SAPPERS AND SLAG

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Abstract

This paper briefly summarizes the role that the construction of the Rideau Canal in 1826-32 played in the establishment of the City of Ottawa. Remains from this construction period have recently been uncovered in downtown Ottawa. Restoration of the Plaza Bridge (which spans the Rideau Canal between the Parliament Buildings and the Chateau Laurier) commenced in 1996 when Public Works and Government Services Canada transferred ownership of the bridge, along with funds for its restoration, to the Regional Municipality of Ottawa-Carleton. Two seasons of initial testing took place in 1996 and 1997 on land beneath the west arch of the Plaza Bridge which is part of the Rideau Canal National Historic Site. When construction started in February 1998, Parks Canada archaeologists located the remains of the original contractor's smith shop and the Sappers' Bridge (with the aid of a backhoe and the construction crew) at a depth of three metres below the road grade. Results of test excavations within the shop and of the excavation of most of the blacksmith shop midden will be presented. This project offers a best-case scenario of cooperation between developers and archaeologists to preserve nationally significant cultural resources.

Résumé

Cette présentation résume brièvement le rôle que la construction du Canal Rideau en 1826-1832 a joué dans la création de la ville d'Ottawa. Des restes de cette période de construction ont récemment été découvertes au Centre-Ville d'Ottawa. La restauration du Pont Plaza (qui enjambe le Canal Rideau entre les édifices du parlement et le Château Laurier) a débuté en 1996 quand le ministère des Travaux publics et Services gouvernementaux Canada a transferé la propriété du pont, ainsi que les fonds nécessaires pour sa restauration, à la Municipalité régionale d'Ottawa-Carleton. Deux saisons de tests préliminaires ont pris place en 1996 et 1997 sur le terrain sous l'arche ouest du Pont Plaza qui fait partie du Site Historique National du Canal Rideau. Lorsque la construction a débuté au mois de février 1998, les archéologues de Parks Canada ont localisé les restes de l'atelier du forgeron de l'entrepreneur initial, ainsi que les restes du Pont Sappers (avec l'aide d'une pelle mécanique et d'une équipe de travailleurs de la construction) a une profondeur de trois mètres sous le niveau de la route. Les résultats des fouilles initiales à l'intérieur de l'atelier du forgeron ainsi que les résultats des fouilles d'une grande partie de l'atelier du forgeron seront presentées. Ce projet offre un example de scenario d'excellente coopération entre des dévelopeurs et les archéologues pour préserver les ressources culturelles d'importance nationale.

Historical Background

The War of 1812 demonstrated how vulnerable the trade link between Upper and Lower Canada along the St. Lawrence was to American attack. A canal linking the Ottawa River and Kingston would ensure that troops and supplies could safely reach Upper Canada via an inland route. Until 1790 when Loyalists began to settle at milling sites, this area of Upper Canada had few European settlements. After the War of 1812, discharged soldiers and other immigrants were encouraged to settle in the area, partly to reinforce defences in case of further hostility. But the settlements that grew were at Perth and Richmond and land speculators

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rather than developers purchased the land along the proposed canal route (Turner 1995:21-25).

Although this route had been surveyed during the War of 1812, it was not until 1826 that a decision was made to begin construction of the Rideau Canal. Colonel John By of the Royal Engineers, with experience on the fortifications at Quebec City, was assigned what was to be one of the largest projects undertaken by the Royal Engineers to that date. (Turner 1995:27)

With several contractors working simultaneously along the route, By and the Royal Engineers were assisted by the 7th and 15th Companies of the Royal Sappers and Miners. The companies, recruited mainly from England and Scotland for construction of the canal, included stonecutters, masons, blacksmiths and carpenters along with Scottish and Cornish miners. These soldiers guarded stores, kept order and provided skills where necessary. In Bytown, the Royal Sappers and Miners cleared the entrance channel, built government buildings and the Sappers' Bridge. (Turner 1995:28-29)

At the start of construction in 1827, By laid out two town sites at the northern entrance to the Canal. Bytown and Lower Bytown were surveyed on either side of the canal route and work began on construction of bridges across the Chaudière Falls to connect to Wright's Town (later Hull). Wright's Town with its thriving timber industries had a population of over 800. On the south side of the Ottawa River, there were only communities at Richmond Landing and a farm owned by Richard Sparks on what is now Sparks Street. Roads, including Rideau and Wellington Streets were laid out, the land cleared and lots leased with the condition that a house be built within 12 months. Lower Bytown grew more rapidly, populated by French Canadians who moved in to work on construction (Woods 1980:76). By 1835, there were 1300 inhabitants in the combined towns (Ross 1927:103). The city of Ottawa owes its origins to the construction of the Rideau Canal.

The contract to build the locks and buildings at Ottawa was awarded to Thomas McKay, a Montreal stonemason and Lachine Canal contractor. McKay's first contract was awarded in 1826 for clearing what became known as Entrance Valley (Price 1976:64). The contracts for the flight of eight locks and the Commissariat (a building which still stands at Ottawa Locks and houses the Bytown Museum and Parks Canada displays) were awarded to McKay in 1827 (Bush 1976:108) while another contractor built the Royal Engineers Building on the east side of the Canal opposite the Commissariat (Parent 1977:5).

Sometime between 1826 when McKay first started clearing the site and 1829 when it first appears on a map (Fig. 1), McKay built the "contractor's Smith Shop". This stone building was built on the west side of the canal and given that it would have been the contractor's main shop where tools and equipment would have been repaired, it was probably built closer to 1827 than 1829, making it one of the first buildings in Bytown. Not being a military building, very little information on this structure has survived, only a few maps and a couple of drawings showing mainly the roof (Fig. 2).

