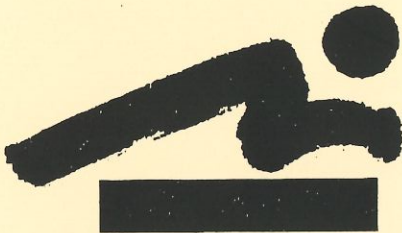
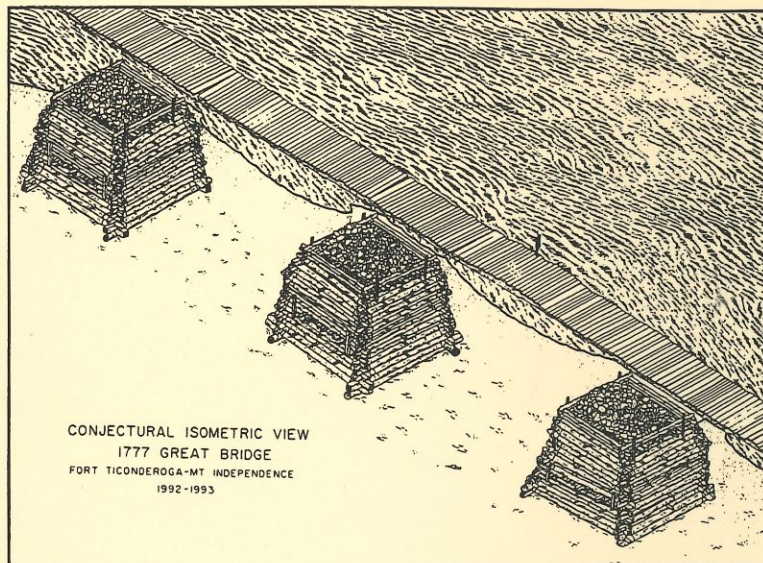


## The 1992 Mount Independence Phase One Underwater Archaeological Survey.



Lake Champlain  
Basin Program



May 1995

Prepared by Kevin Crisman

for  
Lake Champlain Management Conference

This demonstration report is the fourth in a series of reports prepared under the Lake Champlain Basin Program. Those in print are listed below.

***Lake Champlain Basin Program Demonstration Reports***

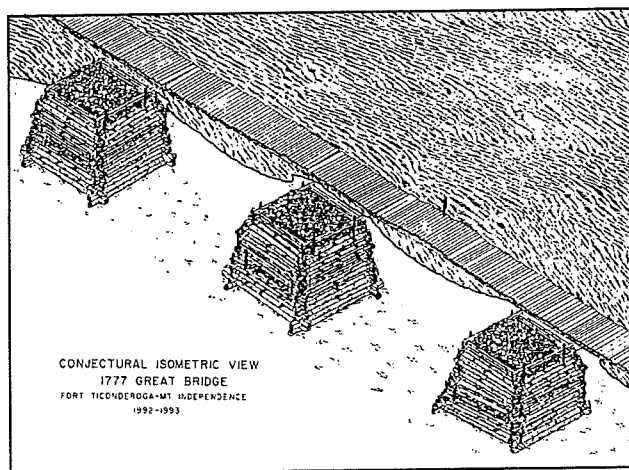
1. Case Study of the Town of Champlain, Yellow Wood Associates, October 1993.
2. (A) Demonstration of Local Economic/Other Community Impacts, Community Case Studies for Economic Plan Elements. The City of Vergennes, Vermont. Economic and Financial Consulting Associates, Inc. October 1993.  
(B) Demonstration of Local Economic/Other Community Impacts. Community Case Studies for Economic Plan Elements. Appendix. The City of Vergennes, Vermont. Economic and Financial Consulting Associates, Inc. October 1993.
3. The Archeology of the Farm Project. Improving Cultural Resource Protection on Agricultural Lands: A Vermont Example. Jack Rossen. May 1994.
4. (A) The 1992 Fort Ticonderoga-Mount Independence Submerged Cultural Resource Survey. Executive Summary. Arthur Cohn. May 1995.  
(B) The 1992 Mount Independence Phase One Underwater Archaeological Survey. Kevin Crisman. May 1995.  
(C) The Great Bridge "From Ticonderoga to Independant Point". Arthur Cohn. May 1995  
(D) Geophysical Reconnaissance in the Mount Independence Area: Larrabee's Point to Chipman Point. Patricia Manley, Roger Flood, Todd Hannahs. May 1995.  
(E) Ticonderoga's Floating Drawbridge; 1871-1920. Peter Barranco, Jr. May, 1995.  
(F) Bottom Morphology and Boundary Currents of Southern Lake Champlain. May 1995. Hollistir Hodson.

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# The 1992 Mount Independence Phase One Underwater Archaeological Survey.



