, Earth Excavation, Backing and Puddling, Pumps & Labor to keep the Works dry, Cofferdam above the Cut, Loose Rock, Masonry for Abutments of Dam.

Works at First Rapids

Chopping & Clearing provided for in the Estimate given to the Committee, and will be completed by the 31st August next....

Increase of Expense arises from adopting a new line of Canal, and Clearing to create a free circulation of air to prevent sickness.

Grubbing provided for in the Estimate given to the Committee, and will be completed by the 31st August next.... Increase of Expense arises from adopting a new Line of Canal.

Cofferdam provided for in the Estimate given to the Committee, and will be completed by the 31st August next....

Increase of Expense. It was found impracticable from the low nature of the Banks of the River, to back up the depth of Water required from Smiths Falls, in consequence the Bed of the River had to be excavated to a greater extent than provided for in the Estimate.

Rock Excavation provided for in the Estimate given to the Committee, and will be completed by the 31st August next....

Increase of Expense, arises from adopting a new Line of Canal, and the removal of the Lock from the lower entrance to the centre of Cut; also from more Rock being met with than anticipated from the appearance of the ground prior to its being cleared, and the Extra Rock Excavations required at the Upper and lower Entrances into the Canal.

Earth Excavation provided for in the Estimate given to the Committee, and will be completed by the 31st August next....

Increase of Expense arises from adopting a new Line of Canal, to avoid Extensive Embankments, which occasioned a greater depth of cutting than provided for in the Estimate given to the Committee.

Masonry of Lock provided for in the Estimate given to the Committee, and will be completed by the 31st August next....

Backing & Puddling provided for in the Estimate given to the Committee, and will be completed by the 31st Aug^t. next....

Increase of Expense arises from the puddle required in the Embankments being included.

Lock Gates, Oak Sills, Sluices, Crabs & Chains, etc:

provided for in the Estimate given to the Committee, and will be completed by the 31st August next....

See remark on Lock Gates etc First Eight Locks....

Paving the bottom of the lock provided for in the Estimate given to the Committee, and is completed....

Increase of Expense has arisen from substituting a wooden floor, the bottom of the Lock being clay.

Dam provided for in the Estimate given to the Committee, and will be completed by the 31st August next....

Increase of Expense arises in consequence of deviating from the original plan, for reasons afforded....

Embankments provided for in the Estimate given to the Committee, and will be completed by the 31st August next.... Increase of Expense arises from an error in the original levels, for although the Line of Canal has been changed, Embankments are necessary.

Pumps & Labor to keep the Works dry provided for in the Estimate given to the Committee, and will be completed by the 31st August next....

Increase of Expense has arisen in consequence of the open nature of the Rock admitting the water from the upper level, which could not have been foreseen at the period of forming the Estimate given to the Committee; the expense of the above service has also been increased from the necessity of deepening the Bed of the Lake, at the upper entrance of the Canal. ...

Lock Master's House provided for in the Estimate given to the Committee, and will be completed....

This Service has not yet been carried into execution, it not being decided whether the more judicious mode would not be, to erect a Block House for the purpose of defence, as well as to serve as a dwelling for the Lock Master and Labourers.

Coffer Dam above the Cut not provided for in the Estimate given to the Committee, and will be completed by the 31st August next. ...

See remarks on Pumps and Labor....

Loose Rock not provided for in the Estimate given to the Committee, and is completed....

Consisting of Large Boulders and Masses of Loose Rock, immediately under the surface soil; their removal was necessary and a higher price had to be given than for Earth Excavation; the necessity of the above service was not foreseen at the period of forming the Estimate given to the Committee.

Masonry for abutments of Dam not provided for in the Estimate given to the Committee, and will be completed by the 31st August next....

Indispensably necessary, and would have been equally required from the nature of the Banks of the River, had the Dam been constructed with Stone & Earth instead of Wood. Booms not provided for in the Estimate given to the Committee, and are completed....

Required to prevent the Raftsman from running timber, which would have caused serious injury to the Dam constructing at Smiths Falls.

Shanties not provided for in the Estimate given to the Committee, and is completed....

It was first intended to have carried the Canal on the

left Bank of the River, the Line proposed by Mr. Clowes. The Contractor accordingly erected Log Buildings, which had to be paid for on altering the said Line agreeable to the terms of his contract....

PAC, W044, Vol. 20, Reel B-1295, pp. 458-464, plus plan.

Project Cost of the Works

Section, No. 11. First Rapids: £10,165 ,, 15 ,, 4-1/2

PAC, W044, Vol. 19, Reel B-1294, p. 21.

Probable Amount of Each Section When Completed

No. 15 First Rapids: 20,896 ,, 4 ,, 2-1/4

PAC, RG8, Vol. 52, pp. 231-232. Statement to the 31st March, 1831. ...

Excerpts From Lieutenant Frome's Report

A little more than 2 miles above Smith's Falls is a canal with a single lock, also on the right bank at what was called the "First Rapids on the Rideau," the lift of which, 6 feet 4 inches, brings the navigation to the average summer level of the Rideau Lake. The canal is a mile and a quarter in length, and the lock is situated about the centre; the excavation, above and below, being principally limestone rock. In the lockpit it was through a ridge of stiff clay with boulders, from 18 to 23 feet deep, and the floor is of hemlock plank laid upon sleepers of the same wood. The sills, and part of the breast-work, were laid in cement, as were most of the works above Long Island, and the walls have a guard of 4 feet 8 inches over the surface of the 7-foot water in the canal. A lay-by for boats is excavated on the south side of the canal above, about half-way between the lock and the river, and an embankment runs for a great part of the distance on the opposite side. At the head the cutting is deeper, averaging about 10 feet. Nearly abreast of the upper entrance of the canal, the dam crosses the river ... upright, and brace of oak, the former bolted to the rock, with pine or hemlock logs across the intervals between the bays, the whole backed with steps of heavy rough stone: four bays can be removed entirely, and the upper row of the whole dam, 365 feet long, to prevent any great rise of the lake in the spring. ...

Lieutenant Frome's Report. PAC Library UG7 G72, Vol. I, *Professional Papers of the Corps of Royal Engineers*, p. 89.

Miscellaneous Information

Memoranda of a Journey along the Route of the Rideau Canal

Poonamallee. This is the place where the Rideau River emerges from the Lake of the same name; and here as almost in all similar situations where a river leaves a Lake there is a fall to be surmounted. This must naturally be the case where a high bank of rock or sand forming the Boundary of

the Lake the water escapes over it and falls to a greater or less height according to the nature of the surface over which it flows and which is warming? by the friction of the water in proportion to its hardness. In some cases the river escapes from the Lake by a continuous succession of small falls, in others by flowing over a long inclined plain forming what in Canada is termed a Rapid, as lastly it flows over a precipitous rock forming a grand cataract. The fall in this place is not great requiring only one Lock of 6 feet four inches of lift - but as it extends in the form of a Rapid for some distance there is a cut to be made parallel to the river for the length of 1-1/2 of a mile and averaging 6 feet deep. The water at the bottom of the lake being too shallow for navigating has to be raised by a dam; over which it is intended to let the superfluous water flow, after filling the cut to supply the Lock & Canal. The stones for building the lock are of freestone and brought from the distance of 9 miles. A considerable proportion of them are already upon the spot, and such progress has been made in the excavation that it is hoped no delay to the completion of the canal within the proper time will take place in this part of it. Contractors Ferguson & Wilie.

PAC, MG24, 19, Vol. 7, pp. 2050-2051. Memoranda of a Journey from Kingston to Bytown made along the Route of the Rideau Canal, in February 1830.

Various Particulars of Interest

The eleventh section comprises the works at the first rapids on Rideau River. The Canal beyond Smith's Falls proceeds to the Rideau Lake for the distance of about 3 miles, when it is met with by the first rapids at the foot of that Lake. This is one of the most difficult little rapids to surmount, as its banks are low and unfit for dams, its channel entirely rock difficult to deepen, and the whole country of rock not easily cut through. It can only be surmounted by embankments, and a dam of 8 feet stretching across the river between the two lateral embankments. The Canal cuts through the left bank for about 1-1/2 miles, where a lock of 7 feet lift is erected. The Canal extends a little above the dam. By these works the rapids hitherto with water of 1-1/2 to 3 feet depth are entirely drowned, the islands in the rapids covered, and the navigation rendered perfect into the broad expanse of the Rideau Lake.

...

PAC, MG24, A12, Vol. 38. *The Montreal Herald*, Saturday, Sept. 22, 1832. "Rideau Canal."

Geological Details

From the upper or first rapids to Burritts rapids the country is chiefly paved (at least near the river) with a grey silicious limestone - in many places this rock is very gelaloidal the cavities being filled with sulphate of iron

and dogtooth spar - a highly calcareous limestone is also to be met with in this section.

PAC, MG24, A24, Vol. I, K p. 51. "Geological Features of the line of the Rideau Canal from the Report of Mr. Burrows, Civil Engineer, 1832."

Name of Canal Section

Oliver's Ferry [present day **Rideau Ferry**]

Number of Canal Section

Section Number 12

Contractors

1st Feb^y 1828 John Furgunson Section 12 Olivers Ferry.

PAC, W055, Reel B-2811, Vol. 865, p. 210. List of the Various Contractors on the line of the Rideau Canal.

Progress Made During 1827

Olivers Ferry removing boulders. In progress.

PAC, RG8, Vol. 44, pp. 171-172. Progress Report of Works at the Rideau Canal from the 21st September, 1826 to the 31st October, 1827.

Progress Made During 1828

Section 12: Olivers Ferry Rideau Lake, advertised & Tenders to be opened 1st February at the Comm^y Generals Office, Montreal.

PAC, RG8, Vol. 45, p. 26. To Gen. Mann from John By, Rideau Canal Office, 23rd Jan., 1828.

Also

PAC, W055, Reel B-2811, Vol. 865, p. 147.

Progress Made During 1829

Section 12: Oliver's Ferry. Not commenced.

PAC, W055, Reel B-2811, Vol. 866, p. 170.

Also

PAC, W044, Vol. 19, Reel B-1294, p. 41.

Also

PAC, RG8, Vol. 47, p. 244.

Progress Made During 1830

Olivers Ferry: £100 ,,0,,0. Saving

PAC, W055, Reel B-2812, Vol. 867, p. 193. Abridged Abstract Report of the Works on the Line of the Rideau Canal Showing amount of Original Estimate, sums Expended and amount when completed.

Progress Made During 1831

1. Upper Narrows, Rideau Lake, including Olivers Ferry,

Section No. 12 & 13.

Works approved of by the Committee....

The Upper Narrows are situated 83-1/8 Miles from By

Town, and 19-5/8 miles from the Works at the First Rapids, the plan submitted to, and approved of by the Committee, was to deepen the Narrows, in consequence Coffers Dams, Pumps, Excavation and Labor were provided for.

Deviations from the Plan approved of by the Committee, and Extra Works

No. 1 It appeared on Clearing the Isthmus between the Rideau & Mud Lakes, and commencing the Excavations, that much more Rock occurred than was originally contemplated, and the periodical sickness which prevailed at that place, rendering it necessary to give a much higher rate of wages to the Labourers as an inducement for them to remain at so unhealthy a station; the removal of the Rock would have been attended with so great an increase above the original Estimate, that I considered it indispensably necessary to deviate from the original plan, and to place a Lock of 4 feet lift, without a Breast Work, and a Dam of 10 feet in height, averaging 427 feet in length, to serve also as a Waste Weir, at the Narrows, to back up 4 feet of water, thereby saving that depth of cutting in the Excavation alluded to.

No. 2 The above alteration has rendered the following Works necessary, viz, a Lock of 4 feet lift, Rock Excavation, Chopping & Clearing Land, Grubbing, Earth Excavation, Lock Gates and Sluices, Stop Gates and Sills for Lock, A Dam to serve as a Waste Weir, Embankments averaging 758 feet in length, and 5 feet in height, and a Lock Master's House.

No. 3 A Draw Bridge is also required, as the Works will render the ford impassable, which work was omitted to be provided for in the Estimate given to the Committee.

Works at the Narrows

Coffer Dam, provided for in the Estimate given to the Committee, and will be completed by the 31st August next ...

Pumps & Labor provided for in the Estimate given to the Committee, and will be completed by the 31st Aug^t.

next

Rock Excavation, provided for in the Estimate given to the Committee, and will be completed by the 31st Aug^t next ...

Increase of Expense has arisen from the placing a Lock at the Narrows for reasons afforded....

Chopping & Clearing Land not provided for in the Estimate given to the Committee, and will be completed by the 31st August next ...

This service was rendered necessary in consequence of placing a Lock at the Narrows.

Grubbing not provided for in the Estimate given to the Committee, and is completed....

Earth Excavation not provided for in the Estimate given to

the Committee, and is completed ...

Earth upon the surface of the Rock where it was proposed to place the Lock, and consequently had to be removed.

Masonry of Lock, not provided for in the Estimate given to the Committee, and will be completed by the 31st August next ...

A Lock was adopted for reasons afforded....

Lock Gates, Oak Sills, Sluices, Crabs & Chains etc not provided for in the Estimate given to the Committee, and will be completed by the 31st August next.

See remarks on Lock Gates etc. First Eight Locks

Dam not provided for in the Estimate given to the Committee, To will be completed by the 31st August next

Adopted to raise 4 feet of water at the Isthmus, to save that depth of Excavation.

Embankment not provided for in the Estimate given to the Committee, and will be completed by the 31st Aug^t. next....

In consequence of raising Upper Rideau Lake, Embankments are required to prevent the water turning the Works.

Lock Master's House not provided for in the Estimate given to the Committee, and will be completed

This service has not yet been carried into execution, it not being decided whether the more judicious mode would not be, to erect a Block House for the purpose of defence, as well as to serve as a dwelling for the Lock Master and Labourers

Draw Bridge not provided for in the Estimate given to the Committee, and will be completed by the 31st August next ...

Required for, reasons afforded....

PAC, W044, Vol. 20, Reel B-1295, pp. 464-467.

Projected Cost of the Works

Section, No. 12. Oliver's Ferry £100 ,, 0 ,, 0

PAC, W044, Vol. 19, Reel B-1294, p. 21.

Probable Amount of Each Section When Completed

Olivers Ferry £6529 ,, 5 ,, 1-3/4

Narrows Rideau Lake

PAC, RG8, Vol. 52, pp. 231-232. Statement to the 31st March 1831.

Miscellaneous Information

Various Particulars of Interest Concerning the Rideau Canal ... At Oliver's Ferry ... the obstructions here are in the shape of large boulders and rocks in the channel. ...

PAC, MG24, A12, Vol. 38. The Montreal Herald, Saturday, Sept. 22, 1832. "Rideau Canal."

Geological Information

The country from Olivers Ferry to Bytown consists generally

of plateaus or flats at the extremity of each, the rapids and locks are situated. ...

PAC, MG29, A24, Vol. I, K. p.5. "Geological Features of the Line of the Rideau Canal from the Report of John Burrows, Civil Engineer, 1832."

Name of Canal Section

Narrows Rideau Lake.

Number of Canal Section

Section Number 13.

Contractors

9th July 1827. William Hartwell. Section 13 Narrows Rideau Lake.

PAC, W055, Reel B-2811, Vol. 865, p. 210. List of the Various Contractors on the line of the Rideau Canal.

Progress Made During 1827

Works at Narrows Rideau Lake Rock excavation, Coffey Dams etc... In Progress.

PAC, RG8, Vol. 44, pp. 171-172. Progress Report of Works at the Rideau Canal from the 21st September, 1826 to the 31st October, 1827.

Progress Made During 1828

Section 13. Upper Narrows Rideau Lake advertised & tenders to be opened 1st Feb^y. at the Com^y Generals Office, Montreal.

PAC, RG8, Vol. 45, pp. 25-26. To Gen Mann from John By, Rideau Canal Office, 23rd, Jan. 1828.

Also

PAC, W055, Reel B-2811, Vol. 865, p. 147.

Progress Made During 1829

Section 13: Upper Narrows Rideau Lake. Not Commenced.

PAC, W055, Reel B-2811, Vol. 866, p. 170

Also

W044, Vol. 19, Reel B-1294, p. 41.

Also

PAC, RG8, Vol. 47, p. 244.

Progress Made During 1830

1. Narrows Rideau Lake: To save expense of Rock excavation at Isthmus to have a head of Water in reserve in Upper Rideau Lake, to scour muddy bottom below Narrows etc.,

PAC, W055, Reel B-2812, Vol. 867, p. 193. Abridged abstract Report of the Works on the Line of the Rideau Canal ...

2. Alterations and Extra Works

It appeared on clearing the Isthmus between the Rideau and Mud Lakes, and commencing the Excavations, that much more Rock occurred than was originally contemplated, and the

periodical Sickness which prevailed at that place, rendering it necessary to give a much higher rate of wages to the Labourers, as an inducement for them to remain at so unhealthy a Station; the removal of the Rock would have been attended with so great an increase above the Original Estimate, that I considered it indispensably necessary to deviate from the original Plan, and to place a Lock and Dam at the Narrows to back up 4 feet of Water, thereby saving that Depth of Cutting in the Excavation alluded to - The Lock is 4 Feet Lift, without Breast Work, and the Dam which serves also as a Waste Weir, 10 feet in height, averaging 427 feet in length.

Rock Excavation

This Extra Rock Excavation incurred in consequence of placing a Lock at this place for the purpose of saving Expensive Rock Excavation at the Isthmus at the same time as preserve a head of Water to scour soft Mud and Slough from below this Work, which impedes even Canoes and rise as the Water rises.

Chopping and Clearing Land

Being found now advisable to place a Regulating Lock at this Station this Expense was unavoidably incurred to ascertain the proper position of the Lock, as also to allow...for Working Lock and constructing Lock...on Block House.

Grubbing

See last reason.

Earth Excavation

For Lock Pit from Surface of Rock.

Masonry of Locks

On account of very expensive Rock Excavation at the Isthmus it was found advisable to place a regulating Lock at this place, which at the same time Coops up a Reservoir of Water.

Gates for Do. Two Pair

Required for the Locks.

Sluices

Remark on Masonry applies to this.

Stop Gates & Sills for same Two of each

See last Remark.

Oak Sills

See remark on Masonry.

Dam & Waste Weir Sluices

Required to raise 4 feet Water over the Isthmus to save that Depth of Cutting.

Embankment - 758 feet in Length

In consequence of increased rise on Lake the Embankment is found requisite to prevent the Escape of the Water of the Rideau Lake round.

Lock Masters House

Block House is here proposed to serve as Lock Masters House not yet Estimated. The ... of £150 for a Lock Masters

House, similar to those proposed for the several Sections.

PAC, W044, Vol. 18, Reel B-1295, pp. 305-306.

Progress Made During 1831

Please refer to the previous section, Section No. 12, for this information.

Progress Made During 1832

... when I was passing through the Canal in May, with Lt. Col. By; One of the Gates of the Lock at the Narrows between the Upper and Lower Rideau Lakes, got out of order and would not open sufficient to allow the steamer to pass through, it became necessary to examine and put it to rights, to put in the Cofferdam and pump the water out, which would have been a much more tedious and expensive operation without the assistance of a Vessel of the above nature which there happened to be handy upon the Rideau.

PAC, W044, Vol. 20, Reel B-1295, p. 125 to R. Byham Esq., from Col. Nicolls, Royal Engineer's Office, Quebec, 30th July, 1832.

2. According to your desire, I beg to inform you of the cause of our difficulty at the Narrows, which appears to have arisen from the interference of a Chain Block, with the inside of Mitre Post. Owing to the swelling of the Timbers, and perhaps a little lowering of the Gate from a trifling depression of the Quadrant. The latter in itself, was not sufficient to cause a Stoppage. There was a twist in the chain, which was probably caused by the effort to raise the Gate. The Chain being out of the Block, it appears unlikely that the Gate could have been traversed during the preceding twelve months, in such a State, and that the stiffness in working was caused by the Quadrant, and a little fullness in the Hedpost [sic]; which has been rectified.

PAC, W044, Vol. 20, Reel B-1295, p. 126. From P. Cole, Capt. R.E. to Col. Nicolls, Royal Engineer Commanding, Kingston, 24th June, 1832.

Projected Cost of the Works

Section No. 17. Narrows Rideau Lake. - Olivers Ferry. £6529, „5,, 1-3/4

PAC, RG8, Vol. 52, pp. 231-232. Statement to the 31st March, 1831.

Exerpts from Lieutenant Frome's Report

The original channel is here closed by a wooden waste-weir, and a lock of 4 feet 10 inches lift, built in a cut made through a narrow tongue of land. The foundation is a solid rock, which has been sunk 3 feet lower than was necessary. There is no breastwork, the lift being thrown on the upper gates, and both the sills are of oak, bolted to

the rock. On the north shore the land is bold and rocky, but on the opposite side an embankment has been carried from the waste-weir for some distance.

The object of raising this part of the lake, instead of keeping the natural level of the whole as the summit, was to save the expense and trouble of some very difficult rock excavation at the isthmus between the Rideau and Mud Lakes, the entrance to which is just 3 miles distant.

Lieutenant Frome's Report. PAC Library, UG7 G72, Vol. I, Professional Papers of the Corps of Royal Engineers, p. 90.

Miscellaneous Information

Memorandum of a Journey from Kingston to Bytown along the Rideau Canal

Leaving the Isthmus the Canal enters upon that beautiful sheet of water termed the Rideau Lake which extends in a direction from east to west of somewhat of a semicircular shape. This is a grand feeder of the Canal being the summit waters from whence the waters decline, on the one side towards Lake Ontario and on the other towards the River Ottawa. Out of this Lake, flows the River Rideau towards the North till it joins the Ottawa and gives its name to the Canal. Proceeding along the Lake for about 5 or 6 miles we reach the Narrows a place sufficiently designated by its name, here as before mentioned it is in contemplation to put in a Lock for the purpose of raising the water on the side next to the Isthmus; but as this plan is not definitely fixed and as no part of the contemplated works are begun here, it is not necessary to dwell upon this point in brief sketch of this kind.

PAC, MG24, 19, Vol. 7, p. 2050. Memoranda of a Journey from Kingston to Bytown made along the Route of the Rideau Canal, in February 1830.

Various Particulars of Interest Concerning the Rideau Canal

At the Rideau Narrows, the Lake contracts again much more than at Oliver's Ferry. Through the Narrows a trifling current always runs to the north. ... The works here are of rock excavation and cleansing the bed of the river. ... These trifling works at Oliver's Ferry and Rideau Narrows form the twelfth and thirteenth sections of the Canal, by which ... an uninterrupted navigation of 45 miles will be attained.

PAC, MG24, A12, Vol. 38. *The Montreal Herald*, Saturday Sept. 22nd, 1832 "Rideau Canal".

Lt. Col. By's Discussion of a Bridge at the Narrows

...I did not communicate either to the respective Officers at Quebec, or to the Board, the agreement entered into with Messrs. Bell & Co., I most respectfully beg to state, that the Bridge in question was one of those contingencies indispensably necessary to carry on the work, and so intermixed with the Contractors work, that if I had

ordered it to be performed by day work, it might have given rise to disputes between the Contractors and the Rol Engr Department, as they (the Contractors) might have complained of its being too long in building or of its not being sufficiently substantial to answer their purposes; to avoid which I consented with Capt. Cole the Officer in charge of the Work, the Master Carpenter, the Clerk of Works, & Overseer of Works in the presence of Mr. Richardson (Mr. Bell's partner) and taking all that was said into consideration, I offered Mr. Richardson £35 to construct the Bridge, & to remove it when no longer required; this he agreed to, and performed the work so as to answer his purpose; but had I attempted to construct the said Bridge it is necessary to observe that the mere collecting materials & workmen would have cost two or three times the sum. I agreed to give Messrs, Bell & Co.; but they having a quantity of material & men on the spot, and time being to them of great value, they were willing to perform the work in question for the moderate sum of £35 and this agreement being made in the presence of both parties, no further notice was taken of it, until Messrs Bell & Co's account was received when the charge was admitted to be correct, & the voucher ordered to be made out; and I further beg to observe that this has been the mode practised in carrying on the Rideau Service from its commencement to its conclusion, being termed job work, or measure and value, it being necessary in the first place to measure the length, Breadth, and height of the work required, to form an idea of its value before the bargain is made; in excavations the number of cube yards is always given, but in such a job as the one in question, the fact of the service being performed, and certified by the Officer superintending the work, the Clerk of Works, the Overseer of Works and myself, was supposed to be all that was necessary; for had I stopped to have reported every arrangement I made, and waited for the Respective Officers to approve before I proceeded, the works could never have been completed, and as I conceived my instructions left all such minor services to my discretion I acted on this, as on all such occasions for the good of the service, and trust that under this explanation the Right Hon^{ble} & Hon^{ble} Board will be pleased to approve of the sum of £25 paid to Messrs. Bell & Richardson for building & removing a bridge at the Narrows, and allow the same to pass in the accounts of L. Rudyard Esq., for the Rideau Canal.

PAC, W044, Reel B-1298, Vol. 24, pp. 605-608. To Col. Fanshawe from John By Shernford Park, Frant, Sussex, 27th July, 1833.

Geological Features of the Rideau Canal

... Some limestone may be found on the heights to the north of the Rideau lake and near Olivers Ferry sandstone again

appears.

PAC, MG29, A24, Vol. I, K. p. 5. "Rideau Canal. ...Geological Features of the line from the Report of Mr. Burrows Civil Engineer, 1832."

Name of Canal Section

Isthmus

Number of Canal Section

Section Number 14.

1. Section 14. Isthmus between Clear Lake & Indian Lake, also between Mud Lake & Rideau Lake, contracted for by Mr. Hartwell...

PAC, RG8, Vol. 45, p. 25. To Gen. Mann from John By Rideau Canal Office, 23rd January, 1828.

Also

W055, Reel B-2811, Vol. 865, p. 147.

2. 9th July, 1827. William Hartwell. Section 14 Isthmus Rideau Lake.

PAC, W055, Reel B-2811, Vol. 865, p. 210. List of the Various Contractors on the line of the Rideau Canal.

3. ...relative to the allowance of 8/6 per cubic yard paid to Michael Ward for Rock Excavation at the Isthmus ... it was impracticable to excavate the rock agreeable to the same.