While work was progessing on the locks and the two military buildings, the Royal Sappers and Miners were building the first bridge in Bytown, the Sappers' Bridge (Ross 1927:82). Construction was completed in four months in December 1827. The single arched bridge was built of dressed ashlar with a rubble masonry core and was 18 feet wide, providing a 57 foot 1 1/4 inch horizontal clearance over the canal. The

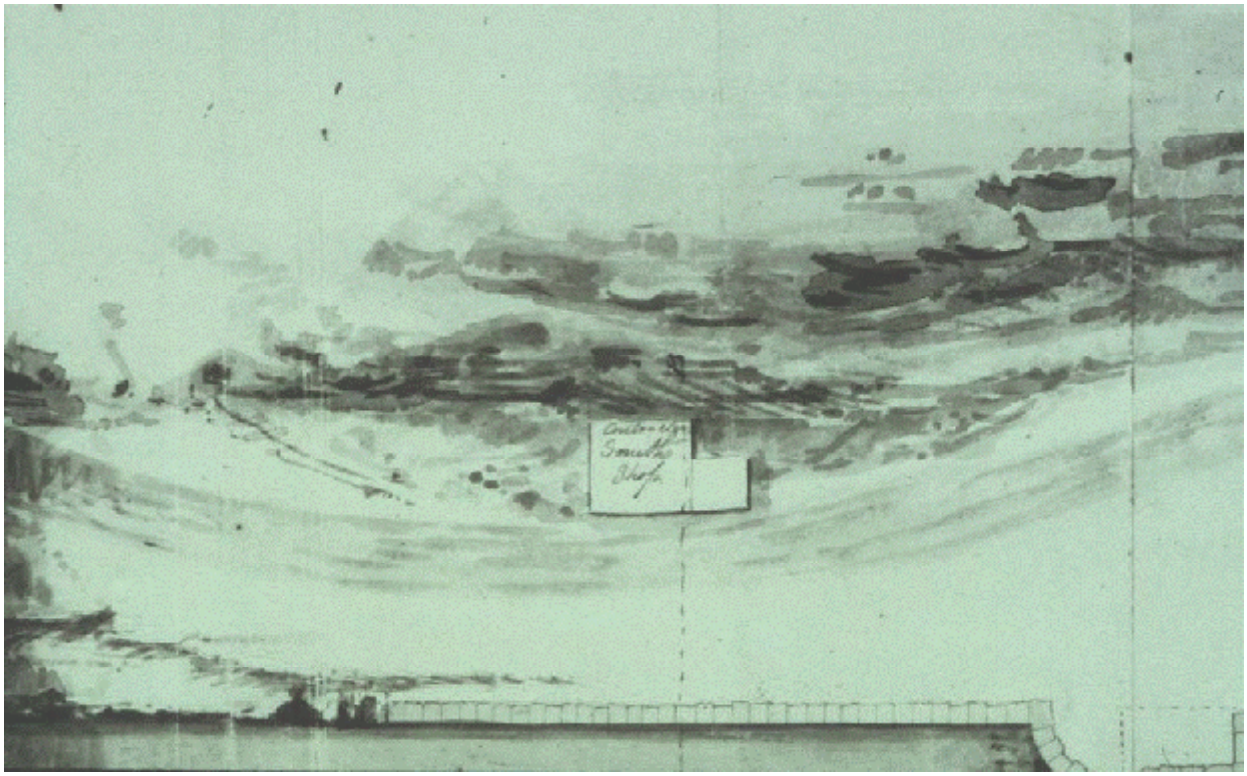

Figure 1. Detail from “Present State of [Works at the] First 8 Locks, Entrance Valley, Rideau Canal”, 24 Oct. 1829. The Sapper’s Bridge is on the left and the smithy to the right of the bridge, on the west side of the canal. (Public Archives of Canada; NMC 12892).

Figure 2. Lower Bytown from the Barrack Hill Near the head of the Eighth Lock and the ‘Sappers’ Bridge: 1845". The bump in the ground on the west side of the Sappers’ Bridge is the bedrock outcropping where the remains were located. The roof of the blacksmith shop is visible in the bottom centre of the drawing. The road to the locks went beneath a wooden ramp at the west (right) end of the Sappers’ Bridge masonry. (Thomas Burrowes Sketch # 11, Ontario Archives, Toronto).

road to the locks on the west side (Figs. 1, 3) went under the ramp up to the bridge masonry and north along the west side of the blacksmith shop.

The construction of the Rideau Canal was completed in 1832. Over the years Bytown became Ottawa and Ottawa became the Capital of Canada. The barracks were torn down on Barracks Hill, replaced by the Parliament Buildings. The beaver meadow at the top of Entrance Valley became turning basins, complete with wharves and warehouses, the west side later to be filled in and become the site of the National Arts Centre.