Prepared by Kevin Crisman

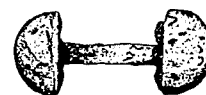




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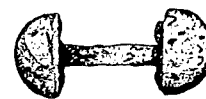
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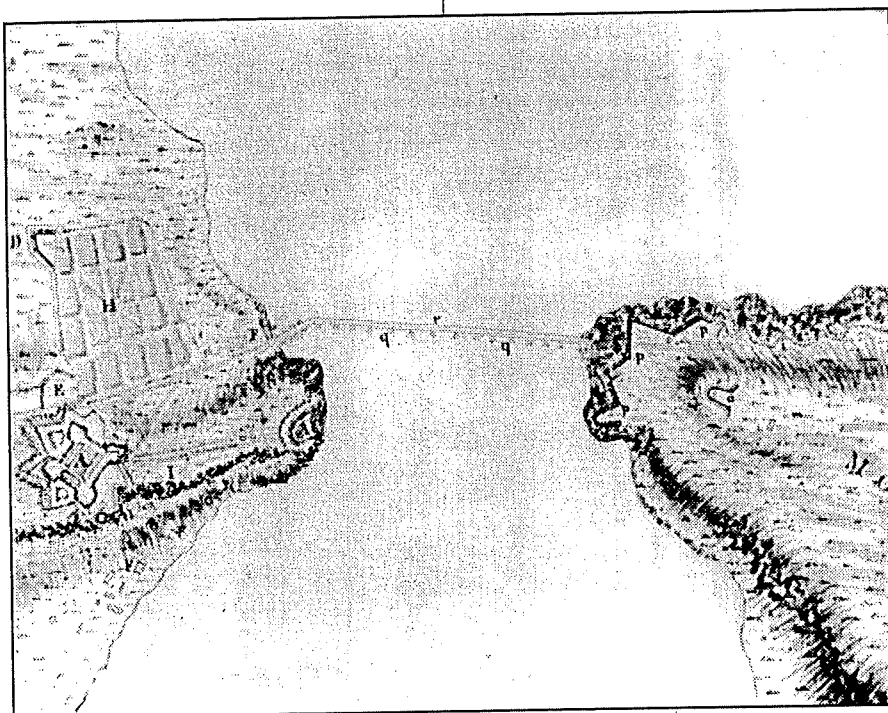
## Introduction

On the 8th and 9th of July, 1776 small groups of Continental Army officers tramped up and down the forested slopes of "Rattlesnake Hill" on the eastern shore of Lake Champlain, examining the hill's topography and soil, and gazing thoughtfully, even apprehensively, at the shining expanse of lake visible through the trees. A few days later much larger parties of soldiers entered the same woods, rolled up their sleeves, and went to work with axes, picks, and shovels, clearing trees, quarrying stone, building roads, and piling up the soil into lines of earthworks. In a few weeks' time Rattlesnake Hill was no longer recognizable as its old self: its bald, stump-ridden sides supported barracks, storehouses, magazines, and a hospital; row upon row of earthwork fortifications bristled with cannon, mortars, and the muskets of its defenders. Even the name had changed, for Rattlesnake Hill was now "Mount Independence," a symbol of the rebelling colonies' desire to free themselves of British rule.<sup>1</sup>

For the next fifteen months Mount Independence and an older fortification on the opposite shore of the lake, Ticonderoga, were part of one of the pivotal events in the War of the American Revolution: the British invasion of the rebellious colonies via Lake Champlain.

Throughout the remaining months of 1776 and on into the first half of 1777 the rebels worked to make their defenses impregnable by adding new breastworks and new batteries. Engineer Jeduthan Baldwin built an enormous floating bridge across the lake to improve communication and block the passage of British ships. The bridge extended nearly 1800 feet (548.64 m.) and was anchored by 22 timber-and-stone caissons (Figure 1). The fortifications may have appeared formidable on the outside, but there was one fatal flaw: by the summer of 1777 they were seriously undermanned.

**Figure 1.**  
Wintersmith Map of Fort  
Ticonderoga, Mount Independence, and the Floating "Great  
Bridge" Across Lake Champlain.  
Courtesy of the Fort Ticonderoga  
Museum.





On the night of July 5-6, 1777, the American Army on Lake Champlain hastily decamped from its carefully-prepared positions and fled southward, abandoning everything to a superior British force led by General John Burgoyne. The bridge was quickly severed by the invaders, who then raced southward in pursuit of the rebels. It was a short-lived triumph for Burgoyne: his army was surrounded and captured at Saratoga in October. The British rear-guard at Mount Independence and Ticonderoga retreated back to Canada that fall, but not before demolishing both fortifications, disposing of ordnance, munitions, tools, and other stores in the lake, and burning the tops of the bridge caissons to prevent their re-use. The fifteen months between the initial occupation of Mount Independence and its final destruction witnessed the height of the struggle for North America; fighting would continue for four more years after 1777, but never again would Britain have such an opportunity to subdue its rebellious colonies.

Mount Independence and the waters surrounding its shores still bear the scars and wreckage left in the wake of the passing armies. On land hummocks, ridges, and lines of stone show where the old defensive works were placed and buildings once stood; under the water, forgotten for over two centuries, lie the remnants of the "Great Bridge" and equipment of war dumped by the retreating British Army. This is perhaps the most pristine Revolutionary War-era archaeological site in North America, for the landscape has seen little disturbance since 1777 other than limited farming and occasional pot-holing by relic hunters. Murky waters and a silty bottom have likewise protected the structures and materials deposited in the lake during the war.