...I beg further to state that on the failure of Mr. Hartwell & the relinquishment of the Work by Mr. Stevenson, not being able to procure any person to contract for the work at anything like moderate prices, owing to the extensive unhealthiness of the situation, I was obliged in the Autumn of 1829 to direct Capt. Cole to take charge of, and give his undivided attention to the said Works, in order to insure their completion at the same period with the other portions of the Canal. ...

PAC, W055, Reel B-2814, Vol. 869, pp. 236-237. To Respective Officers Quebec from Royal Engineer Office, Rideau Canal, 4th Dec., 1830. from John By.

4. ...Vouchers paid for excavation at the Isthmus, Rideau Lake to Messrs A. & G. Buchanan.

PAC, W044, Reel B-1299, Vol. 26, p. 64.

Supervisors

...that I have placed Lt. Colonel Boteler in charge of the various works extending from Kingston Mills, to the Narrows, Rideau Lake, inclusive, an extent of works which requires him to be constantly on the move. ...

PAC, W044; Reel B-1298, Vol. 24, p. 504. To Maj. Gen Sir A Bryce from John By, Royal Engineers Office, Rideau Canal 7th Sept., 1830.

Progress Made During 1827

1. Works at Isthmus Rideau Lake chopping, grubbing and

clearing, Rock and earth excavation etc....In Progress. Works at Isthmus Indian Lake chopping, grubbing & clearing with Earth excavation....In Progress.

PAC, RG8, Vol. 44, pp. 171-172. Progress Report...to the 31st Oct., 1827.

2. At...Isthmus between the Rideau & Mud Lakes, Isthmus between Indian & Clear lakes...the Trees have been felled piled & burnt - to a proper width for the course of the Canal, & some excavations Commenced,

PAC, W044, Reel B-1294, Vol. 19, p. 71.

Progress Made During 1828

1. Section 14. Isthmus between Clear Lake & Indian Lake, also between Mud Lake & Rideau Lake contracted for by Mr. Hartwell, he has cleared the land and commenced the excavation, but he does not appear to have sufficient energy to carry on so extensive a work; I have therefore told him, if I am not better pleased with his exertions on my next visit I shall be obliged to break his contract, and advertise the work afresh.

PAC, RG8, Vol. 45, p. 25. To Gen. Mann from John By Rideau Canal Office, 23rd Jan., 1828.

Also

W055, Reel B-2811, Vol. 865, p. 147.

2. The oftener I examine the excavation now in progress between Rideau Lake and Mud Lake the more I am convinced that it is going to turn out to be a more difficult piece of work than has been suspected.- ...I am sorry that when surveying this Isthmus last Summer we had not a set of boring tools to ascertain its nature more fully in consequence the estimate returned of this work will not I am afraid be sufficient unless some other method than the present be adopted. ...

PAC, MG24, E6, p. 51. To Lt. Col. By, from John Mactaggart, Royal Engineer Office, Rideau Canal, 22nd March 1828.

3. From the nature of the Rock on my job, I now find from what I have expended, say to the amount of two thousand pounds, exclusive of what I have received from you that it is totally out of my power to fulfil my engagement at the Contract prices-under those Circumstances and from your knowledge of the nature of the rock, may I request you will take my Situation into your Consideration, and release me and my Securities from the Contract; by so doing you will much oblige.

PAC, RG8, Vol. 49, p. 1. To Lt. Col. John By from William Hartwell, By Town, October, 1828.

Progress Made During 1829

1. I have the honor of acknowledging the receipt of your letter of the 13th Instant enclosing the Memorial of Mr. Hartwell the Contractor at the Isthmus, which I herewith return, and beg to state for the information of His

Excellency Sir James Kempt that it would have been immediately attended to, but the Clerk of Works Mr. Baird, who made the final measurements in the presence of Mr. Hartwell, was absent on leave, and I have been waiting that Gentleman's return.

I have now the satisfaction to state that I find on enquiry my instructions to Mr. Baird have been strictly obeyed; they were that every thing should be conducted liberally towards Mr. Hartwell, and that his work should be measured rather beyond what he had performed; this I did with the hope of preventing His Excellency being troubled with complaints; but it is a system that cannot be continued, for I have no right to give a Contractor payment for one foot more than he performs, and I feel confident that if they were to be paid their unjust demands, it would only encourage them to make a greater number of false claims.

Had Mr. Hartwell finished his work, or excavated the parts he has commenced to the depths required he would have been entitled to receive 1/ per cubic yard for earth excavation; but as he has only removed that near the surface, I cannot give him more than 6d which is the price I always told him he would be allowed until he completed the work to the required depth; this he cannot deny.

When Capt. Savage measured his work in my presence last July, I advised him to give up the Contract for he was making little or no progress and evidently losing money, but as the sickness had not then commenced he cannot attribute his losses to that cause and I beg to state it is my opinion that the prices he has received are sufficient, although when the Coffers Dams are formed at the extremities of the cut across the Isthmus, and the contractor has to keep his workmen free from water, it may probably then be found that the prices are too low, as they are to cover all contingencies; and it may then be thought just to make some allowance for water work; but Mr. Hartwell has not got into these difficulties, he has therefore no claim of any kind on the Engineer Department.

PAC, RG8, Vol. 47, pp. 32-34. To Lt. Colonel Couper, Military Secretary from John By, Royal Engineer Office, Rideau Canal, 29th January, 1829.

2. Section No. 14. Isthmus Rideau Lake. Chopping and Clearing nearly finished. Excavation about 1/12 part done. Section 15: Isthmus Indian Lake. This work is about 2/3^{ds} done.

PAC, W055, Reel B-2811, Vol. 866, p. 170.

Also

W044, Reel B-1294, Vol. 19, p. 41.

Also

PAC, RG8, Vol. 47, p. 244.

3. ...that I am of opinion the work at the Isthmus between Rideau Lake & Mud Lake will be the last Work Completed on

the whole line of Canal for such has been the Mortality occasioned by Lake fever that there is great difficulty in procuring workmen in fact there is only 4 men on the Isthmus at the moment I therefore propose to send an Officer & Overseer with 300 Men to that station as soon as the sickly season is passed which I imagine will be about the 1st September. ...rations for that number of men during the months of Sept^y, Oct., Nov^y, Dec^y & January by which time I hope to have the Wks so far advanced as to get the remainder performed by Contract which at present appears impossible without payment of double the sum for quarrying.

PAC, MG29, A24, Vol. 1, p. 22.

Also

PAC, RG8, Vol. 49, p. 82, By to Durnford, 12th August, 1829.

4. ...There has been so much sickness between the Mud and Rideau Lakes that the works there have been abandoned, until later in the year, when By puts 300 of his own people upon them....

PAC, MG24, A12, Vol. 34. Extract from the Letter to Lord Dalhousie from Lt. Col. Couper, Quebec, 20th August, 1829.

5. ...At the Isthmuses the two Contractors have only four men at work, several have died and the remainder are too ill to work, Mr. Stephenson one of the Contractors is very bad with the fever himself. ...

PAC, W044, Reel B-217, Vol. 15, p. 20. To John By from Savage, Rideau Canal, 6th Sept., 1828.

6. ... these Calculations must not be considered, as the positive Sums required, for although myself and officers are using every exertion to bring them as near the sum required as possible,... the Excavation of the Isthmus Rideau Lake are Services so interwoven with unforeseen Contingencies, that the Expenses of them must remain uncertain until they are completed.

PAC, W044, B, Reel B-1295, Vol. 19, p. 341. Letter from John By Royal Engineer Office, Rideau Canal, 31st December 1829.

7. ...relative to the allowance of 8/6 per cubic yard paid to Michael Ward for Rock Excavation at the Isthmus...it was impracticable to excavate the rock agreeable to the same. ...I beg further to state that on the failure of Mr. Hartwell & the relinquishment of the Work by Mr. Stevenson, not being able to procure any person to Contract for the Work at anything like moderate prices owing to the extensive unhealthiness of the Situation, I was obliged in the Autumn of 1829 to direct Capt. Cole to take charge of, and give his undivided attention to the said Works, in order to insure their completion at the same period with the other portions of the Canal. ... I formed a new one [schedule] increasing the prices of the Rock Excavation from 4/ to 7/6 the Cubic Yard; which latter price I then, hoped would have included all contingent expenses, but at the commencement of the Excavation Capt. Cole found it necessary to cut a drain 8

feet wide and about 2 feet deep, through the centre line of the Canal, to carry off the water, which found its way through the rock, and as this work was executed under water 8/6 was allowed per Cubic Yard, and this increase only allowed the Workmen Employed to make very moderate wages, and in order to then that the increased price is barely a remunerating one in consequence of the great abundance of water. ...

PAC, W055, Reel B-2814, Vol. 869, pp. 236-237. To Respective Officers Quebec from Royal Engineer Office, Rideau Canal, 4th Dec., 1830 from John By.

8. Station and Description of Persons. Isthmus.

	<u>Number of Men Employed on August 1st.</u>
R1 Engineer Dept.	2
Commiss ^t Dept.	1
7th Company Rl. Sappers & Miners	59
Employed by the R1 Engineer Dept.	<u>250</u>
Total	312

	<u>Taken on since</u>	
Rl. Engineer Dept.	“	
Commiss ^t . Dept	“	
7th Company Rl. Sappers & Miners	“	
Employed by the R1 Engineer Dept.	<u>20</u>	<u>Total</u>
Total	20	332

	<u>Least Number Employed about the 15th Sept.</u>	<u>Present Number Employed on the 15th Sept.</u>
R1 Engineer Dept.	1	1
Commiss ^t Dept.	1	1
7th Company Rl. Sappers & Miners	41	41
Employed by the R1 Engineer Dept.	<u>56</u>	<u>56</u>
Total	99	99

	<u>No. of Men who have been sick at the Station.</u>	<u>No. of Men who rejoined but had a relapse</u>
R1 Engineer Dept.	1	“
Commiss ^t Dept.	“	“
7th Company Rl. Sappers & Miners	32	11
Employed by the R1 Engineer Dept.	<u>201</u>	<u>19</u>
Total	234	30

	<u>Died at the Station</u>		
	<u>Men</u>	<u>Women</u>	<u>Children</u>
Rl. Engineer Dept.	1	“	“
Commisst. Dept.	“	“	“
7th Company Rl. Sappers & Miners	1	4	3
Employed by the Rl. Engineer Dept.	<u>12</u>	<u>5</u>	<u>6</u>
Total:	14	9	9

Remarks: Mr. Dunlop - Clerk - died on the 26th August. Private Simon Gibson died on the 30th August. Private Nathan Shaw died of dropsy on the 15th Sept. but not included in this return - nearly all the women of the Company were attacked severely and most of the children were ill but not in so robust a manner.

Scarcely any men had left the Isthmus from dread of the sickness until after it broke out about the 8th - 10th of August. - from its having kept off so long, an idea had prevailed that they would have escaped it altogether.

Dr. Johnson Asst. Surg. Med. Dept. stationed at the Isthmus.

No sickness having occurred at this place, the number of Men employed 40 - 52 are omitted altogether in this Return.

PAC, W044, Reel B-1294, Vol. 18, p. 482.

Progress Made During 1830

1. Isthmus, Rideau Lake and Strait between Mud and Clear Lakes: In consequence of a much greater proportion of excavation turning out Rock than could at first be ascertained for want of Boring Rods constructing of Extra Lock etc....

PAC, W055, Reel 8-2812, Vol. 867, p. 193. Abridged abstract Report of the Works on the Line of the Rideau Canal Shewing amount of Original Estimate Sums Expended and amount when completed.

2. Alterations & Extra Works

In consequence of a much greater quantity of Rock occurring than at first anticipated, and the very great Sickness which prevails periodically at this Station causing a serious increase in the price of labour, together with the open nature of the Rock admitting water from the Lakes, occasioning a heavy expenditure in pumping, or an equivalent addition to the price of Rock per Cubic yard to cover the same, and as the quantity of water would necessarily augment as the Excavation became deeper, I considered it indispensably necessary to deviate from the original Plan, and have therefore backed up 4 feet of Water, by placing a Lock and Dam at the Narrows, and to surmount this additional rise, it being impracticable to raise the Water of Mud Lake,

by increasing the lift at Chaffeys Mills with Safety, a Lock of 4 feet lift is placed at the end of the Excavation at the Isthmus entering Mud Lake, And should it be found advisable at any further period, on the Country becoming more healthy, to deepen the said Excavation, as originally proposed, it can be done, and there being no Breast Works to the Two Locks above mentioned they will then Serve as Guard Locks.

The Rock Excavation at the Isthmus now cost 8/6d per Cubic Yard, and the additional depth of 4 feet would at the least cost 10/ the length of the Cut in which the above depth will be saved is 6600 feet, about two thirds of its length being Rock, the width of Canal Bottom could not be less than 40 feet, with a Slope of two to one for the earth, and perpendicular for the Rock, the number of Cubic yards of the former would be about 13906 at 5/ per cubic yard (including pumping which in the Beaver Meadow would be attended with very heavy expense) amounts to £3476 discarding fractions, the quantity of the latter would be about 26074 Cubic yards, at 10/ per yard, Amounts to £13037, the total amount of the Excavation would therefore be about £16513. this does not take into consideration the additional expense which might be incurred by delays arising from sickness, and the possibility that to get the same performed, higher prices than those above stated might be required, the Two Locks and Dam will cost about £8766 ,, 11 ,, 5. and the alterations, independent of the saving is I think an improvement upon the original plan, as it prevents the lowering of the whole summit level, which would otherwise take place if any accident had occurred to the Works, either at Chaffeys Mills or the First Rapids.

The above alterations have rendered the following additional Works necessary, Masonry of Lock, Gates for Dc: Sills of Oak, Stop Gates.

Cutting and Clearing

Clearings have been enlarged to allow Circulation of Air, to prevent Sickness.

Rock Excavation

From not being provided with proper implements of boring and from the appearance of the Surface this Excavation was supposed to Consist wholly of Earth, but after Clearing off the first and breaking ground it was found to consist almost wholly of Rock difficult to remove. It is therefore possible to place a Lock at the Narrows thereby Saving 4 feet of Rock Excavation for one, and a half mile through that of the Isthmus.

Masonry of Lock Gate Piers

...Piers for the Gates were only provided for, from its being anticipated that the Rock would prove Sufficiently Sound to render Masonry in Chamber Walls of the proposed Lock unnecessary.

Gates for Ditto

Required for the Lock.

Cills of Oak

It is proposed to excavate the Piers of Masonry and to make Rock bottom and side Walls and to lay both - in same level.

Excavation of Gravel and loose Rock

Gravel and loose rock being met with, a higher price had to be allowed for the Removal of the same, than for Earth Excavation.

Stop Gates Two

Required for the Lock.

Sluices

Required for the Lock.

Building of Houses for Engineer Office, Store and Barracks, as also accomodation for Labourers.

Block House is here proposed to Serve as a Lock Master's House not yet Estimated. ... temporary Log buildings to Shelter for about 500 persons.

In consequence of the incapability of Mr. Hartwell to carry on the Work, and no person of Sufficient responsibility Coming forward to undertake the same, it became indispensably necessary to have the Works executed more immediately by the Engineer Department; In consequence, I stationed one of the Companies of Royal Sappers and Miners at the Isthmus, for whom accomodations, Barracks and Hospital were required; buildings were likewise necessary for the security of the Tools and Stores, and in the first instance to induce Labourers who were dispirited from the place having been so extremely unhealthy in the year 1828 to return, I have accomodations built for them, and Provisions of every description provided for their Comfort, the Circumstances of the Case imperatively calling for a deviation from the general mode of carrying on the Works by Contract.

Clearing and improving Strait between Mud and Clear Lakes

...Required to provide for a Steam Boat Navigation.

PAC, W044, Vol. 18, Reel B-1294, pp. 308-311.

Progress Made During 1831

1. Isthmus Rideau Lake

Section No. 14

Works approved of by the Committee

Isthmus Rideau Lake distant from ByTown 87-1/4 Miles, and from the. Upper Rapids 4-1/8 Miles, is 1760 yards in width, in a direct Line from the Entrance into the Canal from the Rideau Lake to the Entrance into Mud Lake, the total length of Canal in consequence of giving a curve to the same, in order to avoid Rock Excavation, averaging 44 feet in depth, and 875 feet in length, is 2400 yards.

The plan submitted to, and approved of by the Committee, was to raise Indian, Clear, and Mud Lakes to the level of Rideau Lake by the Works at Chaffeys Mills, and to carry the Canal in the curved direction described which

would give an average cutting of 13 feet in depth, 2200 yards in length, and 80 feet in width supposed to be earth; and 600 feet in length averaging 12 feet in depth and 46 feet in width of Rock. Cofferdams to deepen the entrances into the Lakes, with the necessary Clearing, Grubbing, etc. were also provided for in the Estimate given to the Committee.

Deviations from the Plan approved of by the Committee and Extra Works

No. 1 In consequence of a much greater quantity of Rock occurring than at first anticipated, and the very great sickness which prevails periodically at this station, causing a serious increase in the price of Labor, together with the open nature of the Rock, admitting water from the Lakes, and numerous Springs, occasioning a heavy expenditure on pumping, or an equivalent addition to the price of Rock per cubic yard to cover the same, and as the quantity of water would necessarily augment as the Excavations became deeper, I considered it indispensably necessary to deviate from the original plan, and have therefore backed up 4 feet of water by placing a Lock and Dam at the Narrows, and to surmount this additional rise, it being impracticable to raise the water of Mud Lake by increasing the lift at Chaffey's Mills with safety, a Lock of 4 feet lift, is placed at the end of the Excavation at the Isthmus, entering Mud Lake, and should it be found advisable at any future period on the Country becoming more healthy to deepen the said Excavation, as originally proposed, it can be done, and here being no Breast Works to the Two Locks above mentioned, they will then serve as Guard Locks. The Rock Excavation at the Isthmus now costs 8.6 per cubic yard, and the additional depth of 4 feet, would at the least cost 10/0. The length of the Cut in which the above depth will be saved is 6600 feet, about two thirds of the contents being rock, the width of Canal Bottom could not be less than 40 feet; with a Slope of two to one for the Earth, and perpendicular for the Rock, the number of cubic yards of the former, would be about 13906 at 5/0 per cubic yard (including pumping which in the Beaver Meadow would be attended with very heavy expense) amounts to £3476 discarding fractions; the quantity of the latter would be about 26074 Cubic Yards at 10/0 per yard, amounts to £13037, the total amount of the Excavation would therefore be about £16513, this does not take into consideration the additional expense which might be incurred by delays arising from sickness, and the possibility that to get the same performed, higher prices than those above stated might be required. The Two Locks and Dam will cost about £8766.11.5-1/2 and the alteration, independent of the saving, is I think an improvement upon the original plan, as it prevents the lowering of the whole summit level, which would otherwise take place if any accident had occurred to

the Works, either at Chaffey's Mills, or the First Rapids.

The above alteration has rendered the following additional Works necessary, Masonry of Lock, Gates for Do Sills of Oak, Stop Gates.

Works at the Isthmus

Cutting & Clearing provided for in the Estimate given to the Committee, and will be completed by the 31st August next....

Increase of Expense arises from the necessity of Clearing to obtain a free circulation of air, to mitigate the sickness which prevails periodically at this section.

Grubbing provided for in the Estimate given to the Committee, and will be completed by the 31st August next....

Two Cofferdams provided for in the Estimate given to the Committee, and will be completed by the 31st August next....

Increase of Expense, has arisen from these Works having unavoidably exceeded the Estimate.

Pumping and keeping the Works dry: provided for in the Estimate given to the Committee, and is completed....

There appears a saving on this Service, as it was considered more advantageous to increase the prices per cubic yard of Rock and Earth Excavation to cover pumping and contingent expenses, which mode has in general been adopted. Rock Excavation provided for in the Estimate given to the Committee, and will be completed by the 31st August next.... Masonry of Lock not provided for in the Estimate given to the Committee, and will be completed by the 31st August next....

Increase of Expense. At the time of forming the Estimate sent to England in the Spring of 1830, it was expected that the Rock would prove sufficiently sound to answer for the Chamber Walls of the Lock, and that Piers for the Gates would only be required, but the Rock has proved so porous and unsound; that the original idea could not be carried into Execution.

Lock Gates, Oak Sills, Sluices, Crabs & Chains etc: not provided for in the Estimate given to the Committee, and will be completed by the 31st Aug^t. next.

See remarks on Lock Gates etc, First Eight Locks....

Excavation of Gravel, loose Rock not provided for in the Estimate given to the Committee, and is completed....

Gravel and loose Rock being met with a higher price for the removal of the same had necessarily to be granted than for Earth Excavation.

Embankment & Puddle not provided for in the Estimate given to the Committee, and will be completed by the 31st August next....

Required behind the Chamber Walls of the Lock.

Building of houses for the Engineer Office, Stores, Barracks, accomodation for Labourers, residence for the Surgeon, Dead room and Powder Magazine not provided for in

the Estimate given to the Committee....

In consequence of the incapability of Mr. Hartwell to carry on the Work, and no person of sufficient responsibility coming forward to undertake the same, it became indispensably necessary to have the Work executed more immediately by the Engineer Department; In consequence I stationed one of the Companies of Royal Sappers and Miners at the Isthmus, for whose accomodation, Barracks and a Hospital were required; Buildings were likewise necessary for the security of the Stores & Tools, and on the first instance to induce Labourers who were dispirited, from the place having been so extremely unhealthy in the year 1828, to return, I had accomodations built for them, and provisions of every description provided for their comfort, the circumstances of the case imperatively calling for a deviation from the general mode of carrying on the Service.

Clearing and Improving the Strait between Mud and Clear Lakes not provided for in the Estimate given to the Committee, and will be completed by the 31st August next....

Required to provide for a Steam Boat Navigation.

Barrows not provided for in the Estimate given to the Committee, and is completed....

Required for the Royal Sappers and Miners employed on the Works.

Log Bridge not provided for in the Estimate given to the Committee, and is completed....

Required as a temporary communication to the Works.

Charcoal, Boards & Timber not provided for in the Estimate given to the Committee....

Required for the Work Shops of the Royal Sappers and Miners, and other Contingent Services.

Draw Bridge Omitted to be provided for in the Estimate given to the Committee, and will be completed by the 31st August next....

Required in consequence of the Canal crossing a public road. This Service has not yet been carried into execution. Lock Master's House not provided for in the Estimate given to the Committee, and will be completed....

This Service has not yet been carried into execution, it not being decided whether the more judicious mode would not be, to erect a Block House for the purpose of defence, as well as to serve as a dwelling for the Lock Master and Labourers.

Dressing-off the Banks of Canal: omitted to be provided for in the Estimate given to the Committee, and will be completed by the 31st Aug^l. next....

PAC, W044, Vol. 20, Reel B-1296, pp. 468-473.

Progress Made During 1831

1. Works at Isthmus Indian Lake, Section No. 14. Works approved of by the Committee.

Cutting & Clearing: provided for in the Estimate given to

the Committee, and will be completed by the 31st August next....

PAC, W044, Vol. 20, Reel B-1296, p. 469.

Projected Cost of the Works

Section, No. 14 Isthmus Rideau Lake.	£13,639 ,, 3 ,, 0
Section, No. 15 Isthmus Indian Lake.	£17,331 ,, 13 ,, 11-1/2

PAC, W044, Reel B-1294, Vol. 19, p. 21.

Probable Amount of Each Section When Completed

Section 18 Isthmus Rideau Lake, £28049 ,, 13 ,, 11-1/2

PAC, RG8, Vol. 52, pp. 231-232. Statement to the 31st March, 1831. ...

Excerpts from Lieutenant Frome's Report:

The length of this piece of canal is about a mile and a half, and a great portion of it is through a very difficult rock, partly granite: with the idea of saving a little excavation, the winding course of a gully, rather lower than the straight cut, was adopted, and the turns were afterwards found so abrupt, that many of the corners had to be cut away near the Mud Lake. The cutting is very heavy, above 20 feet, and the lock is built close to the shore, on a rock foundation, without any breastwork; the lift of 8 feet being thrown on the upper gates: ... Had the Mud Lake been raised to the same level as the Upper Rideau, by placing this lock as an addition to that at Chaffey's Mills, and the lift of 4 feet 10 inches of the Narrows added to that of 6 feet 4 inches at the First Rapids, the summit level would have extended the whole distance between this place and Chaffey's Mills, about 30 miles, and the work at the Narrows have been reduced to merely deepening the old channel, or making a short cut across the tongue of land. Some low ground must of course have been flooded by this plan, both on the shores of the Lower Rideau and Mud Lakes, but it is of little value, when compared with the saving it would have occasioned.

Descending into Mud Lake, the route continues, through the narrow channel before alluded to, into Clear Lake, and from thence enters Indian Lake, through a cut of about 180 feet connecting them.

Lieutenant Frome's Report. PAC Library UG7 G72, Vol. I, Professional Papers of the Corps of Royal Engineers, p. 90.

Miscellaneous Information:

Memorandum of a Journey from Kingston to Bytown through the Rideau Canal:

Crossing Mud Lake we reach the Isthmus properly so called and which is a place deserving some further notice. It is a neck of land about three quarters of a mile in width, separating Mud Lake from Rideau Lake. This is the sumit

(sic) or highest land in the whole line and divides all the waters which flow on its southern side into Lake Ontario or the River St. Lawrence from those which pass northward and fall into the River Ottawa. The cut to be made through this isthmus may be considered the Keystone of the Rideau Canal. It is at present intended (but who can say what alterations may take place) as the Rideau Lake is three feet higher than Mud Lake to introduce a lock by which this difference in level may be overcome. ... By this Plan the Rideau Canal would have two summit ponds as feeders instead of one, another as a Lock would be likewise required at the Narrows to raise that portion of the Rideau Lake lying between them and the Isthmus to a greater height than at present. It is also said that to this part of the Lake there is no feeder except the small stream which falls in at Stadart's Mills and which being nearly dry in summer would not be sufficient to keep this water at its proper elevation; say nine feet above its present height. There may be other Lakes adjacent which might be tapped for this purpose but of this let wiser heads decide. The piece of ground termed the Isthmus is of a swampy nature and on the side next Mud Lake where it is low is said to be unhealthy during the summer. ... The cutting in some places is deep say 20 feet, and as a considerable quantity of rock excavation may be expected this will retard its completion. It is somewhat singular, notwithstanding this is one of the heaviest pieces of excavation upon the whole line, by some fatality after attending great works of this kind, the Commanding Engineer instead of letting the whole to one respectable and industrious Contractor, has peddled it out in trifling jobs to different individuals. The ill consequences of this plan have already shown themselves. These different contractors instead of working consentaneously (sic) and for the general advantage, are troubled in different places by the surface water inundating each other. A large portion of their time is thus lost by pumping it out. There have been disagreements among their men and other causes of retardment will occur unless a change of system be adopted. The immediate superintendance of this part of the line is under Capt. Cole of the Royal Engineers as the officer residing upon the spot. From the errors in the fear above mentioned or some other cause this gentleman does not appear to enjoy that degree of popularity so essentially necessary for promptly carrying on public works.