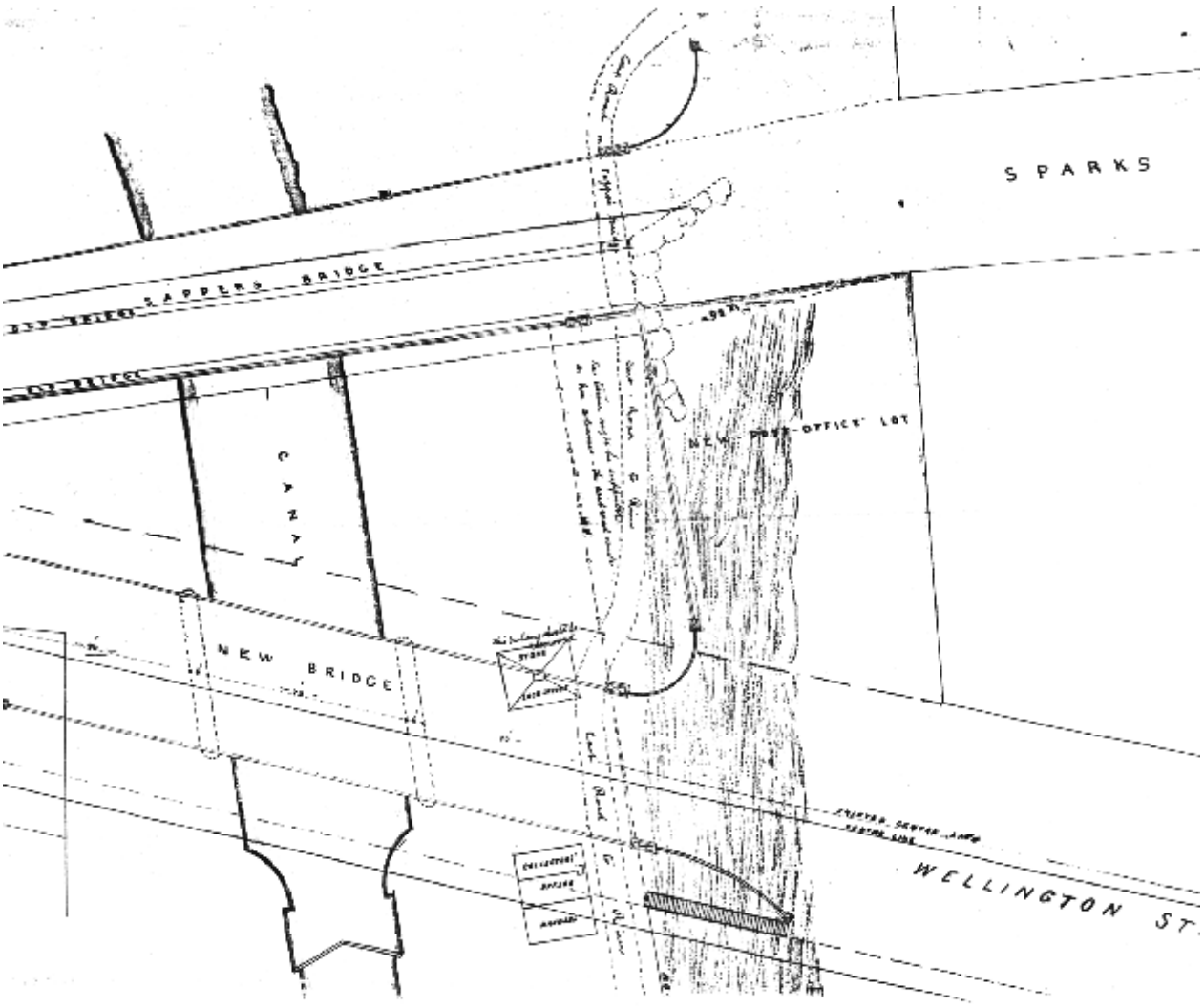

Figure 3. Detail from "Site Plan" Sapper-Dufferin Bridges, Plans [1885]. This is probably an earlier map as the Dufferin Bridge was built in 1872. The blacksmith shop, now called "Stone Lock Office" is labelled "this building should be removed". The road to the locks was located to the west of the smithy until ca. 1872. (Public Archives of Canada; NMC 30575).

A lot was changing at the south end of Ottawa Locks too and in order to understand the complexity of the archaeology at this site, a brief summary follows.

Between 1838 and 1850, the blacksmith shop continued to appear on plans and is labeled: "Storehouse for Lockmaster's tools, etc." "tool store" and "Lockhouse". Traffic in the growing city necessitated the construction of a second crossing of the Rideau and in 1872/3 the Dufferin Bridge (Fig. 3) was built, located

Figure 4. “Dufferin Bridge during the course of construction, ca. 1874”. The Sappers’ Bridge is also being widened and the new cut through its masonry for the road is not yet completed. (Public Archives of Canada; C493).

Figure 5. “Under Dufferin Bridge, Looking South” 1882. The new opening through Sappers’ Bridge masonry is visible on the left. (Public Archives of Canada, 9306).