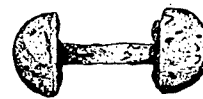
At Mount Independence archaeologists have an unparalleled opportunity to examine a dramatic moment in time, a moment when the fate of a new nation hung in the balance. Recent research on land and under the water has greatly expanded our knowledge of the activities and possessions of the people who built, occupied, and destroyed the fortifications at Mount Independence in 1776 and 1777; it has certainly expanded our understanding of the difficult living conditions they experienced.<sup>2</sup> The following pages describe one facet of the recent archaeological work, the preliminary survey of the lake floor by divers in July of 1992.

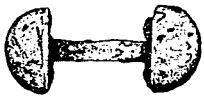
## Project Objectives

The Lake Champlain Maritime Museum's phase I diver survey of the waters surrounding the northern end of Mount Independence was essentially a continuation of both the initial survey dives made in this area by the Champlain Maritime Society and the Vermont Division for Historic Preservation in 1983, and the sonar and magnetometer surveys conducted by the Maritime Museum in May of 1992. The objectives of the phase I diver survey were basic, but necessary to further research and management of the site; simply stated, the plan was to determine the nature and extent of all archaeological materials and features off the northern end of Mount Independence (Figure 2).

The specific goals of the diver verification and mapping phase of the project, undertaken between July 6 and July 17, 1992, were as follows:

1. Evaluate and map all significant sonar and magnetometer targets from the May, 1992 electronic instrument survey. This would consist primarily of Feature 1, the cannon and mortar bomb cluster found off the northwest shore.
2. Systematically survey the near-shore lakebottom off Mount Independence's northern end, employing divers equipped with hand-held metal detectors, or with divers conducting visual and tactile examinations of the lakebottom.
3. Create a detailed, accurate base map of the Mount Independence north shore area with the aid of transits and measuring tapes.
4. Establish datum points along the north shore of Mount Independence and triangulate the locations of all underwater finds and features. Triangulation was to be accomplished by using transits to sight the positions of a stadia rod or buoys placed over underwater artifacts or features.
5. Create detailed, accurate, scale plans of individual underwater features, precisely locating the relative positions of all objects within the boundaries of features.
6. Temporarily recover artifacts (after mapping) for preliminary cataloguing (artifacts recording was to include measurements, descriptions, drawings, and photographs). Because the Maritime Museum was not prepared to conserve these objects in 1992, all finds were to be re-deposited in a secure location on the lakebottom at the conclusion of the cataloguing process.
7. Locate, examine, and evaluate the structural stability and general condition of the approximately twenty caissons remaining on the





bottom of the lake from the 1777 "Great Bridge." The positions of caissons were to be determined by placing buoys on caisson corners and triangulating the buoys from shoreline datum points, in order to create an accurate plan showing the locations of caissons on the lakebottom.

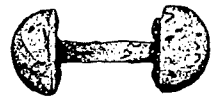
8. Select one well-preserved and relatively exposed caisson for thorough measurements, to permit the drafting of accurate elevation and plan views of a typical 1777 caisson structure.

9. Prepare a management plan for the archaeological resources in the waters off Mount Independence. This plan was to include specific recommendations for further archaeological fieldwork and research, and for protecting the site from accidental or intentional damage.



**Figure 2.**  
The Mount Independence -  
Fort Ticonderoga Area.  
Map by: Scott McLaughlin.

In view of the relatively limited area of the site, and the preliminary nature of the survey, these goals for the diver-survey phase of the project were considered sufficient to yield enough information for basic management and protection decisions. The list of 1992 research objectives outlined above was slightly modified from the original research plan. Our initial plan had called for intensive investigation of the caisson structures, with detailed mapping and measuring of all the bridge caissons extending between the Vermont and New York shores. The discovery of the cannon-mortar bomb feature (Feature 1) indicated that the near-shore lakebottom around Mount Independence contained a greater abundance of Revolutionary War-related artifacts than we had anticipated, and would require more study. We accordingly shifted our focus by allocating more survey and mapping time to the artifact clusters along the shore and intensively recording only one caisson located near the Vermont side of the lake.

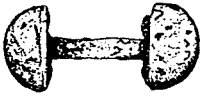


## Project Personnel, Logistics and Diving

The archaeological team for the 1992 Mount Independence phase I survey consisted of project directors Cohn and Crisman, divemaster John Butler, eight graduate students enrolled in a Texas A&M University/Institute of Nautical Archaeology field school, and four experienced Lake Champlain divers. The actual numbers of personnel on site each day varied (depending upon outside commitments or physical ailments such as earaches), but averaged between eight and ten.

The Lake Champlain Maritime Museum at Basin Harbor, Vermont served as the headquarters for the 1992 survey, and much of the preliminary organization of the project took place at this locale. To minimize the effort of transporting diving gear and archaeological equipment the daily field operations were staged from Larabees Point, Vermont, a lakeside community and ferryboat landing located in Shoreham, Vermont, about one mile north of Mount Independence. All tools and equipment were securely stored here every evening in a garage belonging to James Bullard; Mr. Bullard also permitted us to set up a high-pressure air compressor in the garage for filling empty scuba tanks. The project's two inflatable diving boats were moored every night alongside a wharf belonging to Mahlon Teachout, and all equipment loading and unloading took place from this wharf.