PAC, MG24, 19, Vol. 7, pp. 2048-2050. Memoranda of a Journey from Kingston to Bytown made along the Route of the Rideau Canal, in February 1830.

Various Particulars of Interest Concerning the Rideau Canal

The fourteenth section consists of the works at the Isthmus between Rideau Lake and Mud Lake, after having made use of the Rideau Lake for the Space of 45 miles, on the

summit level of the route, the Canal is now turned towards the Cataraqui River, which has an outlet near Kingston into Lake Ontario. To strike the Cataraqui, it becomes necessary to make an excavation of about 1-1/2 miles across an isthmus of that extent to be found between Rideau Lake and Mud Lake, which is a sheet of water connected with the Cataraqui. The cutting required will average about 10 feet deep, most of which is through rocky land. On the Rideau Lake side, there is to be found a swamp, and a beaver meadow on the Mud Lake side, leaving merely a ridge of rock between, to be excavated. The waters of the Rideau Lake and Mud Lake at the outlets of the Canal are both 5 feet deep. Mud Lake is 12 miles long and 10 broad, has bold rocky shores with a muddy bottom, is full of islands, and is 3-1/2 feet beneath the level of Rideau Lake. It will however be raised to the summit level by the works at Chaffey's Mills below.

PAC, MG24, A12, Vol. 38. *The Montreal Herald*, Saturday, Sept. 22, 1832 'Rideau Canal.'

Geological Information on the Rideau Canal

At the Isthmus much variety is found in the great Excavation at this place the rocks being granite in great variety. - The same general features pervade all the islands and shores of the several lakes through which the canal route passes from Brewer's Mill to Olivers Ferry. Some limestone may be found on the heights to the north of the Rideau lake and near Olivers Ferry Sandstone again appears.

PAC, MG29, A24, Vol. I, K, p. 5. "Rideau Canal....Geological Features of the line from the Report of Mr. Burrows Civil Engineer, 1832."

Name of Canal Section

Chaffey's Mills

Number of Canal Section

Section Number 15.

Interest Shown Advertisements and Application for Contracts:

1. ... To construct a DAM and TWO LOCKS at Chaffey's Mills. The Dam to be 20 feet high and 80 feet wide: the Locks 9 feet lift each.

The TENDERS must express the rate in Currency per Cubic Foot for the Masonry of the Locks; per Cubic Yard for the Dams; the Rock and Earth Excavation, and for Rock under water three feet deep. Plenty of Stone may be raised to build the Locks quite beside them; and other materials, such as Lime, Sand, Wood etc., equally convenient. The whole of the abovementioned Works to be constructed in every respect similar to those at present in progress on the Canal, and to be completed in two years from the date of signing the Contract; and none but practical Tradesmen need tender.

The power of rejecting the whole of the Tenders will be reserved if they should be found too high, on reference to the professional opinion of the officer of the Royal Engineers, superintending the Works.

Further particulars of the above-mentioned Works, as also the amount of Security required for the due fulfilment of each of the several works, for which two competent individuals residing in Canada must be responsible, may be obtained at the Commissariat Office, and also at the Office of Lieut. Col. By, St. James Street....

Montreal Herald, Saturday, Dec. 15th, 1827. No. 13, Vol. XVII.

2. Rideau Canal. Persons desirous of contracting to execute the undermentioned portion of the intended Rideau Canal, are requested to send tenders stating the terms on which they are willing to undertake the same, to this Office until Friday the first of February next....

6. To construct a Dam and two Locks at Chaffey's Mills. The Dam to be 20 feet high and 80 feet wide; the Locks 9 feet lift each....

Further particulars of the above mentioned works, as also the amount of security required for the due fulfilment of each, for which two competent individuals residing in Canada must be responsible, may be obtained at the Commissariat Office, and also at the Office of Lieut.-Col. By, St. James-street.

The Albion Vol. 6, No. 28, p. 223, New York, Dec. 22, 1827.

Contractors:

1st Feb^y., 1828. John Sheriff & Co., (Haggart) Section 15: Continued Chaffeys Mills.

PAC, W055, Reel B-2811, Vol. 865, p. 210. List of the Various Contractors on the line of the Rideau Canal.

Supervisors:

...that I have placed Lt. Colonel Boteler in charge of the various works extending from Kingston Mills, to the Narrows, Rideau Lake, inclusive, an extent of works which requires him to be constantly on the move.

PAC, W044, Reel B-1298, Vol. 24, p. 504. To Maj. Gen. Sir A Bryce from John By, Royal Engineer Office, Rideau Canal, 7th Sept., 1830.

Progress Made During 1827

Works at Chaffeys Mills chopping grubbing and Clearing excavating for Locks etc... In Progress.

PAC, RG8, Vol. 44, pp. 171-172. Progress Report of Works at the Rideau Canal from the 21st September, 1826 to the 31st October, 1827.

Progress Made During 1828

1. Section 15: Chaffeys Mills two Locks and a dam.

Advertised & tenders to be opened at the Com^y. Generals Office, Montreal on the 1st February.

PAC, RG8, Vol. 45, p. 25. To Gen. Mann from John By, Rideau Canal Office, 23rd Jan., 1828.

Also

PAC, W055, Reel B-2811, Vol. 865, p. 147.

2. ...and the works at Chaffey's Mills, by Mr. Sherriff, and at other parts of the line ... are advancing with all necessary despatch. ...

The Loyalist, Aug. 7th, 1828. p. 71.

3. ... at Chaffeys the Contractor Mr. Haggart is very ill, and many of the workmen at that Station ...

To John By from Savage, Rideau Canal, 6th Sept., 1828. PAC, W044, Reel B-217, Vol. 15, p. 20.

Progress Made During 1829

Section 15. Chaffey's Mills. Chopping & Clearing Completed, Excavation of waste weir 1/2 finished 9/10ths of cut stone for the Locks are drawn to the spot. Excavations for the Locks commenced.

PAC, W055, Reel B-2811, Vol. 866, p. 170. also PAC, W044, Reel B-1294, Vol. 19, p. 41.

also

PAC, RG8, Vol. 47, p. 244.

Progress Made During 1830

1. Chaffey's Mills ... Saving. In consequence of throwing more water back by Dam at Davis' Mills: Saving Rock excavation doing away with guard Lock etc...

PAC, W055, Reel B-2812, Vol. 867, p. 193. Abridged abstract Report of the Works on the Line of the Rideau Canal Shewing amount of Original Estimate Sums Expended and amount when Completed.

2. Alterations & Extra Works

Prior to commencing the Works I directed further Levels to be taken when it was ascertained that by Deepening the Bed of the River, and cutting off some Rocky points, the Rise to be surmounted might be reduced to 12 feet 6 inches, I therefore considered, that by constructing a Waste Weir in such a manner as would enable the Water in the Lakes to be duly regulated, two Locks would not be required but that one of 12-1/2 feet Lift might be placed in the Channel of the River with perfect security, and I have adopted this latter mode being fully convinced that it provides for the permanent durability of the Works, equally, as if the Original Plan had been carried into effect and at the same time causing a Saving upon the Estimate.

Clearing Land

Quantity of Clearing increased to give more circulation of Air and prevent Sickness, also to form a Waste Channel.

Earth Excavation

Extra occasioned by strengthening the Entrance to the

Lock by Cutting off the point above the Mill Pond, and forming a Waste Channel, the Earth Excavation of which is included in the above Amount.

Paving Bottom of Locks

Flooring of Timber, proposed here, if Rock not be found sufficiently good.

A Floor of Wood is considered more secure than pavement, and less Expensive than an Invert Arch.

Clearing Flood Wood etc. out of the Creek

Occasioned by placing the Lock in the Bed of the River instead of Cutting past the Mills as at first proposed.

In consequence of placing the Lock in the Channel of the River, it was necessary to Remove an accumulation of Drift Wood out of the Mill Pond which would otherwise have impeded the Navigation.

Taking Down the Saw Mills, Grist Mill, Distillery, Fulling Mill, Barn etc.

Occasioned by placing the Lock in the Bed of the River instead of cutting past the Mills.

It was necessary to remove these Buildings they occupying the Channel of the Canal.

Two Temporary Log Dams, to turn the Water whilst Excavating, Building Locks etc.

Required to turn the Water from the Works through the Waste Water Way whilst in progress and rendered necessary from placing the Lock in the Channel of the River, which being a deviation from the Plan on which Messrs. Sheriff & Haggart formed their Contract it was considered Equitable for Government to bear a part of the Expense attendant on the formation of Cofferdams, which would not otherwise have been required to so great an extent.

Extra Cartage of Materials for Locks Six Miles

No Suitable Quarries could be found within 6 Miles of the place.

It was supposed and stated to the Contractors, that good Building Stone could be found in the immediate vicinity of Chaffey's Mills, but on further Examination, none could be found which was considered sufficiently good, in consequence an Agreement was made, that the Contractors should be allowed Carriage for all Stone required for the Lock provided they procured the same from a particular Quarry distant Six Miles from the Mills, and this Arrangement although occasioning, an Increase on the Estimate given to the Committee I considered indispensably necessary to provide for the permanent durability of the Work.

Excavating Waste Water Way

Occasioned -by changing the Site to the Bed of the Work and absolutely necessary to prevent the Spring Floods ... the Lock which, with its Wing Walls, occupied the whole breadth of the Natural Channel to the River.

A Waste Weir was indispensably necessary to prevent the

Water flowing over the Lock Gates which might have caused serious injury to the Works in time of floods, this Service will not be attended with so much Expense as was anticipated when forming the Estimate sent to England in the Spring of 1830, in consequence of Rock being met with on each side of the Snie where it is proposed to place the Weir in question.

Masonry in D°

See last remark.

Stop Gate and Sill for D°

See last Remark.

Embankment etc. for Waste Water Way

See former Remark.

Necessary in consequence of a Waste weir being constructed.

Retaining Walls at foot of D° to turn Water from Entrance to Lock.

See last Remark.

Flooring & Sills for the Masonry of Waste Water Way

See former Remark.

Required for the Security of that part of the Masonry not built upon Rock, and for the Sill to rest upon.

PAC, W044, Vol. 18, Reel B-1294, pp. 313-315.

Progress Made During 1831

1. Chaffey's Rapids

Section No. 15

Works approved of by the Committee

Chaffey's Rapids distant from ByTown 91-3/4 Miles, and from the Isthmus Rideau Lake 4-1/2 Miles, being 333 yards in length, descent in that distance 12 feet 11 inches, and depth of water where it was proposed to place the Locks 5-3/4 feet, are situated between Indian and Opinican Lakes, the fall being from the former to the latter.

The plan submitted to, and approved of by the Committee, was to raise Clear, Indian and Mud Lakes, to the level of Rideau Lake, by placing Two Locks, the lifts being 11 feet 5 inches: The Walls and Gates of the Upper Lock, having an additional height of 3 feet, to guard against the Spring Floods, in the Channel of the River, the breadth of which in consequence of the plan to provide for a Steam Boat Navigation having been approved of, would be completely occupied by the Works in question, thereby doing away with the Dams proposed for the Canal on the Small Scale, but at the same time, rendering it indispensably necessary to provide a passage for the water naturally flowing in a south direction, in order to prevent its passing through the Locks. I beg leave to remark that I have distinct no recollection of having stated to the Committee, that in consequence of the increase in the dimensions of the Locks, a Dam could not be constructed, and that consequently a Waste Weir would be required, or if they took that circumstance into consideration, but conceive that the, case

was too obvious to have escaped observation.

The Committee also approved of taking down Chaffeys Mills, (rendered necessary in consequence of placing the Locks in the River,) and a public Bridge, which latter was too low for a Steam Boat to pass under; A Lock Master's House, Clearing, Grubbing, Rock and Earth Excavation etc were also provided for.

Deviations from the Plan approved of by the Committee and Extra Works

No. 1 Prior to commencing the Works above described, I directed fresh levels to be taken, when it was ascertained that by deepening the Bed of the River, and cutting off some Rocky points, the rise to be surmounted might be reduced to 12-1/2 feet. I therefore considered that by constructing a Waste Weir in such manner as would enable the water in the Lakes to be regulated, Two Locks would not be required, but that one of 12-1/2 feet lift, might be placed in the Channel of the River with perfect security, and I have adopted the latter mode, being fully convinced, that it provides for the permanent durability of the Works equally as if, the original plan had been carried into effect, at the same time causing a saving upon the Estimate.

Works at Chaffey's Rapids

Clearing Land provided for in the Estimate given to the Committee, and is completed

Increase of Expense arises from the necessity of Clearing to obtain free circulation of Air, and to form a Waste Channel.

Grubbing Land provided for in the Estimate given to the Committee, and will be completed by the 31st August next ...

Increase of Expense arises from the necessity of forming a Waste Channel; to prevent the water flowing over the Lock Gates.

Coffer Dam provided for in the Estimate given to the Committee, and is completed ...

Increase of Expense has arisen from placing the Lock in the River, and omitting to provide for the same, in the Estimate given to the Committee.

Pumps and Labor provided for in the Estimate given to the Committee, and will be completed by the 31st August next.....

Earth Excavation provided for in the Estimate given to the Committee, and will be completed by the 31st Aug^t. next ...

Increase of Expense arises from the necessity of cutting off points at the head of the Lock, to afford the necessary facilities for a Steam Boat, and forming a Waste Channel the Earth Excavation of which is included in the above amount.

Rock Excavation provided for in the Estimate given to the Committee, and will be completed by the 31st Aug^t. next ...

Masonry of Lock provided for in the Estimate given to the Committee, and will be completed by the 31st August next ...

Backing & Puddling provided for in the Estimate given to the Committee, and will be completed by the 31st Aug^t. next ...

Lock Gates, Oak Sills, Sluices, Crabs & Chains etc provided for in the Estimate given to the Committee, and will be completed by the 31st Aug^t. Next ...

See remarks on Lock Gates etc. First Eight Locks....

Paving bottom of the Lock: provided for in the Estimate given to the Committee

In consequence of deviating from the original plan, this service is not required.

Dam provided for in the Estimate given to the Committee...Not required in consequence of placing the Lock in the River. ...

Lock Master's House provided for in the estimate given to the Committee, and will be completed ...

This Service has not yet been carried into execution, it not being decided whether the more judicious mode would not be, to erect a Block House for the purpose of defence, as well as to serve as a dwelling for the Lock Master and Labourers.

Swivel Bridge provided for in the Estimate given to the Committee, and will be completed by the 31st Aug^t. next ...

It has been ascertained that a Swivel or Draw Bridge cannot be constructed for the sum original Estimated.

Clearing flood-wood out of the Creek not provided for in the. Estimate given to the Committee, and will be completed by the 31st August next ...

In consequence of placing the Lock in the Channel of the River, it was necessary to remove an accumulation of flood wood out of the Mill pond, which would otherwise have impeded the Communication; also to clear the Creek below the Lock, omitted to be provided for in the Estimate given to the Committee.

Taking down Saw Mill, Grist Mill etc not provided for in the Estimate given to the Committee, and is completed....

Necessary to be removed in consequence of placing a Lock in the Channel of the River, and was not provided for through omission.

Extra Cartage of Material to Lock, 6 Miles not provided for in the Estimate given to the Committee, and is completed ...

Included in the Masonry.

It was supposed and stated to the Contractors that good building stone could be found in the immediate vicinity of Chaffey's Mills but on further examination none could be found which was sufficiently good, in consequence, an agreement was made, that the Contractor should be allowed

carriage for all stone required for the Lock, provided they procured the same from a particular quarry distant 6 miles from the Mills, and this arrangement although occasioning an increase on the Estimate given to the Committee, I considered indispensably necessary to provide for the permanent durability of the Works.

Masonry of Waste Weir, not provided for in the Estimate given to the Committee, and will be completed by the 31st August next

A Waste Weir was indispensably necessary to prevent the water flowing over the Lock Gates, which might have caused serious injury to the Works, in time of floods: this Service will not be attended with so much expense as was anticipated when forming the Estimate sent to England in the Spring of 1830, in consequence of Rock being met with on each side of the Snie; where it is proposed to place the Weir in question: the amount Estimated for Masonry will, it is therefore considered, cover all expenses attendant on this Work and Waste Channel...

PAC, W044, Vol. 20, Reel B-1296, pp. 473-478.

Probable Amount of Each Section When Completed

Section 19. Chaffey's Rapids £11,075 ,, 17 ,, 5-1/4

Indian Lake.

PAC, RG8, Vol. 52, pp. 231-232. Statement to the 31st March, 1831 ...

Lieutenant Frome's Report

At the outlet of this last, in a creek where originally were situated Chaffey's Mills, is a single lock of 10 feet 2 inches lift, about 5 miles distant from the isthmus; 7-feet water is (at the average level of the lake) on the upper sill, and, the same depth in the lock. The floor is rock, and the material used for building entirely sandstone, obtained partly close to the works, and partly at a large quarry a few miles distant, which supplied most of the contractors for this part of the canal. A channel is cut round the lock, to carry off the surplus water in the spring, with a waste-weir. The lock-walls have a guard of 6 feet 6 inches over the surface of the lake.

Lieutenant Frome's Report. PAC Library UG7 G72, Vol. I, Professional Papers of the Corps of Royal Engineers, pp. 90-91.

Miscellaneous Information

Memoranda of a Journey from Kingston to Bytown made along the Rideau Canal

Chaffe's [sic] Mills - (better known by the name of "Haggart's job" as under the management of a jolly bachelor of that name well known for convivial hospitality to all travellers by this route) is the next work the traveller meets with.

The road by which we reach it is still through a barren and rocky country chiefly timbered with the Tamarack a Hemlock tree. Here there is one Lock with a lift of 12 ft. 6 inches - to be built of freestone brought from a quarry 7 miles distant. There is also a small dam, - both are in such a state of progress as to warrant the belief that they will be finished within the time specified. The contractor for this job being an experienced practical mason long acquainted with the execution of public works, it is to be expected his work will bear the marks of his experience and knowledge in this line, and if we may judge from the part already done this hope will be amply realized.

PAC, MG24, 19, Vol. 7, p. 2048. Memoranda of a Journey from Kingston to Bytown made along the Route of the Rideau Canal, in February 1830.

Various Particulars of Interest Concerning the Rideau Canal

The fifteenth Section comprises the works at the Isthmus between Indian Lake and Clear Lake, and at Chaffey's Mills. The Canal from Mud Lake enters into what is usually called Indian Lake and ... it is found to be preferable to cut through a small neck of land, 110 yards broad, between that lake and Clear Lake. The excavation is in a direct line, through earth, and the cutting will average 6 feet deep. The waters of Clear Lake at the Canal Mouth will average 5 feet deep, while on the Indian Lake, they are only 5-1/2 feet in depth. ... Going down the Cataraqui River, the waters are dammed back to Clear Lake, by the works at Chaffey's Mills, situated about 55 miles from Kingston and 154 feet above the level of Lake Ontario. They are situated on the rapids which connect Indian Lake and Davis Lake, on the right side of the river. The plan at present proposed to enable the Canal to pass these rapids, is to erect a dam across the river above the mill-dam now made use of, which will send the water back, through a channel on the left side of an island in the centre of the river, into the first lock, the Canal there entering the river. About 800 feet below, another dam on the right side of another island, will be erected at a continuation of the former rapids, and a lock on the left channel will again permit the Canal to enter the river. By these works the rapids, where only 2 or 3 feet is found, become entirely drowned. ... Limestone is the prevailing rock at this place.

The Montreal Herald, Saturday, Sept. 22, 1832 "Rideau Canal".

PAC, MG24, A12, Vol. 38.

Geological Information

At Chaffeys the crystalline limestone predominates true granite also appears also feldspar, quartz with schort embedded etc...

PAC, MG29, A24, Vol. I, K, p. 5. Geological Features of the

line of the Rideau Canal from the Report of Mr. Burrows, Civil Engineer, 1832."

Name of Canal Section

Davis' Mills.

Number of Canal Section

Section Number 16.

Contractors

1. 30th October 1827. Donald McLever. Section 16. Davis Rapids or Mills.
PAC, W055, Reel B-2811, Vol. 865, p. 210. List of the Various Contractors on the line of the Rideau Canal.
2. Section 16. Davis Mills, Mr. McLever has a contract to build a Lock of 9 feet lift and a Dam of 15 feet high: ...
PAC, RG8, Vol. 45, p. 25. To Gen. Mann, from John By, Rideau Canal Office, 23 Jan., 1828.
3. Mr. Drummond besides the extensive works at Kingston Mills executed those at Davis Mills ...
PAC, MG29, A24, Vol. 1, p. 221 (p.6-7). "Rideau Canal - Historical Sketch of Work of Robert Drummond. Hon. Thos. MacKay and John Redpath, (by Andrew Drummond, Ottawa, 1890-1893.)

Supervisors

...that I have placed Lt. Colonel Boteler in charge of the various works extending from Kingston Mills, to the Narrows, Rideau Lake, inclusive, an extent of works which requires him to be constantly on the move

PAC, W044, Reel B-1298, Vol. 24, p. 504.

Progress Made During 1827

Davis Rapids Grubbing excavating for Lock constructing Dam etc. In Progress.

PAC, RG8, Vol. 44, pp. 171-172. Progress Report of Works at the Rideau Canal from the 21st September, 1826 to the 31st October, 1827.

Progress Made During 1828

1. Section 16. Davis Mills, Mr. McLever has a contract to build a Lock of 9 feet lift and a Dam of 15 feet high: he has cleared the land and quarried some good stone.

PAC, RG8, Vol. 45, p. 25. To Gen. Mann from John By Rideau Canal Office, 23rd Jan., 1828.

Also

W055, Reel B-2811, Vol. 865, p. 147.

2. ... and many of the workmen at ... Davis's Mills are also sick. ...

PAC, W044, Reel B-217, Vol. 15, p. 19. To John By, from Savage 6th Sept. 1828, Rideau Canal.

Progress Made During 1829

1. Section 16. Davis Rapids. Chopping & Clearing completed. Dam not commenced; cut & rough stone for Lock 2/3 ".on the spot, about 1/6 in the quarry. Excavation for Lock and Line of Canal only commenced. Cofferdam made.

PAC, W055, Reel B-2811, Vol. 866, p. 170.

Also

W044, Vol. 19, Reel B-1294, p. 40.

Also

PAC, RG8, Vol. 47, p. 244.

Progress Report up to the 1st March, 1829.

2. Station and Description of Persons. No. of Men Employed

	on the 1st Aug.	Taken Since
Pd. by Rl. Engineer Dept.	5	
Contractor's Men.	<u>30</u>	<u>10</u>
	Total: 35	10.
	Total: 45.	
	No. of Men Who Have been sick at the Station	
Pd. by Rl. Engineer Dept.	5	
Contractor's Men.	<u>26</u>	
	Total: 31.	
	No. of Men who Rejoined but had a Relapse:	
Pd. by Rl. Engineer Dept.	3	
Contractor's Men.	<u>9</u>	
	Total: 12	
	Died at the Station.	
	Men	Women
		Children
Pd. by Rl. Engineer Dept.	"	"
Contractor's Men.	<u>1</u>	<u>2</u>
	Total: 1	" 2

Remarks: 10 Men left the Work previous to the 1st August from dread of the sickness - The Contractor Mr. Haggart is now away sick, both his Clerk and Foreman (not included in this return) have also been ill.

PAC, W044, Reel B-1294, Vol. 18, p. 482.

Progress Made During 1830

1. Davis's Rapids: ...Saving. In consequence of Substituting a Mound of Rubbish Retaining walls & puddle in place of Arched Key^d work there being no material at hand.

PAC, W055, Reel B-3812, Vol. 867, p. 193. Abridged Abstract Report of the Works on the Line of the Rideau Canal Shewing amount of Original Estimate Sums Expended and amount when Completed.

2. Alterations and Extra Works

In consequence of the unsound nature of the Rock

forming the bed of the River, I considered a Waste Weir indispensably necessary for the Security of the Dam, the Lock has also been placed a little below the originally proposed Site, to save Cutting through a rise in the ground which turned out to be rock instead of Gravel.

Grubbing Land

Occasioned by making a Waste Weir prevent Water flowing over the Dam.

Increase of Expense arises from the necessity of having a Waste Weir for the protection of the Dam, the Channel of which required to be grubbed.

Excavation of Gravel

The quantity of Rock Excavation exceeds what was anticipated and Gravel less. The Total quantity of Excavation is less on account of placing the Lock a little lower than was at first intended, the distance of which could not be personally measured.

There was less Gravel met with than at first supposed, the Expense of Rock Excavation is included in the above Amount.

Ditto of Rock

Included in last Item ...

A great extent of Rock Excavation was necessary than provided for - See remark on Excavation of Gravel.

Backing and Puddling

Quantity of Backing increased from removing Rock. The alteration in the Site of the Lock to save rock excavation occasioned an increase in Backing and Puddling.

Sluices

The excess is occasioned by substituting Crabs and Chains instead of Racks and Pinions.

Increase arises from substituting Crabs and Chains for Racks and Pinions, and Cast Iron Valves for Wood.

Excavating a Channel for Waste Weir

To prevent waste Water from passing over the mound or Dam.

A Waste Weir was considered indispensably necessary for the Security of the Dam.

Wooden Frame Work for Waste Weir - head of ditto

To prevent Waste Water from passing over the Mound. Required at the Breast Work of the Waste Weir, to regulate the depth of Water.

PAC, W044, Vol. 18, Reel B-1294, pp. 317-318.

Progress Made During 1831

1. Davis Rapids,

Section No. 16

Works approved of by the Committee

The Rapids situated between Opinican and Davis or Sand Lakes which communicate naturally with each other, the fall being from the former to the latter; distant from By Town 937/8 Miles, and from the Works at Chaffey's 2-1/8 Miles, are

121 yards in length, descent in that distance 7-1/4 feet, and depth of water where it was proposed to construct a Dam 1/2 foot.