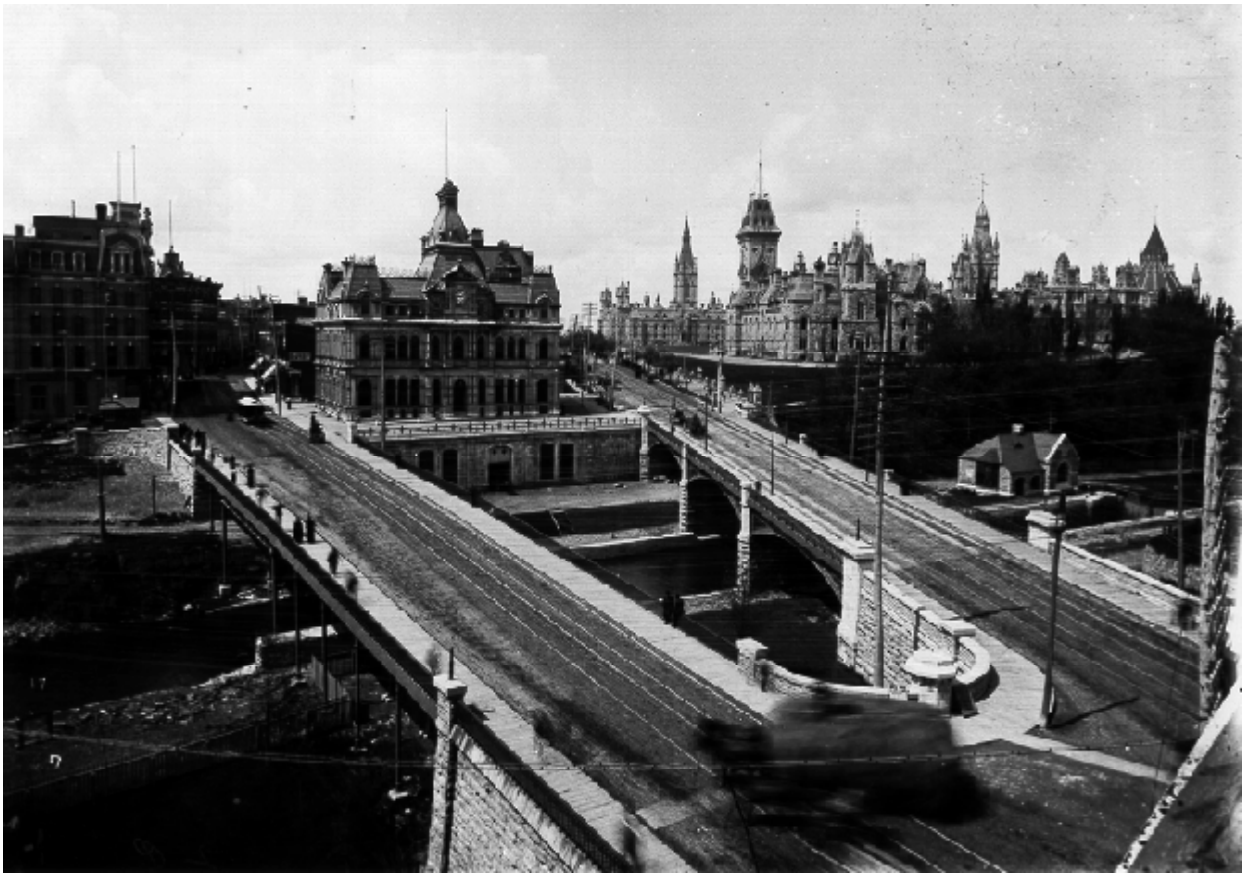

Figure 6 Parliament Buildings, Post Office...junction of Sappers' and Dufferin Bridges ca. 1890-95. (Public Archives of Canada; 8344).

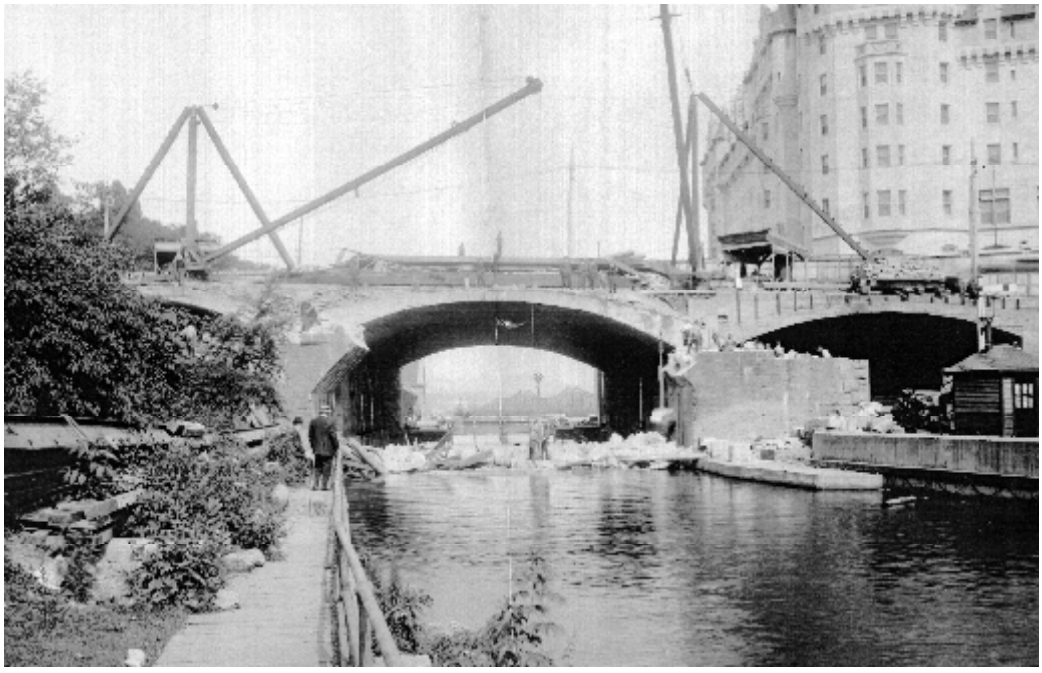

Figure 7 Demolition of the Sappers' Bridge. (Ottawa Historical Society; P799).