During each day of field operations a temporary base was set up on the north shore of Mount Independence where all equipment was unloaded from the boats after the commute from Larabees Point and crew members prepared for



their tasks. Due to the extremely slippery conditions along the smooth bedrock shore at the northernmost end of Mount Independence a shingle beach immediately to the south of the 'masting rock' was selected for the temporary base.

Crew members divided their time between three primary tasks during the two-week 1992 project: operating transits and mapping the shoreline, recording features and surveying under the water, and monitoring divers and general site activity from the boats. During the course of each day's diving and recording most personnel shifted between these tasks depending upon their place in the diving schedule and upon the day's objectives. Efficient operation of the transits was necessary for accurate mapping of all finds on the site. Triangulation of buoys or stadia rods placed over underwater finds was accomplished by taking bearings with a transit placed over fixed points on the shore (datum points). A minimum of three datum points were required to triangulate offshore objects, and the points were spaced about 150 feet apart from one another to provide the highest level of accuracy. The three points were referenced to a permanent survey marker on Mount Independence, in this case a U.S. Geological Survey benchmark located alongside the Daughters of the American Revolution monument on the plateau above the north shore (see Appendix A).

During the first week only one transit was available, which greatly slowed the work, as it was necessary to constantly move the transit between the three datum points to shoot new bearings. The acquisition of a second transit during the final week of the project greatly increased our efficiency. Hand-held VHF radios were used by transit operators and personnel stationed in boats to coordinate the triangulation of buoys and ensure that bearings and feature numbers matched when the time came to prepare our site maps.

The special diving conditions on the site called for a modification of standard diving procedures. Specifically, the low to non-existent visibility in the waters over the site precluded the employment of two-person dive teams or 'buddy teams.' We knew from long experience in low-visibility waters that two people trying to work in close proximity ran the risk of getting entangled or inadvertently hindering mapping and survey operations. The safety factor that a two-person team normally represents in a diving project is essentially negated by murky conditions. Instead, divers were sent down singly to accomplish their objectives, and one or more 'bubble-watchers' in the boats moored nearby monitored the activity of each diver. In the shallow waters we encountered around Mount Independence this system proved to be safe and effective; however, it should be noted that the divers we employed to work under these conditions all had a high level of experience, skill, and confidence.

The surveying and recording tools used by the divers to locate and measure underwater features were simple but more than adequate for the purposes of the project. Divers searching the bottom for finds or features generally limited the amount of recording equipment that they carried, since it tended to hinder movement. Survey divers conducting systematic sweeps of the bottom usually carried a weight with an attached line and buoy to mark finds; divers following pre-positioned transect tapes along the bottom did not require any recording equipment at all. Discoveries were initially noted down relying on the memory of the discoverer, or upon observations made by the diver and written down by a shore- or boat-based survey assistant. If the find was deemed significant a diver would go back to the artifact or feature with the necessary equipment and record its provenience in greater detail.

Underwater measurements and sketches were made with mechanical pencils on plastic drafting film attached to a clipboard; rulers, yardsticks, and 50-foot reel tapes were used to obtain dimensions and distances. Measuring tended to be a lengthy process due to the poor visibility, but the shallow depths permitted extended dives. Flashlights were used by some divers to see the clipboard and read the tape or ruler while they worked. We also experimented with photographs and video-recording during the 1992 project; video footage of the sample caisson was of limited use in analyzing this structure, but photographs taken of the cannon and mortar bombs (Feature 1) were so blurred and indistinct due to the cloudy waters that they were useful only for illustrating the working conditions in this part of the lake.

The twin tasks of "bubble watching" and boat handling were usually carried out by project personnel who were between dives. Besides monitoring the location and respiration of divers, those on boat duty also assisted divers by passing along equipment or writing down observations, by serving as a communications link with transit operators on shore, and by mooring close to the divers and protecting them from marauding boaters (on a number of occasions fishermen ignored the 'diver down' flags and motored close to submerged divers; one fisherman actually used the bubbles of a diver as a target while casting with a lure).





## Project Chronology and Procedure

The 1992 Mount Independence Project began on Monday, July 6 with a day of equipment preparation and the transportation of boats and gear to the mooring and storage areas at Larrabee's Point. On the following day final preparation of diving and measuring gear was completed in the morning and the afternoon was spent on site, establishing datum points, mapping the shoreline for a base map, and relocating both the well-preserved caisson near the Vermont side of the lake and the cannon-mortar bomb feature a short distance off the Mount Independence shore. For the purposes of our surveying work we divided the flat bedrock shoreline of the study area into two sections, the 'north shore' and the 'northwest shore,' with the dividing line between them being the point or elbow along the shore where the orientation of the shore changed slightly (Figures 3 and 4).