The plan submitted to, and approved of by the Committee, was to place a Lock of 9 feet lift, the Walls and Gates having an additional height of 3 feet, to guard against the Spring floods, on the right Bank of the communication between the Lakes alluded to. A Dam averaging 270 feet in length, 12 feet in height, and 22 feet in thickness, to serve also as a Waste Weir, was to be constructed across the Rapids, to give five feet depth of water over the Upper Sill of the Lock; an Embankment with the Clearing, Grubbing, Excavations etc. required, were likewise provided for in the Estimate given to the Committee.

The Works described were to give five feet depth of water into the Chamber of the Lower Lock to be built at Chaffeys Rapids.

Deviations from the Plan approved of by the Committee and Extra Works

No. 1. In consequence of the unsound nature of the Rock forming the Bed of the River, I considered a Waste Weir indispensably necessary for the security of the Dam; the Lock has also been placed a little below the originally proposed site, to save cutting through a rise in the ground, which turned out to be Rock instead of Gravel, the removal of which would have been attended with considerable expense.

Works at Davis Rapids

Grubbing Land provided for in the Estimate given to the Committee, and is completed ...

Coffer Dams provided for in the Estimate given to the Committee, and will be completed by the 31st August next ...

Pumps & Pumping provided for in the Estimate given to the committee, and will be completed by the 31st Aug^t. next ...

Increase of Expense has arisen from more water being met with than anticipated at the period of forming the Estimate given to the Committee.

Excavation of Gravel provided for in the Estimate given to the Committee, and is completed ...

Rock Excavation provided for in the Estimate given to the Committee, and will be completed by the 31st August next....

Increase of Expense arises from a greater quantity of Rock being met with than anticipated.

Masonry of Lock provided for in the Estimate given to the Committee, and will be completed by the 31st Aug^t. next ...

Backing & Puddling provided for in the Estimate given to the Committee, and will be completed by the 31st Aug^t. next....

Increase of Expense. The alteration in the site of the Lock to save Rock Excavation, occasioned an increase of Backing

and Puddling.

Lock Gates, Oak Sills, Sluices, Crabs & Chains etc provided for in the Estimate given to the Committee, and will be completed by the 31st Aug^t. next....

See remark on Lock Gates etc. First Eight Locks....

Dam provided for in the Estimate given to the Committee, and i be completed by the 31st Augt. next ...

Embankment provided for in the Estimate given to the Committee, and will be completed by the 31st August next....

Lock Master's House provided for in the Estimate given to the Committee, and will be completed....

This Service has not yet been carried into execution, it not being decided whether the more judicious mode would not be to erect a Block House for the purpose of defence as well as to serve as a dwelling for the Lock Master and Labourers.

Excavating Channel for Waste Weir including Masonry of Piers and wooden frame-work at head of Do not provided for in the Estimate given to the Committee, and will be completed by the 31st August next ...

A Waste Weir was considered indispensably necessary for the security of the Dam.

Clearing Land not provided for in the Estimate given to the Committee, and will be completed by the 31st Augt. next ...

Required for the Waste Channel and to obtain a free circulation of air in the vicinity of the Works.

PAC, W044, Vol. 20, Reel B-1296, pp. 478-482.

Projected Cost of the Works

Section, No. 16: Davis' Rapids £8,417 ,, 16 ,, 7-1/2

PAC, W044, Reel B-1294, Vol. 19, p. 21.

Probable Amount of Each Section When Completed

Section 20: Davis's Rapids: £8,396 ,, 5 ,, 10-3/4

PAC, RG8, Vol. 52, pp. 231-232. Statement to the 31st March, 1831...

Excerpts from Lieutenant Frome's Report:

The creek below this work, winding between banks hardly above the level of the water, leads into Mousquito or Opinicon Lake, and within a few hundred yards is the outlet into Sand Lake, where, on the site formerly occupied by Davis's Mills, is a single lock, built of the same stone as that used at the last work, with a lift of 9 feet 9 inches between the surfaces of the two lakes; 7-feet water being in the lock, and 7 feet 9 inches on the upper sill. A waste channel is cut round a rocky knoll on the left bank of the creek, where Davis's house originally stood, and the surplus water flows over a waste-weir into the lake below. The embankment, from the head of the lock, to join the high land, consists of two rough stone walls, 3 feet apart, with clay puddle rammed between them, and backed on each side

with earth and stone from the excavation. The lock-walls have a guard of 5 feet above the level of the lake. This work is 2-1/2 miles distant from Chaffey's, and 3 miles across Sand Lake, to the next in succession at Jones's Falls.

Lieutenant Frome's Report. PAC Library. UG7 G72, Vol. I. *Professional Papers of the Corps of Royal Engineers*, p. 91.

Miscellaneous Information

Memorandum of a Journey from Kingston to Bytown

Davis Mills. After leaving Jones Falls - the tourist proceeds across Sand Lake, and from thence through a tract of rugged & rocky land the spot called Davis Mills being the point where the creek begins to expand to form Sand Lake. This place is named from enterprising Americans who came to Canada about 30 years ago - and being employed in hunting out for Lumber discovered this spot, albeit it is nearly concealed from human search being in the heart of a rocky Glen far distant from the haunts of men. ... The public works, for the Rideau Canal consist at this place of one Lock 7 ft. 9 Inches in lift and a Dam of 15 feet height. The stone for constructing the former are the same as those used at Jones Falls brought from a distance of 6 miles. In the formation of this dam something differing from others is observed. It is composed of hard dry stone walls built parallel to each other with a space of about 3 feet between them which it is intended to fill up with puddle. How far this plan may succeed, is doubtful the work being only commenced. The first contractor for this job like many others on the line from some mismanagement are taking the work at too low a rate was obliged to relinquish, and it is now under the joint direction of Mr. Drummond and a Mr. Haggart who will be mentioned hereafter. The first contractor seems to have had some confused idea that in all works the saving of labour constituted gain - for this purpose he has erected a pump drove by a water wheel to clear his lockpit of water. How far this succeeded does not appear it not being under operation at this time. There is however something ingenious in the contrivance and nothing impracticable in the principle if properly applied.

PAC, MG24, 19, Vol. 7, pp. 2047-2048. Memoranda of a Journey from Kingston to Bytown made along the Route of the Rideau Canal, in February 1830.

Various Particulars of Interest

The sixteenth section comprises the works at Davis' Rapids. The Canal, after passing Chaffey's Mills, proceeds in the Cataraqui River for 8 miles, when it meets with Davis' Rapids situated between Davis' Lake, and Opinicon Lake. Here it is necessary to construct a Dam of 15 feet in height, across the river over the centre of an island. The dam may be said to be composed of two arched dams over the

respective channels, which meet and unite on the centre of the island. ...In the channel on the right of the island, a lock of 9 feet lift will be erected, by which the rapids will be drowned, and the waters backed upon Chaffey's Mills. The stone to be found here is limestone, well adapted for building the locks with. ...

The Montreal Herald, Saturday, September, 22nd, 1832. "Rideau Canal". PAC, MG24, A12, Vol. 38.

Geological Information

At Davis Mills the crystalline limestone again occurs also, a great variety of primitive rocks consisting of granite, and trappeau kinds likewise horne blende mud in large lamina etc...

PAC, MG29, A24, Vol. I, K, p. 5. "Geological Features of the line of the Rideau Canal from the Report of Mr. Burrows Civil Engineer, 1832."

Name of Canal Section

Jones's Falls

Number of Canal Section

Section No. 17

Contractors

1. McKay and Redpath.

Signed the contract on 27th November, 1827 for work at Section 17 Jones' Falls.

PAC, W055, Reel B-2811, Vol. 865, p. 210. List of the Various Contractors on the line of the Rideau Canal.

McKay and Redpath Wks Jones Falls, December 18th, 1827 £500; , 0,,0.

PAC, RG8, Vol. 45, p. 48. Dated Paymasters Office, Rideau Canal 31st December, 1827. Lennox Rudyard Paymaster at this Station, requests an Allowance for the following Sums by him disbursed on Account of the undermentioned Services between the 1st October and 31st Decem^r 1827.

Mr. Redpath the Contractor for building the Locks at Jone's Falls.

PAC, W044, Reel B-1295, Vol. 20, p. 293. From John By to Col. Durnford, Royal Engineers Office, Rideau Canal, 27th August, 1829.

2. Mr. Reuben Sherwood.

At Jones' Rapids the site for the Locks is already cleared, and the Contractor Mr. R. Sherwood, has a house up. There are to be several Locks at this place - the breath [sic] of the gates is 25 feet, and calculated for craft drawing 5 feet water. ...

United Empire Loyalist, Vol. 2, No. 6, Saturday, July 7th, 1827, p. 47.

Vouchers paid to Mr. Reuben Sherwood for work performed at Jones Falls previous to Messrs. McKay & Redpath taking

the Contract for that Section upwards of £800 Stg.

PAC, W044, Reel B-1300, Vol. 27, p. 415.

Dec. 3, 1827. Paid Ruben Sherwood Openg Wks Jones Falls

£815 ,, 9 ,, 4-1/4.

--- Ditto --- making Road --- Ditto

£20 ,, 9 ,, 10-1/4

PAC, RG8, Vol. 45, p. 48. Dated Paymasters Office, Rideau Canal 31st December 1827. Lenox Rudyard Paymaster at this Station, requests an Allowance for the following Sums by him disbursed on Account of the undermentioned Services between the 1st October and 31st December 1827.

Terms of Contract

1. Messrs McKay and Redpath by their Contract of 22nd November 1827 engage to perform the whole necessary works required at Jones Falls towards the prosecution of the Rideau Canal at the rates therein stated - for instance - Earth and Clay Excavation at 10d Stg. per cubic yard Rock do at 4/0 per cubic yard ...

Supervisors

1. ...that I have placed Lt. Colonel Boteler in charge of the various works extending from Kingston Mills, to the Narrows, Rideau Lake, inclusive; an extent of works which requires him to be constantly on the move. ...

PAC, W044, Reel B-1298, Vol. 24, p. 504. From John By, Royal Engineers Office, Rideau Canal, 7th September, 1830 to Maj. Gen. Sir. A. Bryce.

Progress Made During 1827

1. At Jones' Rapids the site for the Locks is already cleared, and the Contractor Mr. R. Sherwood, has a house up. There are to be several Locks at this place - the breath [sic] of the gates is 25 feet, and calculated for craft drawing 5 feet water. ...

PAC, *United Empire Loyalist*, Vol. 2, No. 6, Saturday, July 7th, 1827, p. 47.

2. Works at Jones falls, chopping grubbing & clearing excavating for Locks constructing Dam etc. - In Progress.

PAC, RG8, Vol. 44, pp. 173-174. Progress Report of Works at the Rideau Canal from the 21st September 1826 to the 31st October, 1827.

3. At...Jones Falls Quarries have been extensively opened and a quantity of Cut Stone prepared for the Locks. The dams & excavations for the Locks & Cuts at these Stations are in a forward State of progress. ...

PAC, W044, Reel B-1294, Vol. 19, p. 70.

Progress Made During 1828

1. Section 17. Jones' Falls. Six locks 10 feet 2 inch high each. Dam 48 feet high; contracted for by Messrs Mackay and Redpath, whose arrangements for opening these

works in the spring are very good. ...they have also opened two excellent stone quarries and have cleared the land where the Locks & Dam are to be built, and have 40 stone cutters at work.

PAC, W055, Reel B-2811, Vol. 865, p. 151. Progress Reported as of January 23rd, 1828.

2. It is a strange thing I have no orders about the large Lock; would you advise me to proceed with the small ones? for the contractors are getting outrageous with the delay. I therefore propose for your consideration whether it would not be most advisable to commence two Large Locks at Jones' Falls of 150 feet long by 50 Wide with lifts of 15 feet each instead of three small Locks of 10 feet lifts ...

PAC, W055, Reel B-2811, Vol. 865, p. 214. Extract of a Letter from Lieut. Colonel By to Colonel Durnford dated Montreal 21st April, 1828.

3. ...I feel it my duty (though reluctantly) after the Orders received both from the Ordnance and Treasury Boards, and so lately communicated to you, to give it as my decided opinion that it is not advisable to commence any description of Lock at present; but to confine the Contractors to the mere preparation of Stone until the result of Lieut. Pooley's mission to England with your Estimates and Plans shall have been received which it is reasonable to expect will be very Shortly.

PAC, W055, Reel B-2811, Vol. 865, p. 215. Letter from E.W. Durnford Royal Engineer Office, Quebec, 24th April, 1828 to Lt. Col. By.

4. Station and description of Persons.	No. of Men Employed.		Total
	On the 1st August	Taken on Since	
Engineer Dept.	1.	--	1.
Employed by the Dept.	5	5	10.
Contractor's Men.	<u>173</u>	<u>77</u>	<u>250</u>
Total	179	82	261

	Least Number Employed About the 28th August.
Engineer Department	--
Employed by the Dept.	2.
Contractor's Men	<u>84</u>
Total	86

	Present Number Employed on the 15th September.
Engineer Department	1.
Employed by the Dept.	--
Contractor's Men	<u>148</u>
Total	149.

No. of Men who have been

		Sick at the Station		
Engineer Department		1		
Employed by the Dept.		9		
Contractor's Men.		<u>130</u>		
	Total	140.		
		No. of Men who rejoined but had a relapse.		
Engineer Department		-		
Employed by the Dept.		3		
Contractor's Men		23		
	Total	26.		
		Died at the Station		
		Men	Women	Children
Engineer Department		-	-	-
Employed by the Dept.		-	-	-
Contractor's Men		<u>2</u>	-	-
	Total	2		

Remarks: Corporal R1 Sappers & Miners.

One of the men who died was one of four who came from the Isthmus sick - the other three went out of the settlement and died.

121 men had left the work previous to the 1st Aug^t. from dread of the sickness. The whole of the Contractors Establishments & Clubs - 3 Foremen & 1 Timekeeper (not included in this) have been out and one still sick.

PAC, W044, Reel B-1294, Vol. 18, p. 482.

5. ...The works at Jone's Falls are almost at a Stop with the exception of a few men employed at the Quarry, the Contractor, asst Overseer, two Clerks and nearly all the workmen are laid up with the fever and ague. ...

PAC, W044, Reel B-217, Vol. 15, pp. 19-20. To John By from Savage dated Rideau Canal, 6th September, 1828.

Progress Made During 1829

1. Section 17: Jones Falls, Chopping and Clearing completed: Excavation drawn to the spot, wooden pointed Sills commenced. wood to burn Lime provided; Dam commenced; at for Arch Key Work of Dam is provided on the spot, of 5-1/2 Miles; an excellent double Railway is laid.

PAC, RG8, Vol. 47, p. 244b. Abridged Statement of the progress of the Works of the Rideau Navigation under the superintendance of Lieutenant Colonel By, Royal Engineers taken 1st March 1829.

2. ...I leave this (Hog's Back) for Jones Falls tomorrow to look after the Dam in that place, which Lt. Briscoe reports he has had taken down and recommended building agreeable to my orders.

PAC, RG8, Vol. 47, p. 241. To Col. Durnford from John By, Royal Engineers Office, Rideau Canal, 16th March 1829.

Progress Made During 1830 -

1. Jones Falls: In consequence of avoiding most difficult Rock excavations bad foundation of River Lock, Angling Lock to suit Line of Navigation down the March.

PAC, W044, Vol. 19, B-1294, p. 103.

Also

PAC, W055, Reel B-2812, Vol. 867, p. 193. Abridged Abstract Report of the Works on the Line of the Rideau Canal Shewing amount of Original Estimate, Sums Expended and Amount when completed.

2. "Having cleared the ground and carefully examined the same prior to laying out the works it was ascertained that the Snie in question was not at all adapted for placing the Locks required to provide for a Steam Boat Navigation either as regarded the position, or for the equal division of the rise to be surmounted, as Shewn upon the plan submitted to and approved of by the Committee, independent of a very considerable increase in Rock Excavation, which would be incurred by following the same, the removal of which would be attended with a very serious expense as from its Nature the Estimated price of 4/ p Cubic Yard must have been nearly doubled, arising from incorrectness in the levels taken when the Woods and Swamps were almost impenetrable and which did not therefore shew the correct quantity of Rock excavation required, also from more compact and less loose Rock occurring than at first ascertained.

It was not contemplated that any general alteration from the mode of forming the Canal as described upon the Plan of the Locks, on the small scale beyond what would occur in consequence of the increase in the dimensions of the Works, was likely to take place, nor has such been the case, but in the present instance, as the Plan in question did not afford the necessary facilities for a Steam Boat Navigation, and could not at any rate have been carried into effect, without incurring a very heavy and unnecessary expenditure for the reasons above stated, a deviation from the same was rendered indispensably necessary, and I consequently considered myself fully authorized in making such alterations as the nature of the case appeared to call for taking care at the same time that they did not tend to lessen the permanent security of the Works or incur any unnecessary or avoidable expense and have therefore placed three Locks of 15 feet lift each at the lower end of the Snie situated so as to afford the easiest and most direct Entrance to them from the River, which it was possible to attain and a fourth detached of 15 feet Lift to suit the Section of the Ground, the Space between the Combined and detached Locks being formed into a Basin this appearing to me the most judicious mode that could be adopted to meet the difficulties above stated.

PAC, W055, Reel B-2814, Vol. 869, p. 245-246. Deviations

from the Plan approved of by the Committee and Extra Works. Also

W044, Vol. 18, Reel B-1294, pp. 320-321.

3. ... A Waste Weir is also being constructed from the consideration that it will materially tend to insure the durability of the Works, as by affording a passage for the Spring Floods superabundant Water, it will prevent the same from flowing over the Dam, which in consequence of its great height might ultimately be attended with serious results and the probability of such an event being foreseen, it was deemed advisable to guard against the same.

Firm Rock Excavation

It having been deemed advisable to place the situation of the Lower Lock as much out of the Marsh as possible & to angle it more in Line of Navigation down the Marsh, caused considerable additional Rock Excavation.

A greater extent of firm Rock Excavation was required than provided for, and less loose Rock, also from the necessity of Cutting off some Rocky Points at the head of the Upper Lock.

Masonry of Locks

Stone Locks have been substituted in place of Six, as from the Quality and Quantity of Rock to be excavated would have given a much greater excess than has been unavoidably incurred.

Increase of Expense arises from the necessity of Invert Arches, Extra Masonry in Foundations in general but more particularly in the upper Breast Work & Wing Walls, of the Combined Locks from the necessity of extending the Wing Walls alluded to for the preservation of the Masonry, also from an Increase in the Dimensions of the Chamber Walls of the Locks to Increase their durability.

Oak Sills, Lower Lock

Nature of Foundation it was found absolutely necessary to secure the Sill by Piling, Sheathing. (In addition to which, in consequence of the Nature of the Foundation it was indispensably necessary to form a Platform of Wood from the Rear of the Sill of the Lower Lock beyond the Stop Gate grooves in order to form a Sill for the Stop Gates to rest upon. (the Stop Gate was not included in the above Sum) which caused the additional Work as also having introduced a Stop Gate to enable Sill to be repaired, cleared or examined.

Dam

The System of allowing the Water to flow over the Dam having been abandoned as precarious and dangerous to the Works...consequent increase...height of Dam. Extension of Base additional precaution in securing the Open Rocky foundation by Rock Excavation & filling in with sound Materials have caused the Increase of Estimate.

Increase of Expense arises from an Error in the Estimate given to the Committee, the badness of the

which rendered it necessary to sink 8 feet into the Bed of the River to find Rock sufficiently solid to Build upon, also from the necessity of increasing the height of the Dam 7 feet, and its Volume in proportion, to prevent the water from flowing over it.

Stop Gates

From Increased Lift, causing Increase in Expense in this Item.

Increase of Expense, arises from the Increase in the Dimensions of the Locks, the providing for which was omitted in the Estimate given to the Committee.

Rock Excavation for Dam Foundation

This Excess occasioned by Sinking for good foundation which was indispensably necessary - this Dam having to retain upwards of 60 feet Depth of Water.

See Remark on Dam.

Extra Carriage of Materials for Dam

No suitable Materials could be found on the Spot, it was therefore necessary to take them from a Quarry over 6 miles of New made Road.

It was supposed that Material sufficiently good for the Key Work of the Dam, could be procured in the immediate Vicinity of the Works, but on opening several Quarries, it was ascertained that the Rock turned out in such irregular Blocks, that they could not be rendered available without incurring a much greater Expense than the mode adopted, an Agreement was therefore made with the Contractors that they should procure the material required in the formation of the Arch Key Work from the Quarry from whence the Ashlar for the Locks was taken, and that Government should pay for the Carriage of the same.

Quarry Rent and Surface Damage

See last Remark on the Reason for increasing this Item ot in Original Estimate.

The Quarry from whence the ashlar required for the Locks and Arch Key Work of the Dam is procured being situated Six Miles from the Canal, it was considered that the owner of the Land had a fair Claim for Damages, particularly as a great extent of Surface was destroyed, the Mature of the Ground not allowing a regular face of any depth, being formed, and in consequence only the upper Strata could be taken.

Work proposed by Mr. Reuben Sherwood prior to 8th November 1828 Opening Quarries Making Roads etc.

Provided for in the General Contingencies.

On proceeding through the line of Canal in the Spring of 1827, at each Station, I engaged respectable persons, well acquainted with the Country, to Open Roads and Quarries, in order that I might be able to form some idea of what Works could be Executed for, in a Complete Wilderness, otherwise, I could not have formed any decided Judgment, as to the Prices tendered by persons Willing to undertake

their construction, this Mode has evidently been the means of bringing individuals to fair & reasonable terms, as prior to its adoption, most exorbitant proposals were made, even beyond 3/ per Cubic foot of Masonry.

Opening Quarries and other Contingencies prior to Date of Contract per McKay & Redpath & Embankment across Road Gully

Occasioned by increasing Lift of Lower Lock.

Mr. Sherwood refusing to Execute such Services as I deemed necessary in the first instance, unless a Contract for the whole of the Works required at Jones Falls was given him, I was obliged to employ other persons. Mr. Sherwood stated that no good Stone could be found nearer than 6 Miles; as this circumstance tended to increase the Price of Masonry, I considered it advisable, to open ground in several places, with the hopes of procuring good Material within a shorter distance, and occasioned the above Expenditure.

Grubbing and Clearing

Actual quantity required to be Grubbed was 25-1/2 Acres. Estimated quantity 5 Acres.

Waste Weir in Rock Excavation

Formation of Waste Weir through very hard solid Rock.

A Waste Weir was considered indispensably necessary for the permanent Security of the Dam, in consequence of its great height.

Sluice Way (Oak)

Indispensably necessary to regulate head of Water and prevent Damage to Dam & Locks.

Required for the Waste Weir to regulate the Depth of Water.

PAC, W044, Vol. 18, Reel B-1294, pp. 320-323. Signed John By, Lt. Col. Royal Engineers, Commanding Rideau Canal.

Progress Made During 1831

Jones Falls

Section No. 17

Works approved of by the Committee.

Jones Falls or Rapids distant from ByTown 97 Miles, and from the Works at Davis' Rapids 3-1/8 Miles, being 1833 yards in length, descent in that distance 59-3/4 feet, and depth of water over the site where it was proposed to construct a Dam 1-1/2 foot are situated between Davis or Sand Lake, and Cranberry Marsh, the fall being from the former to the latter.

The plan submitted to and approved of by the Committee, was to place Six Locks of 10 feet 2 inches lift each, the Walls and Gates of the Upper Lock having an additional height of 3 feet to guard against the Spring Floods, in a natural Snie; three Locks at its upper and three at its lower Entrance, the intervening space to form a Bason. [sic] A Dam of 48 feet in height, averaging 140 feet in length, and 76 feet in thickness, to give 5 feet depth of water over

the Upper Sill of the Locks, and to serve also as a Waste Weir, was to be constructed across the Rapids....

The Works described were to back up Two feet depth of water into the Chamber of the Lock to be built at Davis Rapids.

Deviations from the Plan approved of by the Committee and Extra Works

No. 1 Having cleared the ground, and carefully examined the same prior to laying out the Works, it was ascertained that the Snie in question was not at all adapted for placing the Locks required to provide for a Steam Boat Navigation, either as regarded the position, or for the equal diversion of the rise to be surmounted, as shewn upon the plan submitted to, and approved of by the Committee, independent of a very considerable increase in Rock Excavation, which would be increased by following the same, (the removal of which would be attended with a very serious expense, as from its nature, the Estimated price of 4-1/2 per cubic yard must have been nearly doubled,) arising from incorrectness in the levels taken when the Woods and Swamps were almost impenetrable, and which did not therefore show the correct quantity of Rock Excavation required, also from more compact and less loose rock recurring than at first ascertained.

No. 2 It was not contemplated that any general alteration from the mode of forming the Canal, as described upon the plan of the Locks on the Small Scale, beyond what would occur in consequence of the increase in the dimensions of the Works, was likely to take place, nor has such been the case, but in the present instance, as the plan in question did not afford the necessary facilities for a Steam Moat Navigation, and could not at any rate have been carried into effect, without incurring a very heavy and unnecessary expenditure, for the reasons above stated, a deviation from the same was rendered indispensably necessary, and I Consequently considered myself fully authorised in making such alterations as the nature of the case appeared to call for, taking care at the same time that they did not tend to lessen the permanent security of the Works, or incur any unnecessary or avoidable expense, and have therefore placed three Locks of 15 feet lift each at the Lower end of the Snie, situated so as to afford the easiest and most direct entrance to them from the River which it was possible to obtain, and a fourth detached of 15 feet lift, to suit the section of the ground, the space between the combined and detached Locks, being formed into a Bason, this appearing to me the most judicious mode that could be adopted to meet the difficulties above stated.

No. 3 A Waste Weir is also required from the consideration that it will materially tend to insure the durability of the Works, as by affording a passage for the

Spring Floods, and superabundant water, it will prevent the same from flowing over the Dam, which in consequence of its great height, might ultimately be attended with serious results; and the probability of such an event being foreseen, it was deemed advisable to guard against the same.

Works at Jones Falls

Clearing provided in the Estimate given to the Committee and will be completed by the 31st August next.

Grubbing provided for in the estimate given to the Committee, and is completed.

Increase of Expense A greater extent of grubbing being required than provided for in the Estimate given to the Committee, the exact quantity having been 25-1/2 Acres instead of 3 Acres.

Two Cofferdams provided for in the Estimate given to the Committee, and are completed....