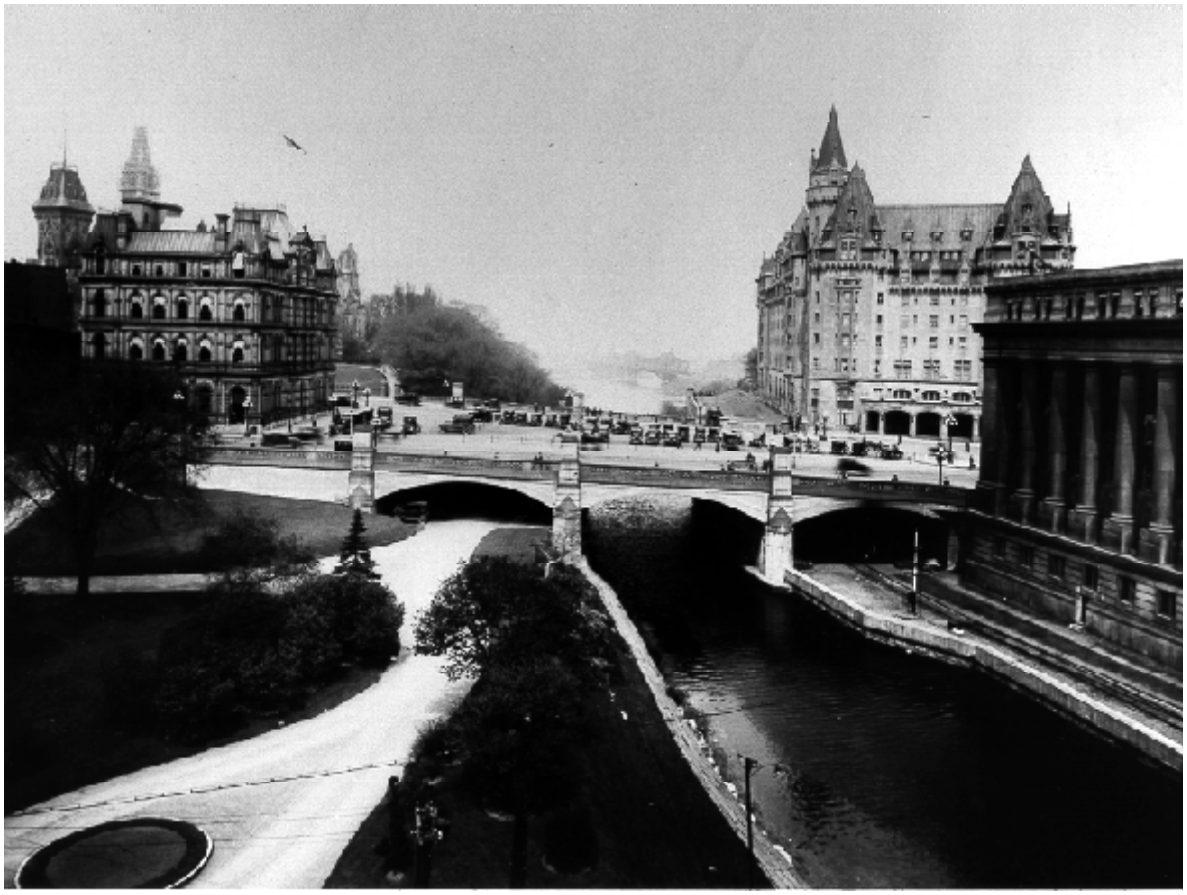

Figure 8. The new Plaza Bridge in 1930. (Public Archives of Canada; PA135162)

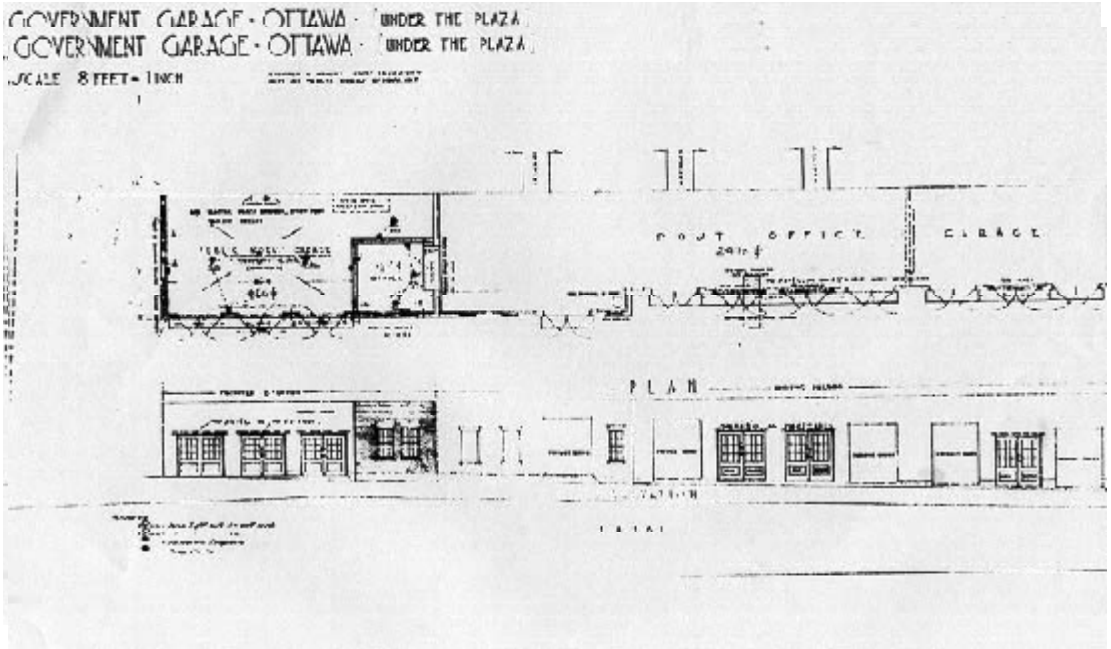

Figure 9. “Government Garage Ottawa [under the plaza]” showing the 1922 extension to the Post Office garage. The Public Works garages are at the south end, on top of the Sappers’ Bridge remains. (Public Archives of Canada; NMC 30606).