Full-scale archaeological study got underway on the morning of Wednesday, July 8. Four divers were assigned the task of mapping the caisson for the duration of the first week, two divers began the mapping of Feature 1, two personnel continued mapping the shoreline, and one diver conducted an inspection of the lakebottom in the zone between the caisson and north shore (a small collection of bar shot was encountered in this area during the 1983 survey and left in situ).

The diver inspecting the lakebottom inshore of the caisson quickly relocated the bar shot found in 1983 (this find was labelled 'Feature 2'), and, nearby, an iron-bladed shovel lying atop a rock ('Feature 4'). Both Features 2 and 4 lay at a depth of eight to ten feet (2.44-3 m.) near the top of the "dropoff zone," where the near-shore, rock-and-mud bottom slopes down to a depth of 20 to 25 feet (6.09-7.62 m.) and the flat, soft-mud plain that characterizes the central channel (Figure 2). A sweep of the area between Feature 4 and Caisson 2 also revealed a collection of five heavy timbers jammed upright into the bottom like dock pilings. Although the timbers were highly eroded, in both their dimensions and appearance they resembled timbers on the caissons, and we concluded that they were probably associated with the 'Great Bridge' structure. The upright timbers were labelled 'Feature 5'.

On Thursday, July 9 the team was joined by Jonathan Eddy and Ronald Plouffe, who brought with them hand-held metal detectors; their equipment and expertise were put to work in a systematic survey of the northwest shore area that lay south of the Feature 1 cannon and mortar bombs. Parallel transects measuring 100 feet (30.48 m.) in length and five feet (1.52 m.) apart were extended



perpendicularly out from shore with measuring tapes, and Plouffe and Eddy swam along the tapes sweeping the bottom with their metal detectors. This survey technique was highly effective, quickly leading to the discovery of a collection of entrenching spades ('Feature 3') and a scatter of miscellaneous finds, including a felling axe, parts of a door lock, a bayonet, and musket parts (Figure 4). These small metal detectors were clearly the most effective tool for searching the bottom, since they could reveal buried or heavily-encrusted metal items, but unfortunately we had the use of them only for this one day.

Friday the 10th of July was a busy, productive day. The mapping of Feature 1 was completed, and two members of the field crew began a 100-foot (30.48 m.) transect survey north of Feature 1 (this was a continuation of the metal detector survey begun the day before, but it relied solely on the divers' vision and sense of touch). Features 2 and 4 were mapped and all of their related artifacts were recovered for study and cataloguing on shore (Figure 5; see Appendix B); at

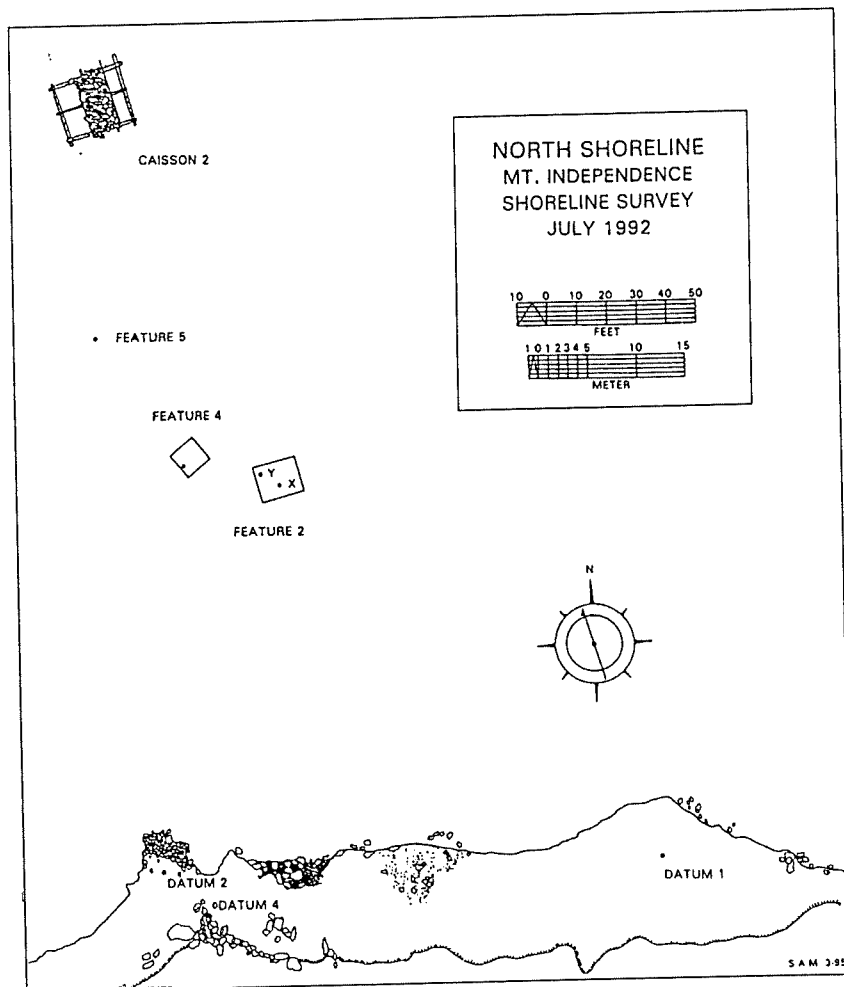
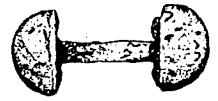


Figure 3.  
Mount Independence North  
Shoreline. Map by Curtis Hite and  
Scott McLaughlin.



the end of the day these finds were tagged and temporarily re-buried on the bottom at the base of the upright timbers of Feature 5. Feature 3, the collection of spades found the previous day, was recorded by tagging each spade, extending a 20-foot (6 m.) baseline tape through the feature and mapping the position of each artifact by trilateration, and then measuring the dimensions of every spade.