Increase of Expense has arisen from the impossibility of getting those Services executed for the Estimated prices.

Loose Rock Excavation, provided for in the Estimate given to the Committee, and will be completed by the 31st August next. ...A less quantity was met with than at first ascertained, as on removing the loose surface stones, compact rock was met with.

Firm Rock Excavation, provided for in the Estimate given to the Committee and will be completed by the 31st Aug^t. next....

Increase of Expense, has arisen from a greater extent of Rock Excavation being required than provided for, and the necessity of cutting off some rocky points at the head of the Upper Lock.

Masonry of Lock provided for in the Estimate given to the Committee, and will be completed by the 31st Aug^t. next.... Increase of Expense, has arisen from the necessity of Invert Arches, Extra Masonry in the foundation required in general, but particularly in the Upper Breast Work and Wing Walls of the combined Locks, and the necessity of extending the Wing Walls alluded to, for the preservation of the Masonry, by preventing the water finding its way in the rear of the Works also from an increase in the dimensions of the Chamber Walls, to ensure their durability, the Locks being 15 feet lift each.

Backing & Puddling provided for in the Estimate given to the Committee, and will be completed by the 31st August next....

Lock Gates, Oak Sills, Sluices, Crabs & Chains, Stop Gates etc. ... provided for in the Estimate given to the Committee, and will be completed by the 31st August next....

See explanation afforded on the First Eight Locks, relative to the above services....

Dam, provided for in the Estimate given to the Committee, and will be completed by the 31st August next....

Increase of Expense has arisen from an error in the Estimate

given to the Committee, the badness of the foundations which rendered it necessary to sink into the Bed of the River 8 feet, to find rock sufficiently solid to build upon; also from the necessity of increasing the height of the Dam 7 feet, and its volume in proportion to prevent the water from flowing over it. ...

Temporary Dam provided for in the Estimate given to the Committee, and will be completed by the 31st August next.

Rock Excavation for Dam foundation not provided for in the Estimate given to the Committee, and will be completed by the 31st August next....

This service was indispensably necessary to obtain a secure foundation for the Dam, arising from the unsound nature of the Rock forming the Bed of the River, but more particularly towards the left bank.

Extra Carriage of Materials for Dam not provided for in the Estimate given to the Committee, and will be completed by the 31st August next....

It was supposed that Material suffering good for the Key Work of the Dam could be procured in the immediate vicinity of the Works, but on opening several quarries it was ascertained that the rock turned out in such irregular Blocks; that they could not be rendered available without incurring a much greater expense than the mode adopted, an agreement was therefore made with the Contractors that they should procure the materials required in the formation of the Arched Key Work from the Quarry, from whence the ashlar for the Locks was taken, and that Government should pay for the carriage of the same.

Quarry Rent and Surface damage not provided for in the Estimate given to the Committee, and is completed....

The Quarry from whence the ashlar required for the Locks and Arched Key Work of the Dam is procured, being situated Six miles from the Canal, it was considered that the owner of the Land had a fair claim for damages, particularly as a great extent of surface was destroyed, the nature of the ground not allowing a regular face of any depth being formed, and in consequence only the Upper Strata could be taken.

Work performed by Mr. Reuben Sherwood prior to the 8th November, 1828....

On proceeding through the Line of Canal in the Spring of 1827, at each station I engaged respectable persons, well acquainted with the country, to open roads and quarries, in order that I might be able to form some idea of what works could be executed for, in a complete wilderness otherwise I could not have formed any decided judgment as to the prices tendered by persons willing to undertake their construction; this mode has evidently been the means of bringing individuals to fair and reasonable terms, as prior to its adoption most exorbitant proposals were made, even beyond 3s/ per cubic foot of masonry.

Opening Quarries and other Contingencies prior to date of Contract per Messrs McKay & Redpath not provided for in the Estimate given to the Committee and is completed...

Mr. Sherwood refusing to execute such services as I deemed necessary in the first instance, unless a Contract for the whole of the Works required at Jones Falls was given him, I was obliged to employ other persons. Mr. Sherwood stated that no good Stone could be found nearer than 6 Miles; as this circumstance tended to increase the price of Masonry, I considered it advisable to open ground in several places, with the hope of procuring good Material within a shorter distance, which occasioned the above expenditure.

Embankment not provided for in the Estimate given to the Committee, and will be completed by the 31st Aug^r. next. Required to retain the water in the Basin between the Locks.

Waste Weir, Rock Excavation not provided for in the Estimate given to the Committee and will be completed by the 31st August next....

A Waste Weir was considered indispensably necessary for the permanent security of the Dam. ...

Clearing the Creek for flood wood not provided for in the Estimate given to the Committee and will be completed by the 31st August next....

The removal of Flood Wood is necessary as it would otherwise interrupt the Navigation.

PAC, W044, Vol. 20, Reel B-1296, pp. 482-9.

Progress Made During 1832

1. ...I have the honour to report for the information of His Excellency (sic) Lord Aylmer, that the water at Jones Falls, has risen three feet above the required height and that the Waste Weir carries off all the surplus water, consequently I have no fears for that Dam, which is upwards of 65 feet high. The Earth has settled with the pressure of water but no leaks have appeared.

PAC, W044, Vol. 20, Reel B-1296, p. 116. Letter from H. Sherwood signed for Lt. Col. By dated By Town, 16th April, 1832 to Col. Nicolls, Comm^g R1 Engineer Canada.

2. ...I have the honor to state, that I can recollect having conferences with Lieut. Colonel By, regarding the expediency of altering the position and lifts of the Locks at Jones's Falls, when he explained that from the nature of the ground, the peculiar hardness and globular formation of the Rock in the direction approved by the Committee, with the immense rush of water to be overcome (being the only outlet from a chain of very large Lakes between these Falls and the summit level), the expense must have been more considerable, had he not raised the Lifts in preference to building two additional Locks....

The price per superficial foot for the cut stone stairs would, at first view, be considered to be high; but when it is recollected that Lieut. Colonel By paid by solid measure

for all description of masonry, from 1/0 to 1/3d, and even to 1/6 per cubic foot, and as these stairs were very heavy stones, probably from six to seven, or eight feet long, nine or ten inches rise, and proportionably wide, brought from a great distance by land during the winter months, I am inclined to think that the price does not exceed what it is customary to give the Contractors in this Command for stone of nearly similar quality....

PAC, W044, Reel B-1298, Vol. 24, pp. 621-624. Letter to Maj. Gen. Sir Alex. Bryce dated Royal Engineers Office, Portsmouth, 1st August, 1832 from E.H. Durnford.

2. ...I further beg to state in answer to the Query made by Mr. Rudyard on "the charge of 2/6 per cube yard for Puddling done by Messrs. MacKay and Redpath at Jones Falls, Rideau Canal instead of /6d the contract price" that the construction of the Dam of 68 feet high, and about 300 feet long, consumed all the material in its vicinity; consequently the Puddle in question had to be fetched from a considerable distance and hauled up a very steep Rocky hill, in addition to which the Labourers employed had all suffered with the Lake Fever, and no fresh men could be procured; therefore the price of 2/6 which I allowed per cube yard, was considered scarcely a remunerating price to the contractors; and I further beg to observe that as the works at Jones' Falls were the boldest undertaking on the Rideau Canal, as they required a Dam 68 feet high to hold up the Waters of extensive Lakes, and four Locks each of 16 feet lift, the space not admitting of a greater number without an enormous expenditure to form foundations, I became more anxious about those works than any other and requested Lt. Col. Boteler to reside on the spot to ensure every possible attention being paid to their construction, and when he & Lt. Burgmann, the executive officer at that station, had ascertained that 2/6 per cube yard would only repay the contractor I agreed to the said price; and trust the Right Hon^{ble}. and Hon^{ble}. Board will be pleased to consider this explanation as satisfactory and approve of the said charge being admitted in the accounts of L. Rudyard Esq., for the Rideau Canal.

PAC, W044, Vol. 24, Reel B-1298, pp. 608-609, p. 632. Letter to Col. Fanshawe from John By, Shefford Park, Frant, Sussex, 27th July, 1833.

2. ...relative to day work performed by Messrs. McKay and Redpath at Jones' Falls, I have the honor of stating for the information of the Hon^{ble} Board, that at the period when Messrs. McKay & Redpath entered into Contract to execute the Works at Jones' Falls, it was intended to have six Locks in connexion, and that the waste water should flow over the Dam, and alto' in the preamble to the said Contract it is stated "all the Works at Jones' Falls" or words to that effect, yet those works which they were in good faith to perform in terms of the same were specifically detailed, nor

were any others at that time contemplated, in consequence however of various causes fully explained in my description Report dated the 14th Jan., 1831 forwarded through Col. Durnford for the information of the Hon^{ble}. Board, it was found necessary to make an entire alteration in the plan on which they had formed their Contract, and as additional works were required, not included in the original specification; I considered them totally unconnected with Messrs. McKay & Redpath's Contract, and in consequence had the excavation for the waste weir etc. performed by the Contractors Men by day work under the immediate superintendance of the Executive Officer of Engineers, whose Certificate that the Work was necessary and prices charged for the same were in his opinion fair and reasonable, I have the honor of transmitting herewith. ...

PAC, WO44, Reel B-1298, Vol. 24, pp. 615-616. Letter to Colonel Nicolls from John By Royal Engineer Office, Rideau Canal, August, 31st, 1832.

3. I hereby certify that the Work performed and materials furnished and charged for, in Messrs. McKay & Redpath's Vouchers of the 31st July 1831 amounting to £2029,,13,,1 and of the 2nd December 1831 amounting to £2794"3,,9-3/4 were necessary and that I consider the prices charged to be fair and reasonable.

PAC, W044, Reel B-1298, Vol. 24, p. 616. Letter signed by Geo. H. Burgmann, Lt., Royal Engineers, Royal Engineers Office, Rideau Canal, 12 September, 1832.

Projected Cost of the Works

Section, No. 17. Jones' Falls, £34,154 ,, 15 ,, 2-1/2

PAC, WO44, Reel B-1294, vol. 19, p. 21.

Probable amount of Section When Completed

21. Jones Falls £77, 342 ,,10,,7-1/2.

PAC, RG8, Vol. 52, pp. 231-232. Statement to the 31st March 1831 Shewing the Total Amount of Works on each Section as Approved by the Committee the Expenditure up to the 31st March 1831 and the Sum still required to complete.

Excerpts from Lieutenant Frome's Report

Jones Falls: The dam built across the ravine, down which the waters from all the small lakes above found an outlet, is 61 feet high, and about 130 yards long on the top, abutting on each side on the high rocky banks, consisting of sandstone and a species of granite. The dam itself is built of the former stone, long smooth blocks of which are laid on edge, breaking joint all the way up: the thickness of this wall is about 12 feet at top, and the backing of stone and clay extends about 60 feet, with a slope of about five to one up-stream. The whole base must be between 300 and 400 feet.

By forming temporary sluices of rough masonry laid in mortar, alternately on each side of the dam at different heights, to carry off the water as it was raised by the

progress of the works, the contractor, Mr. Redpath, who was luckily well qualified for the task, managed to raise this enormous mass to its height without any serious impediment. The water is turned by it down a ravine, about a quarter of a mile long, on the right bank, opening a little above the dam. A narrow channel has been cut through the granite rock bounding this hollow, to a depth of 15 feet below the raised surface of the lake, and a strong framed waste-weir, with sluices in the bottom, placed in it, its top on a level with the water. By this channel and the sluices its depth is regulated, and the surplus finds its way into the old watercourse, a little below the dam. A single lock of 15 feet 2 inches lift is placed about the middle of this ravine, its walls having a guard of 5 feet over the surface water. A basin bounded by the high rocks connects this with the three combined locks, of which the two upper have each a lift of 15 feet, and the river lock 13 feet; this supposes 7-foot water to be retained in it, and also 7 feet on the upper sill of the detached lock, but only 5 feet in that of the upper of the three combined.

These locks are all built on invert arches, and of the same species of sandstone used as the last two works. They have altogether a most beautiful appearance, and seem hitherto to have answered perfectly, notwithstanding their dangerously high lifts. More care was taken with the breastworks and sills than with those of the other locks, and they have been secured with bolts and strong iron straps since their first trial. The gates also are necessarily of a stronger construction....

Lieutenants Frome's Report. PAC Library. UG7 G72, Vol. I, Professional Papers of the Corps of Royal Engineers, pp. 91-92.

Miscellaneous Information

Geological Description

...At this latter place (Jones Falls) however the rocks on the West side are all of the primitive kinds while on the Eastern Side sandstone predominates - At the abutment of the large dam a beautiful specimen of large conglomerate is seen the embedded masses being chiefly of the primitive Kinds such as granite, feldspar, quartz of which last some beautiful specimens of the Kind called rose quartz may be found some of these pieces which evidently have been rounded by attrition are large - from 12" to 16" diameter beneath this some steatite occurs in which are embedded some large crystals of schorl - No limestone is to be found near this place.

PAC, MG29, A24, Vol. I, K, pp. 4-5. "Rideau Canal....Geological Features of the Line from the Report of Mr. Burrows, Civil Engineer, 1832."

Observations on the Rideau Canal by John Barker M.D.

...The difficulty here to be overcome was a rapid 1-1/2 miles long on which the stream fell 61 feet over a narrow rocky Channel confined within precipitous banks of great elevation which retired more or less from the bed of the River. A certain rise in the line of the Canal was inevitably to be encountered and no place could be found presenting fewer obstructions. - The works consist of an immense dam a Bye wash or Waste Weir four locks and a large basin which must all be described separately.

The Dam is built of blocks of Freestone backed with rubble masonry to the thickness of 27 feet the wall is 62 feet high from the foundation and is about 400 feet long - it is strengthened by clay & gravel at the base but slopes up to 60 feet at top.

It forms an arch against the water raised by it and is placed at the foot of the rapids immediately across the bed of the stream between lofty rocks. ...

The Locks are formed in the solid rock to the westward of the Dam at a short distance below it and are of the prodigious lift of 15 feet each. - Although built in the same manner and of the same material as the other locks yet their size and beauty of workmanship have deservedly rendered them celebrated as the masterpiece of the Canal. ...Between the third & fourth locks is a capacious basin formed on a natural rocky ledge of which proper advantage has been taken.

The Bywash or Waste Weir is placed away from the dam on the East side of the entrance to the Locks and is excavated out of the solid rock. - The waterfall is nearly as high as the dam but does not descend to the ravine below in a solid sheet being broken by several ledges. ...

PAC, MG29, A24, Vol. I, K, pp. 1-3. Notes & Extracts from "Observations on the Rideau Canal" by John Barker M.D. Printed in Kingston at the Office of the British Whig, 1834.

Also

PAC, MG29, A24, Vol. 1, p. 221. "Rideau Canal: Historical Sketch of Robert Drummond; Hon. Thomas McKay and John Redpath by Andrew Drummond, Ottawa, 1890-1893."

Observations of a Traveller who passed down the Rideau Waterway

Jones Falls: As we approach this place the surface of the country still retains its broken rugged appearance, - as far as the eye can reach it is composed of high broken hills rising abruptly from what has been the level of the waters at their last station, and still intersected by deep Ravines and Lakes lying in the basins of these hilly acclerities. Here to the eye of the geologist a singular phenomenon is presented. - At the point named Jones Falls (so called from a family of that name being proprietors of the soil) it was

originally Long Falls. These hilly protuberances and unequal surface approach near each other so as to contract the disembogement of Sand Lake from whence the Cataraqui Creek issues. On the north side of this Creek or main river these rocky hills are formed of redish facestone; and on the south side their structure is of a species of granite very hard approximating to the Trap or their family. While the surface presenting an uneven and broken surface gives the traveller no bad idea of Alpine Scenery on a small scale in reference to the difference of deviation between hills & mountains. ...At Jones Falls nothing of the kind had been done not a tree cut nor a building of any description erected; nor even a road to the place. The contractor was thrown at once into the heart of the forest, requiring not only exertions, but also indefatigable perseverance, joined with large capital to enable him even to make a commencement. The settlement most adjacent to him, was inhabited by U.E. Loyalists their descendants mixed with refugees from the United States; a people whose former habits were not such as cause much reliance to be placed upon their words in any transactions with strangers.

The Contractors here are Messrs. McKay and Redpath who have in the progress already made evinced the ability to surmount all the difficulties.

At this place the Cataraqui Creek emerges out of Sand Lake; and the fall is very considerable both in height & length. This is to be surmounted by a Dam across the Creek to back the waters up on a level with Sand Lake, and form Locks of fifteen feet lift each to admit of the ascending and descending of boats between the Lake and the still water below the Locks. This Dam is to be when finished 65 feet in height, extends across a vally [sic] about 138 feet at the bottom and from the receding of the banks will be about 300 feet on the top. It is built of Key work composed of large blocks of freestone hammer dressed and laid on their edges, presenting a convex surface to the stream and sloping about 1 foot in 10 on the face. The Key work is 27-1/2 feet wide at its foundation. As the abutments here are good being of solid rock of the description above mentioned; and the Key work appears to be done with every attention to strength, if sufficient care be taken to fill in & strengthen the backing with earth stones & gravel, there is every chance of its standing, notwithstanding the heavy pressure of about 65 feet of water that it will be occasionally subjected.

By many eminent Engineers it has been a question whether it was preferable, in cases of raising rapids by Dams, to allow the water to flow over these Dams when at its height or to allow of its escaping by a waste weir. No doubt this question will be influenced by different circumstances connected with the locality of the operations. Upon the whole there is perhaps no country better adapted than Canada to decide this point. The striking contrast her

rivers present when at their lowest during the summer heat and their dreadful rise during the Spring & fall freshets, afford means of settling the point were once a sufficient maker of facts collected for the purpose; here however we are still deficient; and the desideration [sic] will be supplied in constructing the Rideau Canal. In deciding this object the Engineer must have a regard to the quality of the stone of which he forms his Dam. If of sandstone liable to rapid abrasion it would certainly be imprudent to allow the water to flow over them: if however the stone be of a nature not liable to be wasted by water running over it, then perhaps the water may be allowed to pass in that way and the expense of a waste weir be avoided. the construction of which is under the best of circumstances an expensive job and where the excavation is difficult still more so, and as in Canada then by washes must be made large to give a free outlet to the highest floods. The Commanding Engineer seems to have had an eye to all these facts in deciding upon his plans at Jone's Falls. When the Dam is finished no water will be allowed to pass over it. How soon it reaches its requisite level it forms a large basin surrounded by high rocky lands, and through this on the south side of the creek as it presently runs a cut is making for a waste weir. The rock here is of the bastard granit [sic] kind exceeding hard and difficult to quarry. But this operation though attended with a heavy expense at first cost was undoubtedly necessary; no criterion of the durability of the freestone of which the dam is formed being yet obtained, when exposed to a run of water. The cutting of this waste weir is performing by the same contractors who are building the Dam and locks, and adds not small item to their heavy job.

Where the waters have attained their proper height by the erection of the Dam they reach a gully on the south side of the creek. Here the locks are to be placed forming the stepping stones for ascending to Sand Lake. These are placed in pairs and between them nature has formed a wide expansion of this Gully which will answer for a passing place or lay by for boats in their ascent or descent. The Locks are constructing of a fine whitish freestone, of an excellent quality, and the workmanship, (as far as it progressed, two of the Locks being nearly finished) is every way worthy of the materials. These stones are well as what is used for the Key work of the Dam are brought from a distance of nearly 5 miles. They are readily obtained at the quarry and cost 5/ per Ton for transport 16 cubic feet being considered a Ton weight. The contractors are never subjected to some additional expense by being obliged to transport them in their rough state. From the nature of the stone, they take in the frost and hence in winter (the proper season for transporting them) they would be liable to chip off were they submitted to long carriage after being

cut. Their becoming affected by the frost renders it necessary to thaw them before they can be cut in winter. Provisions in this quarter are not unreasonably high when it is kept in mind that the farmers bring them from a long distance....

...The completion of the Rideau Canal will no doubt change the aspect of the country in many parts of its line by flooding extensive flats, & some carping souls have opposed this work from the niggardly idea that it would drown so much land in its construction. This however proceeds from a mistaken idea. The land which will be flooded is comparatively of little value and by its passing through natural Lakes; and forming others by art, it will become more efficient as a defence for the country, and less liable to be injured by an enemy.

...The mouth of the lower lock will be entered by a steamer.

PAC, MG24, 19, Vol. 7, pp. 2042-2046. "Memoranda of a Journey from Kingston to Bytown made along the Route of the Rideau Canal in February 1830."

Comment on the Rideau Dams

(TEXT MISSING)

work was built to the height of 18 or 20 feet. - At this height on the opposite side of the dam a fresh sluice way was made the part through the Key work being framed of wood and the remainder of masonry - sheeting piles were driven in several places to prevent the water working its way beneath the floor of this Sluice which was carefully planked. As soon as this sluice way was completed and the key work and the remainder of the dam raised some height above it the outlet of the lake was stopped and every exertion made to close the old sluice way filling in the opening with rubbish and building the Key work behind. The water being then allowed to pass down the ravine rose in front of the dam and discharged itself by the second sluice way.

After this the work went on as before and a permanent waste channel having been excavated in the rocky bank of the ravine provided with sluices and every thing requisite to regulate the height of the water, then this 2nd sluice way was closed, the water was turned into the permanent channel and the dam was then completed to the requisite height without any further trouble.

The annexed sketch Plate XXX shows the plan of the dam and position of the temporary sluices - the rear elevation of the same just previous to the closing of the first sluice and a section of the dam as completed.

PAC, MG29, A24, Vol. I, G, p. 42. Rideau Dams by Lieut. Denison, Professional Papers of the Corps of Royal Engineers Vol. 11, pp. 114-121.

Various Particulars of Interest Concerning the Rideau Canal

The seventeenth section comprehends the extensive works at Jones' Falls. The Canal is descending, the Catarqui meets with no obstruction till it reaches Jones' Falls, 35 miles from Kingston. These falls situated at the connection between Opinicon Lake and Cranberry Marsh are 61 feet in height, within one mile, where the river runs through a narrow rocky ravine, about 50 feet in width. To obviate this extensive fall a dam 48 feet high will be erected in a narrow gut of the rapids, and 6 locks of 10 feet 2 inches in height. For this purpose white freestone of the best quality, sand, clay and limestone are to be found in the greatest abundance. The position of the works are as follows. The river divides here into two branches, the one on the right being known as McDonald's Snie, that on the left, being the main channel on which the falls and rapids are principally to be found....At the entrance of McDonald's Snie, three locks will be erected, and the remaining three at its outlet into the Catarqui. As old snie is to be found, across the island already mentioned, which will be drained and filled up. ...

PAC, MG24, A12, Vol. 38 The Montreal Herald, Saturday, Sept. 22, 1832 "Rideau Canal."

Name of Canal Section

Cranberry Marsh and Lake, Round Tail

Number of Canal Section

Section Number 18

Contractors

1. 1st Feb^y., 1828. John Brewer. Section 18. Cranberry Lake & Marsh.

Section 18. Continued Round Trail.

PAC, W055, Reel B-2811, Vol. 865, p. 211. List of the Various Contractors on the line of the Rideau Canal.

2. Section 18. Cranberry Marsh, about 8 miles of this Marsh require to be cleared and I have a large party of Axe-men and several yoke of oxen employed under the direction of Mr. Brewer with whom I form small contracts as the work proceeds....

PAC, RG8, Vol. 45, p. 24. To Gen. Mann from John By, Rideau Canal Office, 23rd Jan., 1828.

Also

W055, Reel B-2811, Vol. 865, p. 146.

Supervisors

...that I have placed Lt. Colonel Boteler in charge of the various works extending from Kingston Mills, to the Narrows, Rideau Lake, inclusive, an extent of works which requires him to be constantly on the move....

PAC, W044, Reel B-1298, Vol. 24, p. 504. Letter from John By, Royal Engineer Office Rideau Canal, 7th Sept., 1830 to Maj. Gen. Sir A. Bryce.

Progress Made During 1827

Works at Cranberry Lake & Marsh clearing through Lake & Marsh, fixing Stakes booms etc...In Progress.

Works at Round Tail, removing Dam, Rock excavation, construction Dam etc...In Progress.

PAC, RG8, Vol. 44, p. 173. Progress Report of Works at the Rideau Canal from the 21st September 1826 to the 31st October, 1827.

Progress Made During 1828

Section 18: Cranberry Marsh, about 8 miles of this Marsh require to be cleared and I have a large party of Axe-men and several yoke of oxen employed under the direction of Mr. Brewer with whom I form small contracts as the work proceeds, and have upwards of three miles already completed, and hope by the end of March to have a free water communication from one end of this Marsh to the other.

PAC, RG8, Vol. 45, p. 24. To Gen. Mann from John By, Rideau Canal Office, 23 Jan., 1828.

Also

W055, Reel B-2811, Vol. 865, p. 146.

Progress Made During 1829

1. Section 18. Cranberry Lake. Clearing Trees etc. from the drowned Lands nearly completed, removing the Temporary dams at Round Tail and White Fish Falls and constructing a waste weir at the latter place not yet commenced. PAC, W055, Reel B-2811, Vol. 866, p. 171.

Also

W044, Reel B-1294, Vol. 19, p. 41.

Also

PAC, RG8, Vol. 47, p. 244.

2. ... these Calculations must not be considered, as the positive Sums required, for although myself and officers are using every exertion to bring them as near the sum required as possible, yet the clearing and deepening various parts of the River, Cranberry Marsh and Lake ... are Services so interwoven with unforeseen Contingencies, that the Expences of them must remain uncertain until they are completed....

PAC, W044, B. Vol. 19, Reel B-1295, p. 341. From John By Royal Engineer Office, Rideau Canal, 31st December, 1829.

Progress Made During 1830

Cranberry Marsh & White Fish Falls: Extra Weight of Dam Constructed of Waste Weir bad foundation for Dam; extra Rock excavation extra carriage of materials for arched Key work & cutting off stumps 2 feet lower than was originally intended.

PAC, W055, Reel B-2812, Vol. 867, p. 193. Abridged Abstract Report of the Works on the Line of the Rideau Canal Showing amount of Original Estimate, Sums Expended and amount when Completed.

Progress Made During 1831

Cranberry Marsh and Lake

Section No. 18

Works approved of by the Committee ...