Figure 10. "Reconstruction of the Confederation Square area, and construction of the monument to the dead of the Great War, Ottawa, Ont. Aug. 31, 1938". (Public Archives of Canada; 135163).

just north of the Sappers' Bridge. The blacksmith shop appears on the plans for this new bridge and is labeled "Stone Lock Office" (Fig. 3) along with the handwritten note "this building should be removed". At the same time, the Sappers' Bridge was widened on its south side and an opening was cut through the masonry to form a second arch (Fig. 5), to provide road access to the west side of the canal as the new Post Office was built (Fig. 6) in the "vee" between the two bridges.

Major changes took place in 1911 and 1912. Union Station and the Chateau Laurier were built on the east side of the canal. The Sappers' Bridge was demolished (Fig. 7) and parts of the Dufferin Bridge were incorporated into the new, wider Plaza Bridge (Fig. 8). Underneath the west arch of the Plaza, garages and shops were built by Public Works and the Post Office, the first around 1922 (Fig. 9). The post office garage was extended in 1931. In 1938 the Post Office was torn down in to provide space for the National War Memorial (Fig. 10) and an extension was added to south side of Plaza Bridge beneath which was a Public Works warehouse. Between 1939 and 1951, more garages were added, then mezzanines over the garages and eventually the whole area converted to parking spaces (Public Archives of Canada NMC 30605-11).

Archaeological Research

By 1996 the Plaza Bridge was in bad shape; pieces were falling on boaters in the canal and on pedestrians too. That year Heritage Quest carried out a Stage 1 and 2 assessment of archaeological resources that might be impacted by future restoration of the Bridge, required by the transfer of the Federally owned bridge to the Regional Municipality of Ottawa Carleton (RMOC). This investigation

revealed some masonry at the south end of the west arch in the vicinity of the former Sappers' Bridge site but no evidence of a blacksmith shop (Daeschel 1996).

The following spring Parks Canada archaeologists began their investigations (funded by Public Works), as the land on which the Plaza Bridge sits is part of the Rideau Canal National Historic Site. By this time the previously unknown and wrongly dated map from Public Archives of Canada had been located, showing the location of the blacksmith shop in relation to the Sappers' Bridge. If the remains of the Sappers' Bridge could be located, it should be possible to locate the site of the smithy.

Figure 11. Planview of remains of the masonry of the 1872 widening of the Sappers' Bridge. (*Parks Canada photo by C. Phillips*; 34H-1390).

Beneath the west arch of the Plaza, investigations began with the removal of a layer of asphalt; then another layer of asphalt; and in some places a third layer. This was followed by pea gravel and then a concrete floor and as the backhoe crunched its way downward, a layer of bricks, underneath the concrete. This discovery resulted in the location of the shop and garage plans in the National Archives. Hopes for finding any early 19th century remains were fading. However, beneath all this, a large section of masonry was found at the south end of the Sappers' Bridge site, the base of its 1872 widening. Despite getting over 3 m below surface, almost down to the water level of the canal, in the blacksmith shop area, no traces were found (Marucci and Phillips 1997).

As the bridge transfer proceeded, it went with the decision that Parks Canada archaeologists should monitor all future construction excavations beneath the west arch. As part of the rehabilitation of the Plaza Bridge, it was planned to remove up to three metres of the fill which had been placed over the site since the1870s so that the 1912 portals along the canal which had been filled in and buried could be re-opened, making the site more attractive and safer for pedestrians. This fill probably included material from the construction and destruction of the Dufferin Bridge and the Post Office, and construction of the Plaza

Figure 12. Remains of the north face of the Sappers' Bridge on a bedrock outcropping as found in February, 1998. The four courses of dressed ashlar to the right remain and are now displayed *in situ*. (*Parks Canada photo by J.-P. Jérôme*; J-2/10)

Bridge. The fill had been added at the north end to raise the road grade up to the level of the bedrock outcrop at the south end which formed a cliff of two to three metres.

The excavations started in 1998, in February, in Ottawa! It was -20C as the hoe ram and backhoe began the removals. By the afternoon of the first day, a line of lime-mortared rock was exposed (and quickly froze) three metres below surface, exposing the entire west wall of the blacksmith shop. As the backhoe proceeded south up the west side, it approached the area where the bridge remains had been found in 1996 and 1997 and by the end of that first week a section of the north face of the Sappers' Bridge had been found, firmly mortared on to the bedrock just as it was built in 1827 (Fig. 11). The west side had been destroyed by the construction of the garages and later the Plaza Bridge. The section that had survived was also the piece which had been cut through around 1872 to permit access to Ottawa Locks and the Ottawa Post Office. The only record of this opening was a few photographs (Fig. 12), so it was very satisfying to locate the opening and the first course of masonry from this portal. Unfortunately the east side of the opening had to be recorded and then removed as the former road allowance was too narrow to permit access for modern emergency vehicles. The masonry from the 1872 Sappers' Bridge widening was again exposed revealing a section of the two parts of the Sappers' Bridge, interrupted in places by the concrete garage footings.