The second week of the project got off to a delayed start due to extremely windy weather on the morning of Monday, July 13. The day was not entirely lost, however, for the cancellation of full-scale field operations allowed additional work on the field notes of the previous week, as well as recording the four caisson timbers that had floated to the surface within the past year. An important objective that we hoped to complete during the project's second week was the location and preliminary mapping of all the caisson structures extending across the lake between Mount Independence and Fort Ticonderoga. This process was begun on the afternoon of July 13 when a small dive team located and buoyed Caissons 3 and 4.

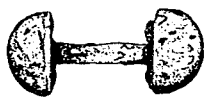
Tuesday, July 14 saw a continuation of the mapping of Great Bridge Caisson 2 and the transect survey of the 100-foot (30.48 m.) zone along the northwest shore. The shoreline transect survey yielded a complete and well-preserved musket (artifact # 01-016) lying only 25 feet (7.62 m.) offshore in 4-1/2 feet (1.37 m.) of water (see Figure 4). Bridge Caissons 5 and 6 were located and buoyed, and a preliminary assessment of these structures was begun.

Due to the nearly complete lack of visibility at the bottom of the channel where these caissons lay, we did not attempt to measure their overall dimensions; most of the mid-channel caissons were more deeply buried than Caisson 2, and all of them seemed to closely match the dimensions of Caisson 2. Divers relied almost entirely on their sense of touch to get an impression of the condition of each caisson, to determine how much of the structure was exposed above the lakebottom mud, and to locate and identify special features (many of the caissons had iron anchors lodged in their sides, the relics of over two centuries of lake shipping).

Immediately after surfacing from a caisson inspection each diver would sketch the general appearance of the structure and write down a detailed written description of what they encountered. We also attempted to place buoys on



**Figure 5.**  
Tina Erwin Cataloguing Bar Shot  
from Feature 2. All artifacts  
encountered during the 1992  
survey were photographed,  
measured and drawn, and then re-  
deposited on the bottom.  
Photo by K. Crisman.



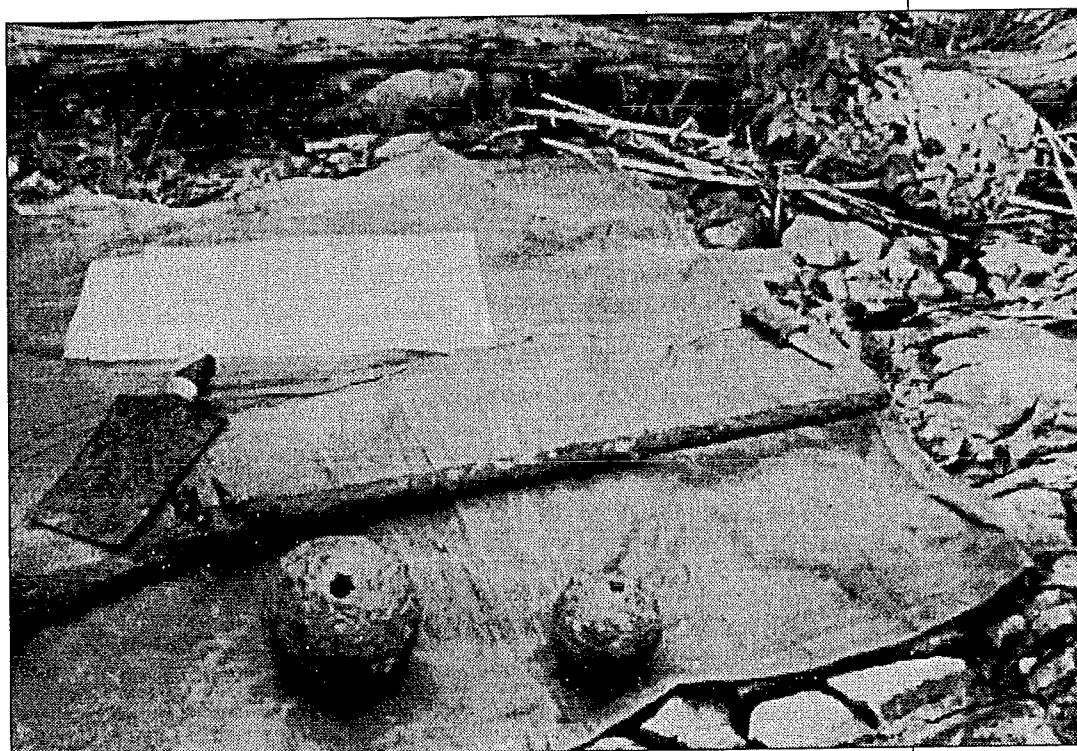
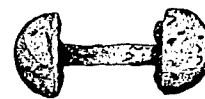
opposite corners of each caisson, and the buoys were then triangulated from our shore-based transits. In some instances it was impossible to find all the corners of each caisson under the thick lakebottom mud. Once we felt that we had completed a satisfactory assessment of a particular caisson, and after the survey buoys had been carefully triangulated from shore, we pulled the buoys and moved on to the next caisson. By the end of Tuesday, July 14, Caissons 3, 5, and 6 had all been inspected, although a follow-up examination of them was scheduled for the next day. Confusion over which buoys were marking each caisson resulted in two divers inspecting Caisson 5 and no inspection of Caisson 4, an error we did not discover until after the survey.