Cranberry Marsh and Lake through which it was proposed to carry the Canal is equally the source of Catarqui and Ganonoqui Rivers, but to render them available, it was necessary to increase their depth, to be effected by constructing a Dam, to serve also as a Waste Weir at the White Fish Falls, the Upper Entrance of the Ganonoqui River, and over which it was anticipated that nearly all the Waste Water between Jones' Falls and Brewer's Upper Mills would flow. The Marsh and Lake in question required to be cleared of Timber and Rushy Islands, and Booms were also to be fixed in the same, to mark the Channel of the Canal, and to prevent the navigation from being interrupted by drift wood. The removal of a Mill Dam at the Round Tail was also provided for.

Deviations from the Plan approved of by the Committee and Extra Works

No. 1 Having ascertained the necessity of deepening Cranberry Marsh and Lake in places, to provide for a Steam Boat Navigation beyond what was at first anticipated, I deemed it expedient to increase the height of the Works at Brewers Upper Mills, and of the Dam or Waste Weir at the White Fish Falls, to give an additional 2 feet in depth over the same, from the consideration that it was the most judicious mode that could be adopted to lessen as much as possible the expense which must unavoidably be incurred in obtaining the necessary depth of water, and as Cranberry Marsh and Lake are amongst the most unhealthy spots on the Line of Canal, I have cleared a greater space of standing Timber than was originally contemplated to afford a free circulation of air, and also to do away with the necessity of Booms, which after every possible care had been taken in their construction, would have been insecure works, perpetually liable to receiving accidents from Steam Boats and other causes, and thereby entailing a constant expense in order to keep them in repair.

No. 2 It is necessary to remark that at the foot of Jones' Falls, is situated what are termed the Drowned Lands, from the circumstance of their being at present flooded by a Mill Dam at the White Fish Falls, and which will be permanently so, by the Waste Weir to be constructed at that place; these must be cleared to a certain extent of standing

and sunken Timber, the expense of which is included in the Estimate of the Works of Section No. 18, it has also been ascertained that many of the Mossy and rushy Island in Cranberry Marsh and Lake, rise with the water rendering their removal in consequence necessary; some Excavation is also required at the Round Tail chiefly of loose Rock.

The circumstances above detailed, but more particularly the necessity of deepening parts of Cranberry Marsh and Lake, the removing of floating Islands, and the additional extent of removing of floating Islands, and the additional extent of Clearing required in the same, and in the Drowned Lands to afford a free circulation of air, have caused an increase upon the Estimate given to the Committee; but although the execution of these services has been unavoidable, no expense has been incurred, but what was indispensably necessary to perfect the water communication.

PAC, W044, Vol. 20, Reel B-1296, pp. 489-490.

Projected Cost of the Works

Section No. 18. Cranberry Marsh and Round Tail.

£1,409 ..-, 1/4

PAC, W044, Reel B-1294, Vol. 19, p. 21.

Probable Amount of Each Section When Completed

Section 22. Cranberry Marsh Lake & Round Tail.

£77,342 .., 10 .., 7-1/2

PAC, RG8, Vol. 52, pp. 231-232. Statement to the 31st March 1831. ...

Lieutenant Frome's Report

The navigation continues below these locks, through Cranberry Lake, along a muddy creek, winding among a quantity of drowned swampy land, and across Cranberry Marsh, entering the Cataroqui through a passage cut round the site of the old dam at the Round Tail; three-quarters of a mile below which are the works at Brewer's Upper Mills, distant from Jones's Falls about 11 miles.

Lieutenant Frome's Report. PAC Library. UG7 G72, Vol. I, *Professional Papers of the Corps of Royal Engineers*, p. 92. Miscellaneous Information

Memorandum of a Journey from Kingston to Bytown

...The Dam here is intended to raise the water so as to overflow another extensive swamp in the line of the creek termed Cranberry Marsh. This part of the work is not yet contracted for, and it is reported that it is to be performed by men hired by government. It is also said to be the intention to put in a wooden Dam here, Cranberry Marsh when filled of water as will be the case when the Canal is finished, will form a handsome and Extensive Lake; and as the water will be Kept at a certain height the probability, is that the country here will become more

salubrious than it presently is.

Proceeding along in the same direction the traveller comes next to a place named the White Fish. Here there is a species of lake or broad place in the creek, which presents rather a singular phenomenon. When the water rises it finds two outlets and runs in nearly opposite directions. While one portion escapes by Cranberry Marsh and in the line of the Canal, another part goes off by the Whitefish falls. From this state of Matters it will be necessary to through [sic] a Dam across this latter outlet, and by preventing the escape of the surplus water raise it of a sufficient height to back it up to the necessary depth at Jones Falls. The forming of this Dam is not yet commenced; but as the water is not very deep it is not looked upon as a difficult undertaking. I did not learn if the Comm^s. Engineer had decided upon using wood or stone in this place, or if he meant to rely upon an earthen embankment.

PAC, MG24, 19, Vol. 7, pp. 2041-2042. Memoranda of a Journey from Kingston to Bytown made along the Route of the Rideau Canal, in February 1830.

Miscellaneous Information

Various Particulars of Interest

The eighteenth section comprises the works at what is termed the Round Tail and Cranberry Marsh. The Canal after leaving the extensive works at Jones Falls, follows the course of the Cataraqui, until it enters Cranberry Marsh about 8 miles long, 68 feet above Lake Ontario, and situated between Jones' Falls and the Round Tail. ... The waters of the Cranberry Lake or Marsh find an exit at two places - the one at a break in a ridge of rocks called the Round Tail, at the head of the Cataraqui River, by which one portion of its waters flow - the other portion near Whitefish Falls, situated in a bay on the east side of the lake, into the Gananoqui River, which falls into the St. Lawrence 12 miles below Kingston. The Gananoque will thus be made the grand regulating waste weir of the Rideau Canal, for here all the waste waters of the Rideau and other large lakes may be let off, so that the Water in the Canal, whether in times of flood or not, will always remain at a steady height, and so do away with the proposed guard gates. To clear through the Marsh and Lake, fixing stakes, booms, the construction of dams at the Round Tail, where the lake exits into the Cataraqui, the removal of old dams, and other works in this section for the purpose of forming a free Channel for the Canal. ...

The Montreal Herald, Saturday, Sept. 22, 1832 "Rideau Canal".

Also

MG24, A12, Vol. 38.

Geological Information

...This ridge is only about 100 yards wide and probably from 1-1/2 to 2 miles long. In the vicinity of Brewers Upper & Lower Mills the rocks are in some variety granite, seimite, mica, feldspar, quartz, trapeau rocks, chrystaline limestone, of a brilliant white color and fetid odor, yellow, white, and variegated sandstone are found. - The same may be traced through the Cranberry vale to Jones' Falls.

PAC, MG29, A24, Vol. I, K., p. 4. "Geological Features of the line of the Rideau Canal from the Report of Mr. Burrows, Civil Engineer, 1832."

Name of Canal Section***Brewer's Upper Mills***Number of Canal Section

Section Number 19

Interest Shown, Advertisements & Application for Contracts

Rideau Canal - Persons desirous of contracting to execute the undermentioned portion of the intended RIDEAU CANAL are requested to send TENDERS stating the terms on which they are willing to undertake the same. 8 - to construct a DAM & LOCKS at Brewer's Upper Mills on the River Catarqui - Dam 25 feet high and 100 feet long: Locks, 12 feet lift.

Tenders for the above service will be received at this Office until Friday, the FIRST of FEBRUARY next, and to be in conformity in all respects to the conditions required by the advertisement of the 3rd December instant.

Montreal Herald, Vol. XVI, No. 15, Wed. Dec. 20th, 1826.

Contractors

1st Feb^y., 1828 John Brewer. Section 19. Brewers Upper Mills.

PAC, W055, Reel B-2811, Vol. 865, p. 211. List of the Various Contractors on the line of the Rideau Canal.

Mr. Drummond besides the extensive works at Kingston Mills executed those at ... Brewers Mills. ...

PAC, MG29, A24, Vol. 2, p. 221.(p. 6-7), Rideau Canal - Historical Sketch of Work of Robert Drummond Hon. Thos. MacKay and John Redpath (by Andrew Drummond, Ottawa, 1890-93).

Supervisers

...that I have placed Lt. Colonel Boteler in charge of the various works extending from Kingston Mills, to the Narrows, Rideau Lake, inclusive, an extent of works which requires him to be constantly on the move. ...

PAC, W044, Reel B-1298, Vol. 24, p. 504. Letter from John By, Royal Engineer Office, Rideau Canal to Maj. Gen. Sir. A. Bryce. 7th Sept. 1830.

Progress Made During 1827

Works at Brewers Upper Mills, Grubbing, excavation, for Locks, Masonry Constructing Dams etc... In Progress.

PAC, RG8, Vol. 44, pp. 173-174. Progress Report of Works at the Rideau Canal from the 21st Sept. 1826 to the 31 October 1827.

Progress Made During 1828

1. Section 19. Brewers Upper Mills, two Locks of 9 feet lift each, and Dam 10 feet high, these works are advertised, and tenders are to be opened at the Commy. Generals Office Montreal on 1st February.

PAC, RG8, Vol. 45, p. 24 To Gen. Mann from John By, Rideau Canal Office, 23 Jan., 1828.

Also

W055, Reel B-2811, Vol. 865, p. 146.

2. ...At Brewers Mills the works are entirely stopped; ... PAC, W044, Vol. 15, Reel B-217, p. 19. Letter to John By dated Rideau Canal, 6th Sept., 1828 from Savage.

Progress Made During 1829

Section 19. Brewer's Upper Mills: Cut and rough stones for Locks in operation about 1/2 the quantity required is provided, clearing and excavating between Upper and Lower Mills in progress not yet ...

PAC, W055, Reel B-2811, Vol. 866, p. 171.

Also

W044, Reel B-1294, Vol. 19, p. 41.

Also

PAC, RG8, Vol. 47, p. 244.

2. Station & Description of Persons.

		No. of men Employed on the 1st Aug.	Taken on Since.
R ¹ Engineer Dept.		2	-
Contractor's Men.		<u>111</u>	<u>22</u>
	Total:	135	22
		Least Number Employed about the 28th Aug.	
R ¹ Engineer Dept.		0	
Contractor's Men		<u>56</u>	56
		Present Number Employed on the 15th Sept.	
R ¹ Engineer Dept.		0	
Contractor's Men		<u>78</u>	78
		No of Men who have been sick at the Station	
R ¹ Engineer Dept.		2	

Contractor's Men		<u>55</u>		
	Total	57		
		No. of Men who rejoined but had relapse.		
R ¹ Engineer Dept. Contractor's Men		1		
	Total	<u>15</u>		
		Died at this Station.		
		Men	Women	Children
R ¹ - Engineer Dept. Contractor's Men		0	0	0
		<u>1</u>	<u>0</u>	<u>0</u>
	Total	1	0	0

Remarks: Mr. Cullen, Master Mason rejoined the Works but now ill in Kingston with a relapse. Mr. Burrett Clerk ill in Kingston, nearly recovered about 9 men had left the works previous to the 1st August.

PAC, W044, Reel B-1294, Vol. 18, p. 484.

3. ...these Calculations must not be considered, as the positive Sums required, for although myself and officers are using every exertion to bring them as near the sum required as possible, yet...clearing and deepening Cataraqui Creek ... are Services so interwoven with unforeseen Contingencies, that the Expences of them must remain uncertain until they are completed. ...

PAC, W044, Vol. 19, Reel B-1295, p. 341. From John By Royal Engineer Office, Rideau Canal, 31st Dec. 1829.

Progress Made in 1830

1. Brewer's Upper Mill & Round Tail: ... Saving.

PAC, W055, Reel B-2812, Vol. 867, p. 193 Abridged Abstract Report of the Works on the Line of the Rideau Canal Showing amount of Original Estimate, Sums Expended and amount when completed.

2. Alterations and Extra Works

From the circumstance of a greater quantity of Rock Excavation being found necessary than provided for in order to reduce the Expense of the same as much as possible, it was deemed advisable to place the Locks at the foot of the Cut, instead of at its head as originally proposed, in consequence Embankments but not to any extent are required.

Several places in Cranberry Marsh and Lake requiring to be deepened, it was considered that the most judicious and economical mode to be adapted, in order to obtain the depth of Water required, would be to give an additional height of two feet to the Chamber Walls and Gates of the Upper Lock, and to the Dam, thereby saving that depth of Excavation at the place alluded to.

Having ascertained from the nature of the foundations, that Wooden floors might be substituted for Invert Arches to the Locks (either the one or the other being indispensably necessary) with perfect Security, and that by adopting the former a saving would also accrue, I have in the present

instance, deemed it advisable to deviate from the plan approved of by the Committee, and am flooring the bottom of the Locks accordingly, with Wood instead of Stone.

It being ascertained that the numerous and Contracted bends in the Cataraqui, did not afford the necessary facilities for a Steam Boat navigation, it was indispensably necessary to make the Water Communication more direct by Cutting through the points formed by the bends in question, and in order to mitigate as much as possible the severe sickness produced by miasmata, arising from the lands on each side of the Creek being periodically flooded, and remaining so until rendered dry by the heat of the Summer; I have had a greater space cleared than actually required for Canal purposes to obtain a free Circulation of Air.

Excavation of Rock

The quantity of Rock met with in Excavation, exceeds what was anticipated.

Backing & Puddling Complete

This excess arises from forming a Basin at head of Locks and raising the Water higher in Cranberry Marsh, than originally intended to prevent Sickness.

Flooring Bottoms of Two Locks with Timber

See Remark on Masonry of Locks.

Floors of Wood were considered sufficiently durable and less expensive than Invert Arches.

Barn purchase & Cost of Removing

This Building Stands on the line of Canal and its removal in Consequence necessary.

Clearing Land

This clearing to create a free Circulation of air to Check Sickness.

Grubbing

Extra grubbing required in Consequence of quitting the Creek at various points to render the Water Communication more direct and available.

Excavation in Straightening Bends of Cataraqui Creek

In consequence of its being found more advisable to Straighten as much as possible the Creek by Cutting off the Elbows, than to follow the natural Channel.

Excavation in Straightening Bends of Cataraqui - Rock

It being found necessary to place lower Cill of lower Lock at Brewers Upper Mill below 5 feet Water to insure that depth during high winds are increased of Rock Excavation followed in Consequence.

It was also necessary to deepen the Creek at a point immediately below the Lock.

Log Bridge Over Cameron's Creek

For accommodation of works in process.

and as the Water, backed up by the Dam and Lock at Brewers Lower Mills will render the Creek impassable, a Bridge must ultimately have been Constructed for the accommodation of

the Public.

Excavations Extra Work Widening passage etc.

This sum has not been required.

Clearing Floodwood etc. out of Mill Pond etc.

It was indispensably necessary to remove an accumulation of Floodwood out of the line of Canal.

PAC, W044, B. Vol. 18, Reel B-1294, pp. 325-327.

Progress Made During 1831

... stating that in consequence of Mr. Brewer, the Contractor for the work at Brewer's Mills, having become involved and having left Upper Canada, he (Lt. Colonel By) had been obliged to enter into an engagement with Mr. Drummond to carry on the Works, and to increase the rate per Cubic foot of finished masonry from 1^s currency to 1^s,4^d sterling - on which Lt. Colonel By remarks that the masonry could not have been executed at Mr. Brewer's contract price from the circumstance of the ashlar having to be drawn six miles - whereas on forming the contract Mr. Brewer supposed that the Stone could be procured in the immediate vicinity of the sites for the Locks, on which account, Lt. Colonel By states that had Mr. Brewer completed the work in a satisfactory manner, he would have considered him justly entitled to such increase in the price of the masonry. ...

PAC, W055, Reel B-2813, Vol. 868, p. 105-106. To Maj. Gen. Sir A. Bryce from R. Byham, Office of Ordnance, 11th Nov., 1831.

Progress Made During 1832

I have the honor to report for the information of the Master General and Right Hon'ble & Hon'ble Board, that a few days since, a temporary dam broke away which was improperly erected by a private Individual at Ansley's Mills on the South East outlet from Lough'borough Lake, and was formed of rough boards and Slabs, intended to Keep a head of Water on the Lake about two feet higher than the original Saw Mill Dam - this Lake contains from 16 to 18 Square Miles, and is about 19 feet above the level of the Rideau Lake - consequently, when this temporary Dam gave way, the whole of the water, so raised, rushed into Cranberry Marsh, and caused a greater pressure on the embankments and Gates at Brewers Upper Mills, than could have been anticipated, but, fortunately, did little or no injury, except that of carrying away the Coffor Dam in front of the Works at Brewers Upper Mills. To prevent the damage that might arise to the Works by the recurrence of a similar accident, I have taken upon myself the responsibility of directing that a safety Gate be constructed at Brewers Upper Mills, agreeably to the Enclosed Plan, the expense of which shall, be reported as soon as ascertained, and I trust that the whole of the Canal will again be open to the public in the course of 18 or 20 days.

This delay affords me an opportunity of replacing such Iron Work as had given way on first passing a Steam Boat from Kingston to the Ottawa, and points out the necessity of vesting in the Officers Commanding on the Rideau Canal the control of all waters above the level of the Rideau Lake, whose duty it should be to inspect all Mills Dams erected by private individuals in such situations as their failure would create injury to the Works, and have authority to cause their being strengthened, if found necessary - to prevent the navigation from being at any time interrupted.

PAC, RG8, Vol. 55, pp. 8-9. To Colonel Nicolls, Com^d Royal Engineer, Canada from John By, Rideau Canal 30th May, 1832.

Also

PAC, MG29, A24, Vol. I, p. E. 55. "Rideau Canal - Copies of Original Mss etc. in Canadian Archives etc (by Andrew Drummond Ottawa 1890-93).

Projected Cost of the Works

Section, No. 19: Brewer's Upper Mill.

£15,036 ,, 10 ,, 4-1/2

PAC, WO44, Reel B-1294, Vol.19, p. 21.

Probably Mount of Each Section when completed

Section 23: Brewer's Upper Mills.

£18,754 ,, 9 ,, 2-3/4.

PAC, RG8, Vol. 52, pp. 231-232. Statement of the 31st March 1831. ...

Lieutenant's Frome's Report

(At Brewer's Upper Mills) The waters are kept up to their required level by a dam at this place, instead of that formerly situated at the Round Tail. It is of framed timber, similar to those described at some of the works on the Rideau, 18 feet high, and backed with a quantity of large blocks of stones piled behind its whole height with a slope of gravel or clay in front. The water does not flow over it as was intended, but is carried off by a sluiceway on the left of the dam. The two combined locks are on the right bank of the Cataroqui, at the end of a cut of nearly 400 yards, with a large basin immediately above them, in which the water is retained by a substantial earth embankment on the river side. They are built on a clay foundation, and floored with timber; the lift of the upper lock 6 feet, and that of the lower 11 feet 6 inches, the upper sill having 1 foot more water on it than in the lower lock at Jones's Falls. On the lower sill it is 7 feet deep. The guard of the walls of the upper lock is 4 feet, which is necessary to provide against the rise in the spring, the Cataroqui being the outlet of a chain of small lakes lying to the westward.

Lieutenant Frome's Report. PAC Library. UG7 G72, Vol. I,

Professional Papers of the Corps of Royal Engineers, pp. 92-93.

Miscellaneous Information

Memoranda of a Journey from Kingston to Bytown

Leaving this place we proceed still ascending the course of the creek which will be deepened by the last mentioned Dam to Brewer's Upper Mills where another lift of locks and a small Dam is required, here the adjacent country is extremely rugged and unequal the surface carved? with high bluffs of bastard limestone. There are two Locks of 8 feet lift. The stone for the construction of which, are a freestone with a considerable quantity of iron in them, they are brought from a distance of five miles; The Lime has also to be transported four miles. Notwithstanding these obstacles considerable progress is made in the works and although Brewer the contractor is not a practical man from the very superior quality of the materials his work may pass among the rest. The Dam here is intended to raise the water so as to overflow another extensive swamp in the line of the creek termed Cranberry Marsh. ...

PAC, MG24, 19, Vol. 7, p. 2041. Memoranda of a Journey from Kingston to Bytown made along the Route of the Rideau Canal, in February 1830.

Various Particulars of Interest

The nineteenth section includes the works at Brewer's Upper Mills. The Canal, having entered the Cataraqui River at the Round Tail, proceeds in an uninterrupted navigation of 17 miles from Jones' Falls to Brewer's Mills, the waters having been dammed back from the latter place, through the marsh at Cranberry Lake. ... The fall in the level of the river at this place, requires a dam of about 10 feet in height above the rapids, together with two locks of 9 feet lift each below. Some rocky islands are to be found in the channel, which aid in the construction of the dam. A dam is erected above the present mill-dam and mill, and also above the rapids, across one of the channels to a small island, - a second dam is erected on the channel that intervenes between this and a larger island, and the Canal runs through the channel on the right bank, between this latter island and the main land. About half-way between its entrance and its exit from this channel, the locks are situated. ...

The Montreal Herald, Saturday, Sept. 22, 1832 "Rideau Canal".

Also

MG24, A12, Vol. 38.

Geological Information

...In the vicinity of Brewers Upper and Lower Mills the rocks are in some variety granite, seimite, mica, feldspar,

quartz, trapeau rocks, chrystaline limestone, of a brilliant white color and fetid odor, yellow, white, and variegated sandstone are found...

PAC, MG29, A24, Vol. I, K, p. 4. "Geological Features of the line of the Rideau Canal from the Report of Mr. Burrows, Civil Engineer, 1832."

Name of Canal Section

Brewer's Lower Mills. Includes Jack's and Billidore's Rifts.

Number of Canal Section

Section Number 20

Contractors

1. 16 May, 1827 Samuel Clowes

Section 20: Brewers lower Mills

Section 21: Billidore Rifts

Section 22: Jacks Rifts.

PAC, W055, Reel B-2811, Vol. 865, p. 211. List of the Various Contractors on the line of the Rideau Canal.

2. Sections 21 & 20: Mr. Clowes has a contract to form the Canal for 6 miles, consisting chiefly of excavations, to straighten the natural River, and to build a Lock of 10 feet 7 incs lift, and a Dam, 10 feet high at Brewers Lower Mill; These works are proceeding rapidly and will be completed in Sept. 1829.

PAC, RG8, Vol. 45, p. 22-30. To Gen. Mann from John By Rideau Canal Office, 23 January 1828.

Also

PAC, W055, Reel B-2811, Vol. 865, p. 146.

3. ...Mr. Drummond besides the extensive works at Kingston Mills executed those at ... Brewers Mills. ...

PAC, MG29, A24, Vol. 1, p. 221 (6-7). ("Rideau Canal - Historic Sketch of Work of Robert Drummond, Hon. Thos. MacKay and John Redpath (by Andrew Drummond, Ottawa, 1890-1893).")

Supervisors

...that I have placed Lt. Colonel Boteler in charge of the various works extending from Kingston Mills, to the Narrows, Rideau Lake, inclusive, an extent of works which requires him to be constantly on the move. ...

PAC, W044, Reel B-1298, Vol. 24, p. 504. Letter from John By, Royal Engineer Office, Rideau Canal, 7th Sept., 1830 to Maj. Gen. Sir A. Bryce.

Progress Made During 1827

1. I have nothing but trouble, Colonel McLean is doing all he can to put a stop to the Canal, he has overflowed the whole work 4 times and me and eighty men have had to stand for two or three days each time till the water was drained

off, and there it leaves the land all over mud; and makes it so sickly it is not possible to keep labourers on the ground. This is just the situation I am in. ...

PAC, MG24, E6, p. 2. From Mr. Clowes dated Kingston, July 25th, 1827.

2. Mr. Clowes Civil Engineer having made several complaints that the works of the Rideau Canal now executing by him have been repeatedly flooded by a Mr. McLean (to whom Brewers new mills are supposed to belong) thereby occasioning a great additional expense to Government, loss of time & sickness amongst the Labourers employed; ...Mr. McLean must be regularly warned by the committee not to obstruct and retard the works of the Canal by again flooding them from his Mills; but should it appear that a simple warning is not likely to have this effect you are hereby authorized and desired by Lt. Col. By to place a guard upon the Mills or adopt such other means as may appear to you most conducive to the good of the service, and in order to prevent the works of the Canal from being again obstructed or damaged

PAC, MG24, E6, p. 2. Answer to the above in the shape of a Letter to Lt. Frome Royal Engineer, Royal Engineer Office, Rideau Canal, 31st July, 1827.

3. Brewers Lower Mills, chopping clearing and grubbing, excavating for Lock Constructing Dam etc. - In Progress.

Works at Billidores Rifts chopping clearing & grubbing excavating for Locks etc... In Progress.

Works at Jacks Rifts chopping, clearing & grubbing excavating for Lock etc... In Progress.

PAC, RG8, Vol. 44, pp. 173-174. Progress Report of Works at the Rideau Canal from the 21st September, 1826 to the 31st October, 1827.

Progress Made During 1828

Sections 21 & 20: Mr. Clowes has a contract to form the Canal for 6 miles, consisting chiefly of excavations, to straighten the natural River, and to build a Lock of 10 feet 7 ins. lift, and a Dam, 10 feet high at Brewers Lower Mill; These works are proceeding rapidly and will be completed in Sept. 1829.

PAC, RG8, Vol. 45, p. 24. To Gen. Mann from John By Rideau Canal Office, 23 January, 1828.

Also

PAC, W055, Reel B-2811, Vol. 865, p. 146.

Progress Made During 1829

1. Section 20. Brewers Lower Mills. A quantity of cut stone (about 1/4 of what will be required) is provided on the spot.

Sections 21 & 22: Billidores & Jack's Rifts: The Lock at these two sections is not required as the lift will be obtained at Kingston Mills; but 2/3rds of the clearing indispensably necessary 1/5th of the grubbing, and about 1/4 of the excavations are performed.

PAC, W055, B-2811, Vol. 866, p. 171.

Also

W044, Vol. 19, Reel B-1294, p. 40.

Also

PAC, RG8, Vol. 47, p. 244.

2. ...these Calculations must not be considered, as the positive Sums required, for although myself and officers are using every exertion to bring them as near the sum required as possible, yet the clearing and deepening various parts of the River, ... also clearing and deepening Catarauqui Creek ... are Services so interwoven with unforeseen Contingencies, that the Expences of them must remain uncertain until they are completed.

PAC, W044, Vol. 19, B-1295, p. 341. From John By, Royal Engineer Office, Rideau Canal, 31st December, 1829.