Two level one archaeological resources now existed in the middle of the construction zone. And the RMOC project manager was not tearing his hair out. He was as excited as the archaeologists, realizing the display potential of these sites underneath the newly rehabilitated bridge. The road was re-aligned, plans were altered and agreed on by three partners (RMOC, the National Capital Commission and Parks

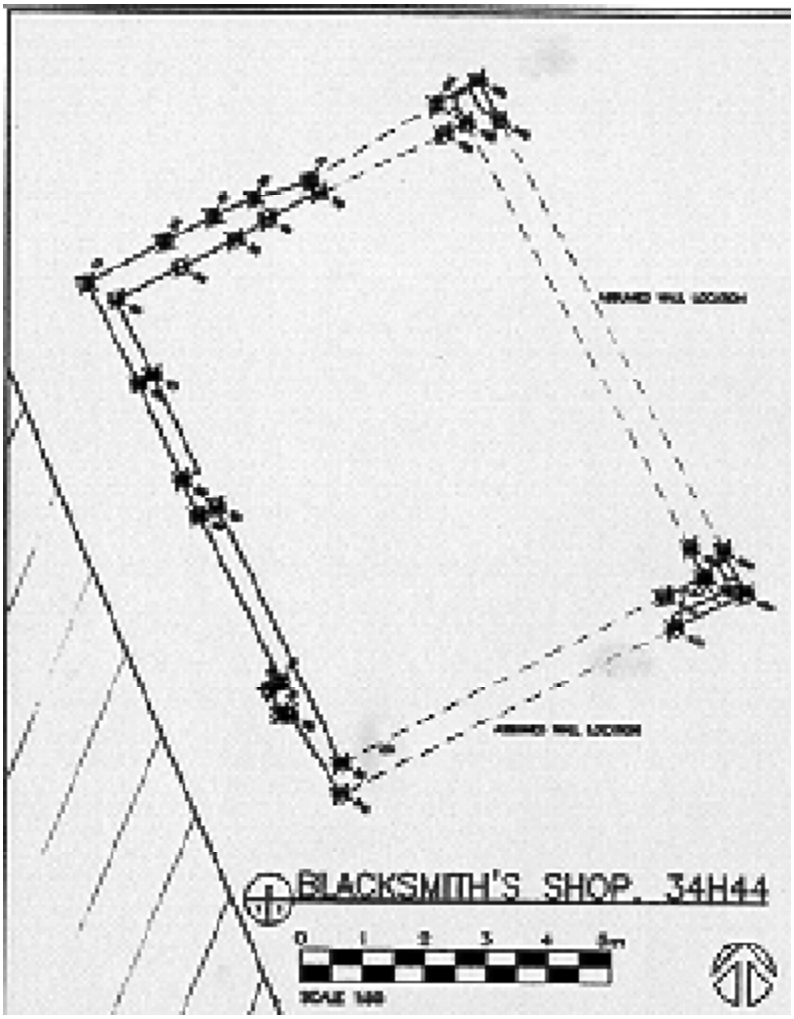

Figure 13. Detail from "Blacksmith shop - plan view". (*Parks Canada drawing by J.- P. Jérôme;* 711468-1)

Canada) and the smithy covered in sand and the bridge secured in a plywood sandbox while construction began on the Plaza Bridge.

By the end of the winter, the entire west wall of the blacksmith shop and the two corners on the east side had been located. The shop (Fig. 13) measured 7.4 m by 9.0 m, a large smithy with room to include two forges (Light, personal communication 2000). In the summer RMOC offered the funds to conduct further research at the site to determine how much of the walls remained and if anything was left of the floor. As the top of the masonry was already over two metres below the former surface, it was feared that only the footing, and hopefully some of the smithy floor would have survived. Two 1.5 m wide L-shaped units were opened (Fig. 14) in the northeast and southwest corners. The upper layers of rubble were similar to that found in the previously removed upper two metres, but this changed once the top of the blacksmith masonry was encountered, to lime mortar and large pieces of dressed limestone, most having one face whitewashed. These were the stones from the upper portions of the walls; when the shop was dismantled around 1872, everything had been shoved into the structure to fill it in. Five or six pallets of stone from the walls were removed from the two units and below this was a solid black layer of charcoal and slag mixed in the wet, sticky clay, the original floor of the smithy. Unfortunately by this depth the floor was at the same level as the water in the canal and all the iron artifacts are completely covered in concretions; conservation will be slow and expensive.


Figure 14. Excavation of the blacksmith shop. (*Parks Canada photo by C. Phillips*; 34H-1493T)

At the floor level of the original shop, over 1 m of the interior white-washed (Fig. 15) walls were found to remain. There was no footing; at

Figure 15. Interior north wall of the blacksmith shop. The whitewash stops approximately 30 cm above the blacksmith floor level. (*Parks Canada photo by J.-P. Jérôme*; K-26/11)

Figure 16. Clay pipe fragments from the blacksmith shop. (RAO-3283T).

50 cm thick on a clay base, today's Plaza Bridge engineers declared it solid and that a footing was not required. In Figure 15, the whitewash stops about 30 cm above the smithy floor. Despite 15 to 18 different layers excavated, there was no layer between the 1872 wall demolition debris and the 1832 smithy floor with material dating to the later use of the building as a "tool store" or "lock office". Possibly there was once a raised wooden floor to combat the damp and the interior walls were whitewashed down to this floor. However, no evidence of wood or flooring nails in either of the excavation units was found. Given the wet conditions, a wooden floor would have rotted; it is strange to think that it would have been removed prior to shoving in the walls.