On the following day, Wednesday, July 15, the extensive recording of Caisson 2 was completed, along with the removal of wood samples from all caisson timbers for later identification and a test excavation at one corner of this caisson. The excavation revealed that approximately 6-1/2 feet (1.98 m.) of the structure lay beneath the mud. The location and examination of the other caissons continued, with the buoying of Caissons 7, 8, and 9. The visual-tactile northwest shore transect survey was completed, with no major finds other than a folding-stock anchor weighing approximately 75 lbs (34.02 kg.); the anchor resembled in size and general appearance a small folding-stock anchor found on the wreck of the canal schooner *General Butler* (which sank in 1876), and thus was about the appropriate weight for a canal boat or similarly-sized vessel. On this day representative examples of mortar bombs from Feature 1 and shovels from Feature 3 were recovered for study and recording, and the musket found the previous day was also brought ashore for examination (Figure 6). All artifacts were redeposited on the bottom at the end of the day.

On the final two days of the 1992 project all of the team's efforts were focused on the completion of the caisson survey. On the morning of Thursday, July 16, three members of the crew were dropped near the New York terminus of the "Great Bridge" to prepare a shoreline basemap and establish datum points for triangulating caissons on the New York side of the lake channel. The remainder of the team located and buoyed caissons 10 through 16 and began assessing their condition and general appearance.

On Friday, July 17, the last day of fieldwork, a survey team was again dropped off along the New York shore, while dive teams working out of the two inflatable completed the search for, and study of, the remaining caissons. One team worked from the channel toward shore, locating Caissons 17 and 19 (Caisson 18 could not be found, and may have been demolished or dredged as part of a channel-clearing operation). The other dive team worked from the New York

shore out, locating Caissons 22, 21, and 20. After all of the caissons had been buoyed, triangulated, and inspected by divers every buoy was recovered, survey flagging tape on both the New York and Vermont shores was removed, and all artifacts recovered for cataloguing during the week were removed from their temporary redeposition areas and securely reburied within Caisson 2.



**Figure 6.**  
**Mortar Bombs, a Musket, and a**  
**Spade Found Off the Northwest**  
**Shore. All of the iron objects were**  
**encrusted with a layer of iron**  
**corrosion product, but were**  
**otherwise in excellent condition.**  
**Photo by K. Crisman.**



## Northwest Shore Transect Survey

The systematic survey of the northwest shoreline at the north end of Mount Independence was undertaken with two objectives in mind: to determine the extent of the cannon and mortar bomb feature (Feature 1) and to establish if other surface scatters of ordnance, tools, and related military equipment existed in this vicinity. In order to be effective a survey of this type has to be carried out with some sort of systematic pattern to ensure that the coverage of the bottom is complete (or, if for some reason it was not complete, to ensure that the extent of the unsurveyed areas are precisely determined). For the purposes of this survey the northwest shore was defined as the waterfront between Datums 2 and 3 (see Figure 4).

There were a number of diver survey techniques available to us, but the approach that best fit the minimal visibility and bottom topography was to establish a series of baselines or transects extending perpendicularly out from shore. For baselines we used 100-foot (30.48 m.) fiberglass tapes, stretched taut and securely anchored at either end. The 100-foot length of the tape just reached to the edge of the northwest shore dropoff, where the rocky lakebottom sloped steeply down to the flat mud of the mid-lake channel. Artifacts discovered by divers could be quickly mapped by having the diver describe the find to a clipboard-equipped shoreside assistant, as well as the location of the find along the centerline tape and its position relative to the tape (north or south of the baseline). A 5-foot (1.52 m.) spacing for the transects was selected, because this guaranteed some degree of survey overlap with adjacent transects. Both ends of each transect were triangulated with our transits, shooting to a stadia rod along the shore and to a buoy tied to the offshore end of the baseline tape.

The first eight transects surveyed along the northwest shore extended southwest of Feature 1, and were labelled Transects 1 through 8. These transects were all inspected by divers equipped with hand-held metal detectors, which, as noted earlier, were particularly useful instruments for these conditions. The offshore ends of Transects 1 through 4 all extended over a scatter of nineteen entrenching spades, a collection that was subsequently mapped and defined as Feature 3 (Features 1 and 3 are discussed in detail later in this report). Other finds revealed by the metal detectors included, on Transect 2, an iron lock mechanism for a door, an iron felling axe (01-021), and one more entrenching spade. Transect 8 overlay what appeared to be the deteriorated parts of a musket and a bayonet. Of these finds only the axe was recovered for inspection in 1992.