Progress Made During 1830

1. Brewer's Lower Mill: ... Saving.

PAC, W055, Reel B-2812, Vol. 867, p. 193. Abridged Abstract Report of the Works on the Line of the Rideau Canal Shewing amount of Original Estimate Sums Expended and amount when completed.

2. Alterations and Extra Works

It being ascertained that the contracted & Sinuous character of the Catarauqui Creek, rendered it nearly unavailable for Steam Boats, without incurring a very heavy Expenditure in Widening and deepening the same, an undertaking, it may be necessary to remark, almost impracticable, as from the unhealthy nature of the locality, and offensive description of the Mud to be removed Labourers could not have been procured, unless a very high rate of wages had been offered as an inducement, and it having also been proved, that Men could not Work in situations above described with impunity but that the consequence would inevitably be severe sickness, if not death itself (every individual, with scarcely an exception, employed in clearing the Bed of the Creek to obtain a foundation for the dam at Kingston Mills having suffered most severely from the effects of the effluvia proceeding from the disturbed deposits, and which in numerous instances occasioned the Death of the persons attacked) I considered myself fully justified in deviating from the original Plan, and have therefore obtained the required water communication by cutting through numerous points formed by the Windings of the River between Kingston Mills and Brewers Upper Mills, in as direct a Line as the Nature of the Ground would admit of, at the same time, making use of the creek whenever

practicable, and although the Estimate given to the Committee has in consequence been exceeded, I consider the Plan adopted a more economical mode of forming the Canal between the points stated, than the enlarging of the Creek in question an operation which would otherwise have been required, particularly, when in addition to the reasons above given, the great Expense, necessarily attendant on Excavations in Water, is taken into consideration.

Having ascertained that an Error of 1"7 feet (1' 7"?) had occurred in the Levels taken between Brewers Upper and Lower Mills from which the Plan and Estimate approved by the Committee were formed, and it being indispensably necessary to quit the Creek at various points, I considered the least expensive and more judicious mode to be adopted would be, to abandon the line at first proposed, and to increase the Lift of the Lock 3 ft. 7 in. as 8 feet Depth of cutting is thereby saved, through a considerable extent and 7 feet of Water, also provided over the Lower Sill of the Locks at Brewers Upper Mills.

In order to take advantage of a Ridge of Rock the Dam which serves also as a Waste Weir, is placed lower down the River than originally proposed, and is so constructed as to enable the Water to be drawn off below the Level of the Upper Sill of the Lock, should it, at any future period, be required in order to make any necessary repairs to the Works.

Cutting and Clearing Land

Clearing enlarged to permit circulation of Air with a view to prevent Sickness - has increased the Expense.

Grubbing Land

On account of the Increased Size of Lock.

Backing & Puddling behind Lock Walls

Increase Arises from the Addition to the Lift of the Lock.

Waste Water Way

Works not provided for in Estimate but approved of by Col. Durnford Commanding R.E., as it insured a complete control over the Water, and in case of Repairs being necessary enables the Water to be drawn out below Upper Sill of Lock.

It was considered advisable to construct the Dam, in such a manner as to enable the Water to be drawn off below the Upper Sill of the Lock.

Flooring Bottom of Locks with Hemlock Logs and Plank

Substituted for the Inverted Arch - the foundation being found sufficiently good to admit of a Wooden Bottom to Lock instead of an Inverted Arch.

A Wooden Floor was considered sufficiently durable and less Expensive than an Invert Arch.

Clearing away Scantling Flood Wood etc. for Sill of Waste Water Way or Dam

Being found more advisable to place this work ... Ridge

of Rock which extends across the River near the Saw Mill, it was in consequence necessary to remove an accumulation of Flood Wood.

PAC, W044, Vol. 18, Reel B-1294, pp. 329-330.

Projected Cost of the Works

Section, No. 20: Brewer's Lower. Mill	£10,268 ,, 8 ,, 1/2
Section, No. 21: Billidore's Rifts	£10,872 ,, 2 ,, 5-1/4
Section, No. 22: Jack's Rifts	£19,155 ,, 1 ,, 7-3/4

PAC, W044, Reel B-1294, Vol. 19, p. 21.

Probable Amount of Each Section When Completed

Section 24: Brewer's Lower Mill	£9339 ,, 12 ,, 1-3/4
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PAC, RG8, Vol. 52, pp. 231-232. Statement to the 31st March, 1831 ...

Lieutenant Frome's Report

At Brewer's Lower Mills, one mile and three-quarters distant, another wooden dam, about 13 feet high, is constructed across the river, to retain sufficient water between these two works; and a single lock is built on the left bank, on a clay foundation, entered from a cut of about half a mile long, made through the low swampy land, to avoid an abrupt bend in the creek: the floor is of wood, and the lift of the lock 13 feet 2 inches, allowing 7-foot water on both upper and lower sills, with a guard of 3 feet 2 inches on the walls.

Lieutenant Frome's Report. PAC Library. UG7 G72, Vol. I, Professional Papers of the Corps of Royal Engineers, p. 93.

Miscellaneous Information

Memorandum of a Journey from Kingston to Bytown:

...This sheet of still water will extend 6 miles to Brewers Lower Mills which form the next scene of operation on the Canal. Here we meet with a small job consisting of one Lock and wing Walls. The water from Kingston Mills is here backed up by the Dam and the Difference of level is surmounted & a lock of 14 feet 8 Inches lift. Here is a small dam and considerable excavation of clay with which it is intended to form the wing walls or embankment. The stone here is of the same quality as at Kingston Mills with the exception of the granite. Considerable progress has been made in drawing in the stone and the contractor Mr. Drummond has now taken the necessary measures to complete the job within the specified time. Here the original contractor was a Mr. Clowes who like many others either undertook the work too low (sic) or wanted energy to complete it. While on this part of the subject it may not be improper to remark that many individuals utterly unacquainted with the work they had to perform engaged in it at prices too low for its accomplishment - and finding themselves closely watched for

the due performance of their undertaking and no outlet by which they could remedy their error have gone off and abandoned their works which have fallen into the hands of men capable of performing them. Such has been the case here and in many others the same event has to be remarked. Such contractors disappointed of their views by entering an work they were ignorant of, have gone off and no small share of apology has been heaped upon the commanding Engineer from such men. - They now however pretty well weeded out and the work in general has fallen into hands capable of performing it.

PAC, MG24, 19, Vol. 7, pp. 2040-2041. Memoranda of a Journey from Kingston to Bytown made along the Route of the Rideau Canal, in February 1830.

Various Particulars of Interest

The twentieth section comprehends the works at Brewer's Lower Mills, The Canal from the rapids at Brewer's Upper Mills proceeds without interruption for 3 miles to the Lower Mills. ... The rapids here are to be overcome by a dam above the rapids, which will raise the water 4 feet perpendicular, and by a lock of 10 feet 7 inches lift, below the rapids. A long island is found in the middle of the stream, at the head of which and on its right side, the dam is erected, while by the left channel, the Canal proceeds till it meets the lock at the end of the island....

The twenty first and twenty second sections comprise the works at Billedores' Rifts and Jack's Rifts at each of which places a single lock of 5 feet lift, with wing walls to act as dams, will be erected. The rapids at Billedores' Rifts are situated about 4 miles below Brewer's Lower Mills and about which limestone is to be found in abundance. Jack's Rift is 7 miles from Billedores', and the stone about which is precisely the same as at the former. ... With the exception of these trifling obstructions the Canal has an uninterrupted navigation of about 15 miles from Brewer's Lower Mill to the Kingston Mills.

PAC, MG24, A12, Vol. 38. *The Montreal Herald*, Saturday, September 22nd, 1832. "Rideau Canal."

Geological Information

From Kingston Mills the canal passes through an alluvial valley for 10 miles to Brewers Lower Mill - The valley is bounded on the west at the distance of a mile from the canal by very high ridges of limestone which are continuous for nearly 7 miles after which ridges of sandstone appear and continue with small exceptions to Brewers Upper Mills. On the East sundry granite rocks appear these at a distance of one or 1-1/2 miles are in most instances covered by transition limestone - in some instances a very hard silicious sandstone constitutes the superior rock and in many places the rocks may be lined in

their proper order viz. granite or other primitive rock covered with sandstone and that again by transition limestone no organic remains have been found in the latter - A singular ridge of limestone occurs in the valley about two miles from Kingston Mills this attains to a height of 9 feet, is nearly perpendicular. On the East side presenting an abrupt precipice and dips to the West which side is covered with ... the strata of this have an inclination westward. This ridge is only about 100 yards wide and probably from 1-1/2 to 2 miles long. In the vicinity of Brewers Upper & Lower Mills the rocks are in some variety granite, semite, mica, feldspar, quartz, trappeau rocks, chrystaline limestone, of a brilliant white color and fetid odor, yellow, white, and variegated sandstone are found - The same may be traced through the Cranberry vale to Jones' Falls. ...

PAC, MG29, A24, Vol. I, K, p. 4. "Geological Features of the line of the Rideau Canal from the report of Mr. Burrows, Civil Engineer, 1832."

Name of Canal Section

Kingston Mills

Number of Canal Section

Number 23

Contractors

1. ...Mr. Drummond having received the Contract for the extensive works on the Canal at the western terminus at Kingston Mills removed with his family from Bytown to Kingston. ...

PAC, MG29, A24, Vol. 1, p. 221.(6-7) "Rideau Canal - Historical Sketch of Work of Robert Drummond Honble. Thos. MacKay and John Redpath (by Andrew Drummond, Ottawa, 1890-93).

2. Date of Contract: 14 May, 1827.

Name of Contractor: Robert Drummond.

No. of Section: Section 23. Kingston Mills.

PAC, W055, Reel B-2811, Vol. 865, p. 211. List of the Various Contractors on the line of the Rideau Canal.

3. Vouchers for opening quarries, forming roads; erecting Shanties at Kingston Mills.

Lt. Colonel By promised a Mr. McDermott a Contract for the Works at Kingston Mills but after he had Commenced active operations and went to considerable expense in making the necessary preparations, Lt. Colonel By refused to give him the Contract.

PAC, W044, Reel B-1300, Vol. 27, pp. 415-416, No. 8.

Supervisors

1. ... that I have placed Lt. Colonel Boteler in charge of the various works extending from Kingston Mills, to the

Narrows, Rideau Lake, inclusive, an extent of works which requires him to be constantly on the move.

PAC, W044, Reel B-1298, Vol. 24, p. 504. Letter from John By Royal Engineer Office Rideau Canal, 7th September, 1830 to Maj. Gen. Sir A. Bryce.

Progress Made in 1827

1. The Rideau Canal: We yesterday visited the foot of "Tuttle's Hill" the place at which, a few days since, ground was broken for the first time on the Kingston section of this splendid work. A Mr. Macdermott has contracted for the first two miles and a half of the Canal, and has cleared away the greater part of wood from the scite (sic). He commences digging on Monday. ...

United Empire Loyalist, Saturday, June 16th, 1827, Vol. 2, No. 3, p. 23. Taken from the Kingston Chronicle.

2. Works at Kingston Mills, chopping clearing & grubbing excavating of Locks constructing Dam etc... In Progress.

PAC, RG8, Vol. 44, pp. 175-176. Progress Report of the Works at the Rideau Canal from the 21st September 1826 to the 31st October, 1827.

Progress Made During 1828

1. ... that I inspected the various works of the Rideau Canal accompanied by Capt. Savage & Capt. Victor Roy. Engineers, between the 7th & 17th Instant, and have the satisfaction to state, we found the arrangements making by the different contractors, for opening the various works in the spring, proceeding with a rapidity far exceeding our most sanguine expectations.

... 23 & 22 Sections At the 23rd and 22nd Sections, Kingston Mills Mr. R. Drummond has contracted to build four locks of 9 feet lift each, a Dam 18 feet high and to make the necessary excavations & embankments, and to clear the extensive swamps in these Sections.

The clearing & excavations for the Locks, and the clearing of the Swamps are proceeding with rapidity: he has a quantity of stone quarried and 20 stone cutters at work preparing for the Locks; he has also a large quantity of stone collected to build the dam, the moment the Spring floods will permit, and is making preparations to commence the Cofferdam for the outer Lock. ...

PAC, RG8, Vol. 45, pp. 22-24. Letter to Gen. Mann from John By Rideau Canal Office, 23rd Jan. 1828.

Also

PAC, W055, Vol. 365, p. 145-146.

2. ...At Kingston Mills, Lieut. Briscoe Royle Eng, the asst. Overseer, the Contractor, his Clerk, Foreman, and nearly the whole of his men (about 100) have been attacked, the Clerk and 12 men have died, Lieut. Briscoe still continues extremely ill, with the lake fever. ...

PAC, W044, Reel B-217, Vol. 15, p. 19. Letter to John By

dated Rideau Canal, 6th Sept. 1828, from Savage.

Progress Made During 1829

1. Section No. 23. Kingston Mills. Clearing etc. - completed - excavations for Locks about 2/3rds done. Dam 3/4rs built - cut and rough stones for the Locks, about 3/4rs of the quantity required in the quarry. Cofferdam at the head of Kingston Bay commenced.

PAC, W055, Reel B-2811, Vol. 866, p. 171,

Also

PAC, RG8, Vol. 47, p. 244,

Also

W044, Vol. 19, Reel B-1294, p. 41.

2. ... Sir John Colborne arrived last night and is much pleased with the general appearance of the place & proposes to Commence his tour of inspection through the line of Canal tomorrow morning when Capt. Cole the Officer in Charge of the Kingston District and himself have the honor to accompany His Excellency.

PAC, MG29, A24, Vol. 1, B. p. 25. Col. By, Bytown, 23rd July, 1829.

Also

RG8, Vol. 49, p. 51, ["Rideau Canal - Copies of Original Mss. etc. in Canadian Archives" (by Andrew Drummond, Ottawa, 1890-93)].

3. ... that Lt. Col. By has now got possession of and commenced Every lock or dam he needs throughout the whole line except that at the White Fish Falls where the temporary dam erected by him (as I understood) or some other person has been destroyed which renders it impracticable to navigate from Jones' to Kingston Falls.

PAC, MG29, A24, Vol. B, p. 25. Col. Durnford to Col. Couper, 19th November, 1829. ["Rideau Canal - Copies of Original Mss. etc. in Canadian Archives" (by Andrew Drummond, Ottawa, 1890-93)"].

Also

PAC, RG8, Vol. 49, p. 220.

4. ... the saving arising from my proposal to do away with the Locks at Billidores & Jacks Rifts by placing a fourth Lock at Kingston Mills, raising the Dam at that place, and forming certain embankments to retain the water, so as to convert Cataroque Creek into a fine sheet of water, extending to the high land on each side and thereby drowning that pernicious swamp, by forming it into a small Lake of about 9,400 acres was deducted which deduction amounted to £8102,2,,0 and this alteration was approved of by the committee.

PAC, W044, B. Vol. 20, Reel B-2811, p. 530. Letter from John By to Col. Durnford, Royal Engineers Office, Rideau Canal, 30th December, 1829.

Progress Made During 1830

...The Progress Report and Plans show the works as they are now completing ... yet I have no doubt the whole will be finished in August 1831: and I beg to state, notwithstanding the excavations are carrying oh at the lower lock at Kingston Mills, also the deepening and clearing Cataroque Creek, and cutting through the Isthmus between Mud and Rideau Lakes during the winter, which owing to the, intense frost, adds considerably to the expense, yet such is the dreadfully offensive smell arising from the decayed vegetable matter in these excavations, that I am apprehensive of the breaking out of the fever afresh, and have, as a matter of necessity, to lessen these expensive excavations, ordered the dam and locks at Kingston Mills to be raised, which lessens the excavations in Cataroque Creek;

PAC, W044, Vol. 19, Reel B-1294, pp. 60-61, No. 123. Letter from Lt. Col. By to Gen. Mann, Royal Engineers' Office, Rideau Canal, 15th March, 1830.

Kingston Mills Including Jacks Rifts and deducting Billidore's Rifts. - In consequence of increased height of Dam, to save Sickness and excavation, consequent construction of waste weir etc...

PAC, WO55, Reel B-2812, Vol. 867, p. 193. Abridged Abstract Report of the Works on the Line of the Rideau Canal Showing Amount of Original Estimate, Sums Expended and Amount when Completed.

3. Station and description of persons. Kingston Mills.

	No. of Men Employed		
	On the 1st. Aug.	Taken on since	Total
Rl. Engineer Dept.	1	-	1
Contractor's Men.	388	-	388
Total.	389	-	389.

Least Number Employed about the 28th Aug.

Rl. Engineer Dept.	-
Contractor's Men	<u>24</u>
Total	24.

Present Number Employed on the 15th Sept.

Rl. Engineer Dept.	1
Contractor's Men.	<u>171</u>
Total	172

No. of Men who have been sick At the Station.

Rl. Engineer Dept.	1
Contractor's Men	<u>217</u>
Total	218

		No. of men who rejoined but had a relapse.		
Ri. Engineer Dept.		-		
Contractor's Men		-		
	Total	-		
		Died at the Station.		
		Men	Women	Children
Ri. Engineer Dept.		0	0	0
Contractor's Men.		8	4	4
	Total	8	4	4.

Remarks: Mr. T. Burrows - Asst. Overseer occasionally ill with former Ague. Mr. R. Drummond the Contractor is now away for the reestablishment of his health - the whole of his Clerks, Foremen and sub-contractors (14 persons) have been ill and had to leave the plans. The Master Mason still dangerously ill in Kingston - about 1 man killed by an accident not included in this Return.

PAC, W044, Vol. 18, Reel B-1294, p. 482.

4. Kingston Mills - Section No. 23.

Alterations and Extra Works

Having ascertained that the Ground, it was proposed to occupy, was not adapted for the placing of four Locks in Connection, it has been necessary to have one detached, the space intermediate being formed into a Bason [sic], it has also been deemed expedient to construct a Waste Weir, from the consideration that it would materially tend to insure the permanent durability of the Dam and Works in general, and at the same time provided for the drawing off the Water, should it be required at any future period to repair the Embankments, or clean the bed of the Canal from deposits (sic) or other obstructions.

The Line of Canal between Kingston Mills, and Brewer's Lower Mills has been rendered more direct, by quitting the Creek and cutting through numerous points, this was rendered necessary for the reasons afforded relative to the alterations adopted at Section No. 20 - which are equally applicable in the present instance, and to which may be added that from the extreme Sinuous character of the Creek in question, its navigation by Steam Boats must always have been a tedious and at the same time a difficult operation, even had it been practicable without incurring an enormous and unnecessary expenditure, to have increased its width and depth to the dimensions required.

The necessity of quitting the Creek at various points having been fully ascertained, and an error in the original levels also discovered, in order to save depth of Cutting and meet the said error, the total lift of the Lock and height of the Dam, have been increased, --- this gives 7 Feet Water in the Chamber of the Lock at Brewers Lower Mill, and renders an extension of Embankments unavailable.

Having stated the reasons which rendered alterations from the plan approved of by the Committee indispensably necessary, I beg to offer a few remarks in explanation of the Causes which led to the errors in the original Levels. - In the first place, a Large portion of the Country on each side of the Cataraqui Creek is either Marsh or flooded for several months during the Summer Season, and when the Water is evaporated the heat of the Sun acting upon decaying Vegetable Matter, slimy deposits Creates Miasmata of so malignant a description, that only those seasoned by long residence can possibly escape its effects, and which has been but too clearly demonstrated from the number of Labourers, who have fallen Victims to disease whilst employed, although every precaution, by clearing land to create free Circulation of air has been adopted, with the hopes of mitigating the sickness which prevails periodically in the Kingston Sections of the Canal, and without which expense having been incurred, the Works could not have been executed, Secondly, The Marshes totally impassable in Summer, are generally but very slightly crusted over with ice during the Winter Season, unless a continuation of very severe weather occurs, one of my overseers nearly lost his life from repeatedly breaking through the same whilst employed in taking a Survey of the Creek.

The impossibility of taking Correct levels in such a Country with Instruments having been proved, to obtain correct data, I was Compelled to adopt the expensive mode of constructing temporary Dams, across the Creek in question at certain distances, and by which means, the errors in the original levels were discovered, these explanations will I trust prove satisfactory, and at the same time shew the numerous and Varied difficulties which have been met with, and I beg further to remark, that I am fully Convinced, taking every thing into Consideration, that the forming the Canal, as above described, is the least expensive mode, which could have been adopted under existing Circumstances, and at the same time it provides the necessary facilities for a Steam Boat navigation, which the original plan did not afford.

Clearing the Line of Canal between Jack's Rifts and Kingston Mill Pond

... Increase of Expense arises from the necessity of quitting the Creek at various points to render the Water Communication more direct and available; also from the Clearing a greater Space than required for the bed of the Canal to create free Circulation of Air, to mitigate the extreme Sickness which prevails periodically.

Grubbing the necessary part of above distance

Increase of Expense arises from quitting the Creek, the necessity of which has been explained.

Earth Excavation on the above distance

Arises from the necessity of altering the sites of the

Locks to suite the nature of the ground, and to Keep the Lower Lock as much out of the River as possible, to avoid bad foundations, and partial piling, which latter would otherwise have been required, as it was considered that the building of Masonry partly on rock, and partly on an Artificial foundation, might be attended with injurious results.

Rock below Surface on Lake Ontario

... Increase of Expense arises from more Rock Excavation having been ascertained to be necessary than at first anticipated, which may have arisen from the fluctuations of Lake Ontario.

Embankment for Basin

... Increase of Expense arises from the necessity of having a detached Lock to suit the Ground, and the forming of the Space between it and the Combined Locks into a Basin.

Masonry of Three Locks

... Increase of Expense arises from an error in the Original levels, which rendered an increase in the lifts of the Locks necessary to rectify the same, and at the same time to save depth of Excavation at those places where it was deemed advisable to quit the Creek, which from the unhealthy nature of the Country would have been attended with a heavier expense than the plan adapted; also from the Contract price exceeding the Estimated one, arising from the high rate of Wages demanded by Artificers and labourers in Consequence of the great Sickness which prevails in the Vicinity of Kingston Mills.

There are no documents in this office from which it can be ascertained, the saving upon each Item in Consequence of placing a 4th Lock at Kingston Mills, antic the doing away with the Works at Billedore's and Jack's Rifts, it appears that a Saving of £8102,,2,,0 would accrue from the Alteration which was deducted from the Amount of Works required at Kingston Mills.

Masonry for Side retaining Walls

Increase of Expense occasion of - See last remark.

Four Pair Sluice Gates Complete

Increase of Expense arises from the substituting Crabs and Chains for Racks and Pinions, and Cast Iron Valves for Wood - and an additional pair being required for the detached Lock.

Pumps and labor Keeping Locks dry

... Increase of Expense arises from the not having allowed a Sufficient Sum for this Service in the original Estimate the Keeping of the Works clear of Water whilst Constructing has been attended with great difficulty, so much so, that the Contractor found it expedient to use a Steam Engine at his own expense.

Dam

... Increase of Expense occasion of - See remark on Masonry of Locks, also from the additional height and consequently,

thickness given to the Dam to prevent the Water from flowing over it.

Masonry of the 4th or Upper Lock

... In consequence of doing away with the Works at Billidore's and Jack's Rifts a fourth Lock was to be Constructed at Kingston Mills, but from the nature of the ground, it has been necessary that the same should be detached, which was not anticipated at the period of forming the Estimate given to the Committee, and has occasioned an Increase of Expense on the Masonry of Locks - See also remark on Masonry of three Locks.

Pointed Sill for ditto on Rock

An Oak Sill was required for the detached Lock.

Masonry of Waste Water Way or Bywash

To enable the Water to be drawn ...

A Waste Weir was considered necessary to insure the permanent durability of the Dam and Works in general. Also to provide for the draining off the Water between Kingston Mills and Brewer's Lower Mill, in order that repairs to the Embankment, when required, might be made with greater facility and to enable the bed of the Canal to be cleared of deposits and other obstacles which might interrupt the navigation.

Embankments to retain Water raised by Dam 900 Yards

... Embankments were indispensably necessary to retain the Water raised by the Dam - See remark on Dam and masonry of three Locks.

Raising a part of the Montreal Road as it Will be flooded by Water raised by Dam.

... The necessity of this Work has proceeded from the additional height given to the Dam of three feet eight Inches.

Sill at Stop Gate For Bywash

Required for the Stop Gate of the Waste Weir to rest upon.

PAC, W044, Vol. 18, Reel B-1294, pp. 332-338.

Projected Cost of the Works

Section, No. 23. Kingston Mills. £21,161 ,, 18 ,, 2.

PAC, W044, Vol. 19, Reel B-1294, p. 21.

PAC, W044, Vol. 19, Reel B-1294, p. 29.

Probable Amount of Section When Completed

Kingston Mills £52,972 ,, 11 ,, 3-1/2

Lock Gates, Oak Sills etc. £18,670 ,, 15 ,, 5-1/4

PAC, RG8, Vol. 52, pp. 233-234. Statement to the 31st March 1831, Shewing the Total Amount of Works on each Section as Approved of by the Committee the Expenditure up to the 31st March 1831 and the Sum still required to complete.

Lieutenant Frome's Report

... From hence to Kingston Mills, 10-1/2 miles distant, the water is kept up to a level by the dam constructed at the

latter place. The old course of the stream is followed for the greater part of the distance, with occasional cuts across its bend to shorten the distance, but near Kingston Mills, the flat marshy country through which it flowed is completely inundated, and all traces of the Old Cataroqui have vanished. The channel is here marked out through the mass of dead timber on each side, presenting the most desolate appearance.