Artifacts found on the smithy floor include: dark olive and clear container glass fragments, pane glass, smoking pipe fragments (Fig. 16), one marked "Murray/Glasgow"; bones, some of which are butchered, ceramics including: stoneware, coarse earthenware, creamware, pearlware, bone china and two Derbyshire inkwells, a large blob of pine tar and lots of very corroded iron which x-rays reveal include nails, chain links, fasteners and blacksmith waste. All the datable artifacts are from the first third of the 19th century. Where are the artifacts from the 1870 lock staff: were they incredibly tidy, or only using antiques?

Figure 17. Excavation of the blacksmith shop midden. (*Parks Canada photo by C. Phillips; 34H-1547T)*.

Figure 18. Pearlware bowls: 34H45Q4-1, 2. (RA0-3312T).

The process of smithing produces certain distinctive residues or by-products. Two of these microscopic residues, scale from the hammering of hot metal, and "welding balls" from the welding of hot metal, are always found in profusion on the working floor of a smithy. It is even possible to map the interior of a smithy using these residues, for the remains are more concentrated near the site of their production, the anvil (Light, personal communication 2000).

Accordingly, soil samples taken during the excavation yielded excellent results. Although the excavations were in the corners of the building away from the anvil, the samples nevertheless yielded significant quantities of both scale and welding balls. This means that it is possible to definitively identify the working floor of the original shop. It also implies strongly that if the working floor of the original shop is intact, any further excavation should allow for the mapping of the entire interior by means of the soil sampling technique as published by Stewart *et al*. in 1979. It appears probable that it would be possible in the future to reconstruct the layout of the interior of this shop.

Figure 19. West profile at the south edge of the midden. (*Parks Canada photo by C. Phillips; 34H-1565T).*

In the fall of 1998, a huge bore hole for water main installation was excavated south and east of the blacksmith shop. Just to ensure this construction did not get too close to the smithy, Parks Canada archaeologists were back to watch. The thin buried 1827 surface was clearly visible one metre below surface in the profile of this excavation. Then suddenly in the northwest corner the surface layer increased to over 30 cm thick. A soil sample was collected: slag and charcoal. The blacksmith midden had been located. And it would be right in the path of the service lines to be installed the length of the bridge. These archaeologists were trying the patience of Job. But funds were cheerfully given and archaeology resumed, this time in January.

Based on the known depth of the 1827 buried surface in the adjacent bore hole and smithy, one metre over the midden was carefully removed by backhoe. A service trench three metres by eight metres was necessary. With the top metre removed, a heated shelter was constructed over the site to thaw the soil and the archaeologists. In two weeks the midden was excavated (Fig. 17), mostly by hand. When time ran out

on the final three one metre square units, they were allowed to freeze and then carefully scooped up with a backhoe, thawed inside and the layers then screened. Located at the southeast corner of the shop, it is estimated that up to 1.5 m of the midden may have been lost by the borehole excavation. The deposit was thinning at the eastern edge of the excavation units and had thinned to just the buried surface at the northern end. If anything remains between the shop walls and the service trench, it is still undisturbed.

Shortly after the 1830s, a macadamized road surface had been prepared. Macadamized surfaces consist of a base of clay or sand over which broken stone is laid. At the midden, the macadamizing consisted of a 10 cm layer of local clay overlain by a 5 cm of flat stone spawl up to 10 cm in diameter. This sealed the blacksmith's midden from all later intrusion.

Twenty-four boxes of material from this midden were collected, including slag, samples of unspent charcoal, and artifacts including: glass, copper and shell buttons, one coin, pipe fragments, slate pencils, fish, bird and mammal bone and , stoneware and pearlware (Fig. 18) ceramics. As this surface is also at the canal water level, all of the iron is heavily corroded. Most of the material lay on the black organic buried surface, with some artifacts pressed into the sands and clays below. The ash, slag and charcoal deposit (Fig. 19) was 27 cm thick at the south end, tapering to less than 10 cm at the south.

Summary

In closing I would like to offer some tips learned during the project for conducting urban archaeology:

- Just because an urban area is built up, it doesn't mean there are no archaeological resources left.

- Working on a construction site, it helps to remember that time is money. Archaeologists have to be flexible with their hours and innovative in their techniques.

- Try to have had some previous excavations at the site so that layers can be quickly recognized and remember that soil is a different colour when its frozen.

- It really helps to find something right away. Fill everyone in on what's been found, right down to the labourers, so that everyone will look out for the resources. And then watch everything, to avoid sneak attacks from outside backhoe operators.
- Finally, only work with engineers who are history buffs. We were fortunate that the goal of the Plaza Bridge project was to restore and save historic elements of the bridge. Adding to that history with the location of the archaeological resources complemented the aims of the RMOC engineers.

Epilogue

Public Works and Government Serives Canada heritage masons removed the sand and the protective plywood from the remains of the Sappers' Bridge in April 2000. The remains are now stabilized and on display. The site of the blacksmith shop, which is still over a metre below the newly paved surface is outlined with paving stones awaiting a time when Parks Canada wins the lottery and continues excavation. A display is also planned by Parks Canada for this site, both of which will note the contribution of the RMOC to the

discovery, protection and stabilization of these level one resources. As you descend the new stairs which lead from the National War Memorial to the canal, two more pieces of the Rideau Canal's earliest history greet the visitor to this historic site. And back in the laboratories, Parks Canada's conservators are chipping away at the rust on the iron and the archeologists are working on the final report.

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