The dam at Kingston Mills, which retains the waters to this level, is constructed on the same principle as the others, of stone placed on edge. Its height is about 30 feet, and the length on the top, from the rock on which it abuts, near the wing-wall of the upper lock on the right bank, to the cut stone pier of the sluiceway, which joins its abutment on the left, near 400 feet. There is a far larger mass of clay and broken stone at the back of the key-work than was originally intended, with a very gradual slope upstream. An earthen embankment extends to the east, from the sluiceway, for about 1000 yards, till it meets the high land; and a similar mound of nearly the same length is also raised across some low land to the westward, to prevent the water from turning the works. The locks, built of limestone, are four in number, the upper being detached, with a large basin between it and the other three, which are combined, and of an extra thickness on the river side, being without any backing, and faced with ashlar. The lift of the detached lock is 11 feet 8 inches, allowing 7 feet 8 inches water on the upper sill, and 5 feet in the basin, which is retained on the west by a large earthen embankment faced with a stone wall. A species of lay-by, or dock, is connected on the east side with this basin, large enough to receive a steam-boat, and with piers to which gates may be hung. The lifts of the other three are also 11 feet 8 inches each, allowing 8-feet water on the river lock, making a total lift of 46 feet 8 inches from the surface of Lake Ontario to that of the Cataroqui, as raised by the present dam. ...The excavation was through a species of granite, and was an expensive as well as a tedious undertaking, rendered still more so by the difficulty of procuring hands in the spring and autumn, owing to the very unhealthy situation. all the works between the isthmus and Kingston, as well as some on the other side of the Rideau Lake, the same delay was experienced from thin cause. At the head of the bay where the Rideau Canal enters Lake Ontario, the depth of water is at all seasons sufficient, but within a mile of the locks a rocky shoal, as has been mentioned, crosses the route. A coffer-dam was at an early stage of the work formed round a narrow part of the channel proposed to be deepened; but the canal was completed, and in operation, before any thing was done to remove this impediment; so that steam-boats were obliged, at certain seasons, to unload at Kingston Mills, there not being 4-feet water over the bar.

A channel has however since been cut round it, without meeting with any rock that required blasting under water, and the communication is now uninterrupted to Kingston, 5 miles distant from the mills. ... Lieutenant Frome's Report.

PAC Library. UG7 G72, Vol. I, *Professional Papers of the Corps of Royal Engineers*, pp. 93-94.

Miscellaneous Information

Geological Features of the Line of Canal

In Kingston Bay - transition limestone, - in upper strata of orthocerite and a few bivalve shells occur. - The lower beds are in general of a dark blue color very compact chrysaline fracture conchoidal with a few traces of sulphate of iron.

On nearing the locks at Kingston Mills some granite masses appear through a cleft of which the waters of the Cataraqui flowed and which is now used for the Canal. These masses rise about 150 or 160 feet high - a great portion of a Knoll of this rock had to be excavated (for 22 to 23 thousand yards cubic) to obtain sufficient space for placing the locks in course of this excavation great varieties of the granite appeared from large to fine grained, semote, a trifling portion of mica chiefly in cavities some little sulphate of iron also in cavities and which were found generally in connection with beautiful specimens of dogtooth spar. ...

PAC, MG29, A24, Vol. I, K, p. 4, "Rideau Canal Geological Features of the line from the Report of Mr. Burrows Civil Engineer, 1832."

Description of a Journey along the Rideau Canal

To the traveller who passes this Route it is unnecessary to be proby [sic] in describing the Town of Kingston ... where two headlands form a barrier between the Lake and an extensive Bay which runs up into the country for the distance of five miles in a direct line to the spot where the waters of the Cataraqui Creek falls into it, and where the falls had been taken advantage of to erects mills termed Kingston Mills, ...and the shores of the Bay afford excellent quarries of a bluish limestone admirably adapted for building materials while their distance presents no serious obstacle as they can be transported by water in summer and with sleighs in winter. ...Kingston Mills. This may be denominated the outlet of the Rideau Canal.. There the country becomes rugged and uneven in the surface - the rocky hills approach each other and the waters of the Cataraqui Creek come rushing down into the Bay and the first lift from the level of Lake Ontario is to be made. Difficulties here presented themselves which would have (paralysed?) less experienced Engineers, and defeated

Contractors not endowed with stern perseverance. All these however are in a fair way of being overcome under the superintendance of a Mr. Drummond the Contractor, and a considerable progress in the completion of a piece of well executed work is already made. The lift is overcome by four locks of 14 ft 8 inch lift each. The Sills are composed on the one side of the creek of greyish limestone, and on the other of a hard Granite very difficult to break, and of which the Lock Pits have to be excavated at great expence of Labour. On gaining the summit here at the Top of the locks, the country spreads out into an open vally (sic) through which the creek winds in a very crooked course, It not being navaigable it was found necessary to back up the waters to a sufficient depth. This has been done by erecting a substantial dam with two long Embankments. This is nearly finished and has the promise of durability, both the stone work of the Dam and locks are built of Grey limestone brought from a quarry on the banks of the Bay about four miles distant, and locked up with the rough granite as excavated from the Lockpits. Several circumstances have intervned to enhance the expense of the operations here. Besides the hard excavation of the Lockpits already mentioned; it is necessary to cut a waste weir for the escape of the creek waters when raised to their proper height by the Dam; and of sufficient size to slow their discharge, under all the varieties of rise and fall, - it not being intended to let the superfluous water flow over the Dam as in other places. In addition to this the swampy vally [sic] through which the creek passes & which is filled of heavy timber some standing and others under every stage of decay has to be cleared and as the ground is swampy this work must be done in winter at a great labour in raising the frozen trees. Here the contractor is not sufficiently paid for his labour when only allowed the same sum as he gets for cutting and clearing off timber under the usual circumstances. In this place I observed the adoption of a steam engine for pumping out the water in the lower lockpit which certainly is preferable on the score of economy to using the hand or horse pump, though more expensive in the outset to the Contractor. Owing to the narrowness of the vally where the locks are placed and the high rugged land in the vicinity preventing the waste weir being carried around, the creekwater escapes by the side of the lower locks, - hence its wall requires to be built strong thick of cut stone on both sides instead of being backed up as usual in some place. From the side of the second lock coming from the granite rock there is a beautiful living spring of excellent water. ...Now soon the Canal is in operation a large track of vally will be here filled with water Kept back by the Dam, - which will form a complete lake having deeply indented bays around it, upon which the traveler [sic] will enter when he has risen through the Locks. This

sheet of still water will extend 6 miles to Brewers Lower Mills which form the next scene of operation on the Canal.

PAC, MG24, 19, Vol. 7, pp. 2038-2040. Memoranda of a Journey from Kingston to Bytown made along the Route of the Rideau Canal, in February 1830.

Particulars of Interest Concerning the Various Lock Stations

The twenty third and last section comprises the works at Kingston Mills. Here the Cataraqui River falls into Kingston Bay, a part of Lake Ontario, 5 miles from the town of Kingston. ...It is proposed to erect here three Locks to back the waters as far as Jack's Rifts, The position of the locks is at the entrance of the Canal, at the Cataraqui, in five feet water. The Canal dam being erected on the main channel of the river below, where it diverges into two, the Canal itself enters into the smaller channel and joins the river some distance below, after the Cataraqui has made a sharp turn to the right....The rock through which the Canal will be cut is hard granite. ...

PAC, MG24, A12, Vol. 38. *The Montreal Herald*, Saturday, Sept. 22, 1832 - 'Rideau Canal.'

A Description of Drummond's Work

... Mr. Drummond having received the contract for the extensive works on the Canal at the western terminus at Kingston Mills removed with his family from Bytown to Kingston. ... An interesting description of these is given in the pamphlet entitled Notes and Observations on the Rideau Canal by Edward John Barker Editor of the British Whig-1834. As he credits Mr. Drummond as having given him the information I give the extract in full. - "After passing along the Cataraqui Creek to where the Cataraqui was wont to rumble down a precipice of some 30 feet high the approach is made through a gorge with lofty granite rocks on both sides continuing all the way to where the falls of the Cataraqui formerly were, along this gorge the creek is not more than 120 or 130 feet wide but the shores are bold and steep with 6 feet of water in the shallowest parts. - On the whole route from Kingston to Bytown there is no natural part of the Canal which impresses the beholder with more fearful delight than the portion of the Cataraqui Creek - the awful sublimity of the lowering rocks inspires a species of pleasure difficult to describe and although the scenery on the Rideau River and on some of the Lakes is hardly to be surpassed both for splendour and loveliness yet it yields in grandeur to this part.

The lift to be overcome at Kingston Mills is 46-1/2 feet divided into equal portions of 11'8" each. - The original fall was not so high but the water has been raised 20 feet to overcome two small rifts between this place and Brewer's lower Mills. - The Locks are 4 in number and being

the first on the Canal require a short description which may serve for all the rest as all are built in nearly the same way. - They are composed of cut limestone, or sandstone (a species of freestone of almost eternal duration) which are the only building materials used in the entire line. - They are 110 feet long clear of the gates, 33 feet wide with a depth of 5 feet of water over the sills. - The gates are framed of oak and are put up in a most substantial manner. The crabs, chains and other iron Works was manufactured in England and at Three Rivers in Lower Canada, they are of the best material and most approved patterns.

Between the 3rd and 4th lock is a capacious basin built in the same manner as the locks, sufficiently large for the largest sized Steamboat to turn or pass. - The time of passing them will occupy about 12 minutes each, upon an average.

The locks themselves are situated on the west side of the old falls and the site now occupied was blasted out of the solid granite rock, nearly 2000 yards cubic were removed.

To raise the waters at this place, a dam and two extensive embankments are made. - The dam is built with rough limestone, is about 300 feet in length - 34 feet high in centre and is flanked on the east end by the waste weir - one embankment to the eastward extends 2600 feet and the other to the westward 3200 feet in length. The height of these embankments is various, the highest part about 23 feet and the lowest not exceeding so many inches. - They are well built with stone and clay but are not perfectly water tight. - Over the locks is thrown a long and lofty wooden bridge the high road to Montreal passing through the village. -

... The sole contractor and architect was Robt. Drummond, Eng. of Kingston.

During the period of erection the place was very sickly and 500 labourers are said to have lost their lives.

The foregoing extract affords a glimpse of the difficulties to be overcome in the western section of the route especially, from the rugged and disrupted state of the primitive rocks encountered. Col. By always placed great reliance on Mr. Drummond for his perseverance, energy and faithful performance of whatever he undertook to do. ...

PAC, MG29, A24, Vol. 1, p. 221 (or 6-9) (Rideau Canal - Historical Sketch of Work of Robert Drummond, Hon. Thomas MacKay and John Redpath (by Andrew Drummond, Ottawa, 1890-1893.)

Also

MG29, B6, Vol. 3, p. 105. From Dr. Barker's Pamphlet.

ENDNOTES

Chapter 1

- 1 Canada. Public Archives (hereafter cited as PAC), W044 Vol.19, p. 12, "Report on the Military Settlement in the Neighbourhood of the Rideau, pointing out the Communication which may be established....," by Lt. Col. Cockburn, Quebec, 26 November 1818.
- 2 PAC, RG8, C series, vol.38, pp.189-91, instructions from E. Nicolls, Quebec, to Lt. J. Jebb, RE, 27 April 1816.
- 3 PAC, RG11, Series 1, vol.38, J. Jebb, Kingston, to Lt. Col. Nicolls, 8 June 1816.
- 4 PAC, RG8, C series, vol.38, p.165, J. Jebb, Kingston, to Nicolls, 8 June 1816.
- 5 For Jebb's findings, see Part 2 below
- 6 Ibid.
- 7 PAC, RG8, II, vol.6, part 2, "Extract of a Report to His Grace the Duke of Wellington Master General of His Majesty's Ordnance etc. Relative to His Majesty's North American Provinces...1825" (hereafter cited as Smyth Report), p.71, par.27
- 8 Upper Canada Gazette (Toronto), 30 Nov. 1826, p. 24.
- 9 For the list of documents which made up By's

Chapter 1 (cont.)

- Instructions. See Part 2, below.
- 10 PAC RG8, C series, vol.42, pp.85-8, By to Durnford, 18 September 1826.
- 11 Ibid.
- 12 PAC, W044, vol. 18, p.341, "General Contingencies."
- 13 Ibid.
- 14 PAC, RG8, C series, vol.42 p.97, Dalhousie to By, 26 September 1826; see also PAC, W044, vol.15, p.176, Dalhousie to By, 26 September 1826 (extract), and *ibid.*, vol.18, p.349, Dalhousie to By, 26 September 1826.
- 15 For detailed information on the construction of the Chaudire bridge, see Part 2, below.
- 16 Alexander Herbert Douglas Ross, *Ottawa Past and Present* (Toronto: Musson, 1927), pp.72-3.
- 17 Ibid.
- 18 PAC RG8, C series, vol. 1261, pp.303-4, H.C. Darling, military secretary, Quebec, to By, 27 February 1827.
- 19 PAC, W044, vol.18, p.475, signed N.H. Baird, 26 April 1831.
- 20 *Ibid.*, pp.351-2, By to Gen. Mann, 1 November 1827.
- 21 A.H.D. Ross, *op. cit.*, pp.52-4, "On the 18th of June 1823, the Earl of Dalhousie took an active part in forwarding the Rideau Canal project, when he purchased from Hugh Frazer the property now bounded by the Ottawa River and Cathcart Street, the Rideau River, Rideau and

Chapter 1 (cont.)

Wellington Streets and Bronson Avenue." See also PAC, W044, vol.18, pp.349-50, Dalhousie to By, 26 September 1828, "I take this opportunity of meeting you here to place in your hands a Sketch Plan of several Lots of Lands, which I thought advantageous to purchase for the use of Government, when this Canal was spoken of, as likely to be carried into effect, this not only contains the site for the Head Locks, but they offer a valuable locality for a considerable Village or Town, for the lodging of Artificers and other necessary Essentials, in so great a Work. I would propose that these be correctly surveyed, laid out in lots of 2 or so Acres, to be granted according to the means of settlers and to pay a Government rent of 2/6 per acre...annually."

See also PAC, RG8, C series, vol.274, pp.69-73, By to acting military secretary, 20 June 1831.

- 22 Ibid. vol.42, pp.87-8, By to Durnford, 13 September 1826. For details on how the land was administered, see Part 2.
- 23 Descriptions of the spring surveys carried on by John Burrows may be found in Part 2.

See also PAC, RG8, series, vol.43, pp.215-6, By to Darling, 14 April 1827. "I propose leaving Montreal on the 27th instant, to examine the proposed Route of the Rideau Canal. This service requiring two Birch Canoes with five men in each, I applied to Governor Simpson of the Hudson Bay

Chapter 1 (cont.)

Company, who kindly sent me Mr. Cowie of that department with orders to supply me with everything I required, but being ignorant of canoeing, I requested Mr. Cowie to complete them for a three week's voyage....I have also (by the advice of Colonel Durnford,) agreed to employ Mr. Sherwood, a surveyor residing at Brockville who has been employed by Colonel Bruyeres...and Mr. Clowes, in surveying the proposed route...he has offered to act as my guide & to point out the ground for 15/ sterling per day, with all his expenses paid, and has promised to meet me at Hull on the 1 of May next."

24 PAC, RG8, C series, vol.44, p.80, By to Mann, 6 July 1827.

25 Ibid., p.86.

26 Ibid., 13 July 1827. "It appears self-evident that by forming a steamboat navigation from the River St. Lawrence to the various Lakes, would at once deprive the Americans of the means of attacking Canada, and would make Great Britain mistress of the trade of that vast population on the borders of the Lakes of which the Americans have lately so much boasted,...and for military service, they ought to be constructed of sufficient size to pass the steamboats best adapted for navigating the Lakes and rivers of America, which boats measure from 110 to 130 feet in length, and from 40 to

Chapter 1 (cont.)

50 feet in width drawing 8 feet water when loaded, and are capable of being turned to Military purposes without any expense as each boat would carry four 12 pounders and 760 men with great ease. It is therefore evident, that the moment our Canals and Locks are completed on this scale we shall not only possess the trade of all that immense population on the borders of the Lakes, but also have Military possession of the Lakes for, by having the power of collecting our forces at any one point with a rapidity of motion, that no land movement can equal, the Lakes must remain in our possession and consequently Canada rendered perfectly safe from attack."

See also PAC, W044, vol.19, p.95, By to Durnford, 15 May 1827. "I have met with nothing to induce me to alter my opinion as to the propriety of making this water communication from Kingston to the Ottawa a Steam boat navigation."

27 Ibid., part 2, p.20, By to Mann, 1 November 1827.

Chapter 2

- 1 PAC, RG8, C series, vol.42, p.103, By to Maj. Gen. Darling, 2 October 1826.
- 2 PAC, MG12, W055, vol.864, p.73, R. Byham (secretary to Board of Ordnance), to Mann, 30 June 1827; see also PAC, MG12, W044, vol.19, p. 101, Mann to Byham, 21 July 1827.

Chapter 2 (cont.)

- 3 PAC, MG12, W055, vol.863, pp.65-65a, Byham to Mann, 6 December 1826.
- 4 PAC, MG12, W044, vol.23, pp.235-6, Bolton to Nicolls, 27 March 1835.
- 5 PAC, MG12, W055, vol.863, pp.65-65a, op.cit.
- 6 PAC, MG12, W044, vol. 19, p.120; *ibid.*, p.106, By to Durnford, 24 April 1827.
- 7 In 1828-29, Burgess seems to have had a severe drinking problem and had therefore to be discharged from his duties. There is a good deal of acrimonious correspondence in the records, concerning his dismissal in all its ugly aspects.
- 8 PAC, RG8, C series, vol.47, p.255, By to Durnford, 23 March 1829.
- 9 PAC, MG12, W044, vol.27, p. 362, Pooley to Lt. E.C. Frome, 11 February 1832. "We hereby certify that during the time Mr. Fitzgibbon has been employed as Master Carpenter on the Rideau Canal, we have on every occasion found him fully equal to his situation, and particularly active and zealous in the performance of his duties."
- See also *ibid.*, p.363, signed D. Bolton, 11 February 1832, "I certify Mr. Fitzgibbon to be in my opinion a highly zealous active Master Carpenter and a good tradesman, perfectly understanding the business he has superintended, whilst employed on the Canal."
- 10 *Ibid.*, pp.302-3, By to Respective Officers, Quebec, 19

Chapter 2 (cont.)

- November 1830; PAC, RG8, C series, vol.52, pp.122-3.
- 11 PAC, MG12, W044, vol.15, p.11, proposed establishment of the Engineer department on the Rideau Canal for the year 1828.
 - 12 PAC, RG8, C series, vol.48 p.303, Pooley to By, 23 April 1829.
 - 13 PAC, MG12, W044, vol.27, p.411.
 - 14 Among these men were Capt. Bolton, Capt. Cole, Lt. Pooley, Lt. Frome, Lt. Boteler and Capt. Denison.
 - 15 PAC, MG12, W044, vol.24, p.504, By to Sir Alexander Bryce, 7 September 1830.
 - 16 PAC, RG8, C series, vol.43, p.196, Mann to Dalhousie, 4 April 1827. "I have the honour to acquaint your Lordship, The Master General and Board of Ordnance have given directions that two Companies of Royal Sappers & Miners, with their proportionate number of Officers, be sent to. Canada to be employed on the formation of the Rideau Canal: one Company is now under orders for embarkation, and will sail early in this Spring, the other it is hoped, will be ready in the course of the Summer."
 - 17 PAC, MG12, W044, vol.19, p.89, By to Mann, 7 July 1827.
 - 18 Ibid., C series.
 - 19 PAC, RG8, vol.46, pp.139-40, By to Lt. Col. Couper, 30 November 1828; PAC, MG29, A24, vol.2, p.14, By's request for a detachment of sentries to allow the Royal Sappers

Chapter 2 (cont.)

- and Miners to take up duty at the Hogs Back; PAC, RG8, C series, vol.46, p.119, By to Couper, 11 November 1828.
- 20 PAC, MG12, W044, vol.16, p.74, Capt. Rice Jones, Major of Brigades, "Return of Deserters from the Companies of Royal Sappers & Miners employed upon the Rideau Canal since their arrival in Canada."
- 21 Ibid., p.76, By to Mann, 2 August 1828, "whether it would not be advisable as a ready mode of checking desertion, to promise such men as shall conduct themselves well during the time of constructing the said Canal, that at the completion of that work, all who wish it, should receive their discharge, & one hundred acres of land."
- 22 PAC, RG8, C series, vol.43, pp.212-4, By to Darling, 15 April 1827.
- 23 PAC, MG12, W044, vol.15, p.81, Sir John Webb to Byham, 1829.
- 24 PAC, MG12, W055, vol.864, p.101, Byham to Bryce, 15 June 1832.
- 25 PAC, MG12, W044, vol.18, pp.72-3, memorandum on the formation of the Rideau Canal between the Ottawa River and Kingston, from Carmichael Smyth to Mann, 14 March 1826. See also *ibid.*, vol.15, p.275, By to Col. T. Ellicombe, 29 May 1833.
- 26 *Ibid.*, vol.18, p.94, extract from memorandum dated 15 June 1826.

Chapter 2 (cont.)

- 27 Herald (Montreal), 20 December 1826.
- 28 PAC, MG12, W044, vol.19, p.93, By to Durnford, 211.11, 1827.
- 29 PAC, MG24, D8, Wright Family Papers, vol.18, pp. 6741-2, letter to (?) from Gardner, 8 May 1829. "I cannot but believe that there is something to be made on that canal. Mr. Anan had an interview with Mr. McKay the he started away in which Mr. McKay said if the Col. wanted a stone dam build there he would build it for him. He meant to get all the stone work on the Canal be could but he would not take any wood work or excavation - hence I think you had best say nothing about a stone dam - but show the proposal we made out, to Col. Durnford. I should think that since you are quite intimate with him, & Mr. McKay does not want the job unless it should be wholly in stone you will stand a good chance if your are in time."
- 30 PAC, MG12, W055, vol.865, p.80, extract of letter from By to Darling, 19 April 1827.
- 31 Ibid., vol.864, p.162, extract of letter from By to Durnford, 4 May 1827.
- 32 For the actual terms of the contracts, see Part 2, below.
- 33 PAC, RG8, C series, vol.44, p.88, By to Mann, 6 July 1827.
- 34 Ibid., vol.49, pp.112-3, By to Durnford, 27 August

Chapter 2 (cont.)

- 1829.
- 35 Ibid., vol.1261, p.385, military secretary to By, 14 February 1828.
- 36 Edward Charles Frome, "Account of the Causes which led to the Construction of the Rideau Canal, connecting the Waters of Lake Ontario and the Ottawa; the Nature of the Communication Prior to 1827; and a Description of the Works by means of which it is converted into a Steamboat Navigation," *Papers on Subjects Connected with the Duties of the Corps of Royal Engineers*, vol.1, 2d ed. (1844), p.80.
- 37 PAC, MG12, W055, vol.867, p.156, extract mentioned in accompanying letter from Durnford to Mann, No.21, 11 February 1830.
- 38 *Herald* (Montreal), 23 August 1828. Other bids for tenders may be found in *ibid.*, 22 December 1827 and 28 February 1829.
- 39 PAC, MG12, W044, vol.18, p.125, Darling to Durnford, 25 October 1826.
- 40 PAC, MG12, W055, vol.863, p.217, Porrett to Mann, 13 May 182
- 41 PAC, RG8, C series, vol.44, p.82, By to Mann, 6 July 1827.

Chapter 3

- 1 A.D.H. Ross, *op. cit.*, p.87.

Chapter 3 (cont.)

- 2 PAC, MG24, 19, Hill Collection, p.1978, agreement between Nicholas Sparks and John By, Hull, 17 November 1826, witnessed by Pooley and MacTaggart.
- 3 See below, and also the case of Col. McLean in PAC, MG24, E6, John MacTaggart papers, pp.2-3.
- 4 PAC, MG29, B6, vol.3, p.86 (taken from PAC, RG8, C series, vol.58, p.38), By's address to the Respective Officers, Quebec, 19 August 1831.

See also: PAC, RG8, C series, vol.53, p.38, By to Respective Officers, Quebec, 19 August 1831.
- 5 Ibid.
- 6 Ibid., vol.53, p.39, Ordnance Storekeepers, Quebec, to Lt. Col. Glegg, 31 August 1831. "We have the honour to forward a copy of a letter dated the 19th Instant from Lt. Colonel By reporting that the navigation of the Rideau Canal from Bytown to Burrits, has been impeded by the supply of water being cut off, Mr. Merrick having damed [sic] up the River to enable him to perform Repairs at his Mill. We therefore request you will be pleased to submit for the consideration of His Lordship the Commander of the Forces the importance of some steps being authorized by His Lordship to remedy such practices in future, without waiting for legal intervention, as the delay to be experienced in such cases, must be productive of the greatest injury to the Rideau Navigation."

Chapter 3 (cont.)

- 7 PAC, MG24, 19, Hill Collection, p.320, Dr. Christie to "My Friend Bill Tyrconnell" in the United States, ca.1827.
- 8 PAC, MG29, B6, vol.2, p.E20, copy of letter from W.W. Fenton to By, 18 June 1828. See also PAC, RG8, C series, vol.48, p.116.
- 9 PAC, MG12, W044, vol.20, p.541, By to Jonas Jones, 24 March 1829.
- 10 Ibid., p.540, By to Durnford, 29 August 1829.
- 11 For a detailed study of the original plans and the necessary additions and deletions from them, see Part 2.
- 12 PAC, MG12, W044, vol.2, p.321, Durnford to Fanshawe, 15 July 1831.
- 13 For By's detailed report of the dam's collapse, see Part 2.
- 14 PAC, MG24, D8, Wright Papers, vol.33, pp.14857-8, C.C. Wright to H. Gates Company, Hull, 6 April 1829.
- 15 PAC, MG12, W044, vol.20, p.609, By to Mann, 4 April 1829; *ibid.*, vol.19, p.37.
- 16 For detailed descriptions of the stations affected, the spread of the illness and the mortality rates, see *ibid.*, vol.18, p.482.
- 17 *Ibid.*, vol.15, p.19, Savage to By, 6 September 1828.
- 18 PAC, MG29, B6, vol.2, E22; PAC, RG8, C series, vol. 49, p.82, By to Durnford, 12 August 1829.

Chapter 3 (cont.)

- 19 Ibid.
- 20 Ibid., vol. 52, pp.229-34.
- 21 For details about the Royal Sappers and Miners, see Part 2.
- 22 PAC, RG8, C series, vol.54, p.158, By to Glegg, 31 December 1831.
- 23 PAC, MG24, 19, Hill Collection, p.6673; H.R. Morgan, "The Story of Colonel By, Founder of the City of Ottawa," Saturday Night, 29 August 1925, general section, p.3.,
- 24 PAC, RG8, C series, vol.55, p.10, By to Nicolls, 30 May 1832.
- 25 Albion (New York), 10 November 1832.
- 26 The imperial government operated the canal until 1856, when it was turned over to the provincial authorities. Unfortunately, all the canal records from the early period were burnt in the Ordnance office in Montreal during the 1849 riots.
- 27 A.D.H. Ross, op. cit., p.88.
- 28 Statement on memorial plaque, Frant Parish church, Frant, Sussex.

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