The lakebottom in the vicinity of Transects 7 and 8 was transitioning from rock

to featureless sand. A quick inspection of the area south of Transect 8 suggested that without metal detectors (which, as noted earlier, were available to us only for one day) further searching in this direction was unlikely to yield any results. We therefore continued the northwest shore survey in the other direction, northeast of Feature 1 and Transect 1 (see Figure 4). The twenty-three transects completed in this direction were given letter designations (A through W), and were carried out by divers relying solely on their narrow range of vision (averaging 6 inches to 2 feet (15 to 60 cm.) and upon their sense of touch. This search technique was likely to reveal only those materials on or near the surface of the lakebottom. Despite the limitations of this type of survey, a surprising range of materials were encountered and recorded.

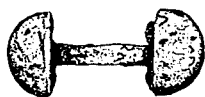
Transects A through D crossed over the cannon and mortar bombs of Feature 1; other Revolutionary War-related finds in this vicinity included one more shovel or spade at the outer end of Transect B and a small pile of spikes and a bayonet just inshore of Feature 1, along Transect D. A large iron wheel was also encountered slightly inshore of Feature 1 and initially identified as a piece of nineteenth or twentieth century debris; a re-examination of the wheel in 1993 showed that this was in fact the cast iron wheel from a gun carriage and was undoubtedly tossed into the lake around the same time as the cannon, mortar bombs, and spades. Similar wheels have been recovered from a Revolutionary War context at Fort Montgomery State Historic Site in the Hudson Highlands of New York.<sup>3</sup>

One other item was found during the northwest shore survey, on Transect K, that was unquestionably associated with the Revolutionary War: a complete flintlock musket (artifact # 01-016), lying 25 feet (7.62 m.) offshore in 4-1/2 feet (1.37 m.) of water (Figure 7). In spite of the exposed, shallow-water environment in which it lay for over 200 years, the musket was in good condition, with minor erosion of the wooden stock and a moderate build-up of iron corrosion products around the lock and barrel. The trigger guard was missing. This musket was recovered for cleaning and conservation in 1993, at which time the name "Pomeroy" was found stamped on the gunlock. The weapon (or at least its lock) was made at Seth Pomeroy's armory in Northampton, Massachusetts, and is similar



**Figure 7.**  
**The Moment of Discovery: Curtis Hite with the 'Pomeroy' Musket.**  
The musket lay exposed on the bedrock lakebottom in less than four feet of water.  
Photo by John Bratten.





in pattern to the French 1763-pattern Charleville musket (see Appendix B, the preliminary catalogue of artifacts, for a description and illustration of the musket).

Certain finds encountered during the northwest shore survey were obviously nineteenth or early twentieth century in origin. These included two legs from a cast-iron stove (Transect L), and an iron anchor with a folding stock (between Transects Q and R). The remainder of the finds, consisting of bricks and brick fragments, bits of leather, lengths of plank, a glass pane, and assorted pieces of scrap iron (most of which appeared to date to the nineteenth and twentieth centuries).

The 1992 northwest shore survey accomplished its primary objectives, which were to map the extent of the surface scatter of Revolutionary War artifacts in the vicinity of Features 1 and 3, and to determine if this stretch of lakebottom held any other surface clusters of eighteenth-century military equipment. The search here established that there were no other major exposed features, although it is certainly possible that other clusters of artifacts may lie buried beneath the rocks, mud, and sand that compose the bottom in this location.



## North Shore Survey

For the purposes of the 1992 survey the 'north shore' was defined as the waterfront between Datums 1 and 2 (see Figure 3). This area encompassed the eastern landing of the Revolutionary War 'Great Bridge,' and was clearly a zone of considerable activity between 1775 and 1777. Although the lakebottom off the north shore deserved systematic archaeological study, the discovery and mapping of Feature 1 and our previous commitment to the caisson study left little time for surveying in this vicinity. The composition of lakebottom off the north shore was also considerably softer and oozier than the bottom off the northwest shore, and it was clear from the start that hand-held metal detectors would be the key to finding most of the material buried in this vicinity.

Despite the limited attention given to this area in 1992, three probable Revolutionary War-related features were found and mapped off the north shore (Features 2, 4, and 5). These were all encountered during one dive on the first week of the project, when a general inspection of the bottom in area was carried out to determine the nature of the bottom and to locate any obvious artifactual material. Feature 2 consisted of a scatter of bar shot, a pickaxe head, two bottles, and some grape shot, Feature 4 was an iron shovel blade and two glass bottles, and Feature 5 was composed of five massive logs wedged upright in the bottom inshore of Caisson 2.

Features 2 and 4 were buoyed and triangulated, their artifacts were mapped on the bottom, and all finds were recovered for inspection and cataloguing. The dimensions and relative positions of the five logs of Feature 5 were recorded, and the timbers were used as a reference point for temporarily reburying artifacts at the end of the 1992 survey. A detailed discussion of the three features may be found in the following section of this report.

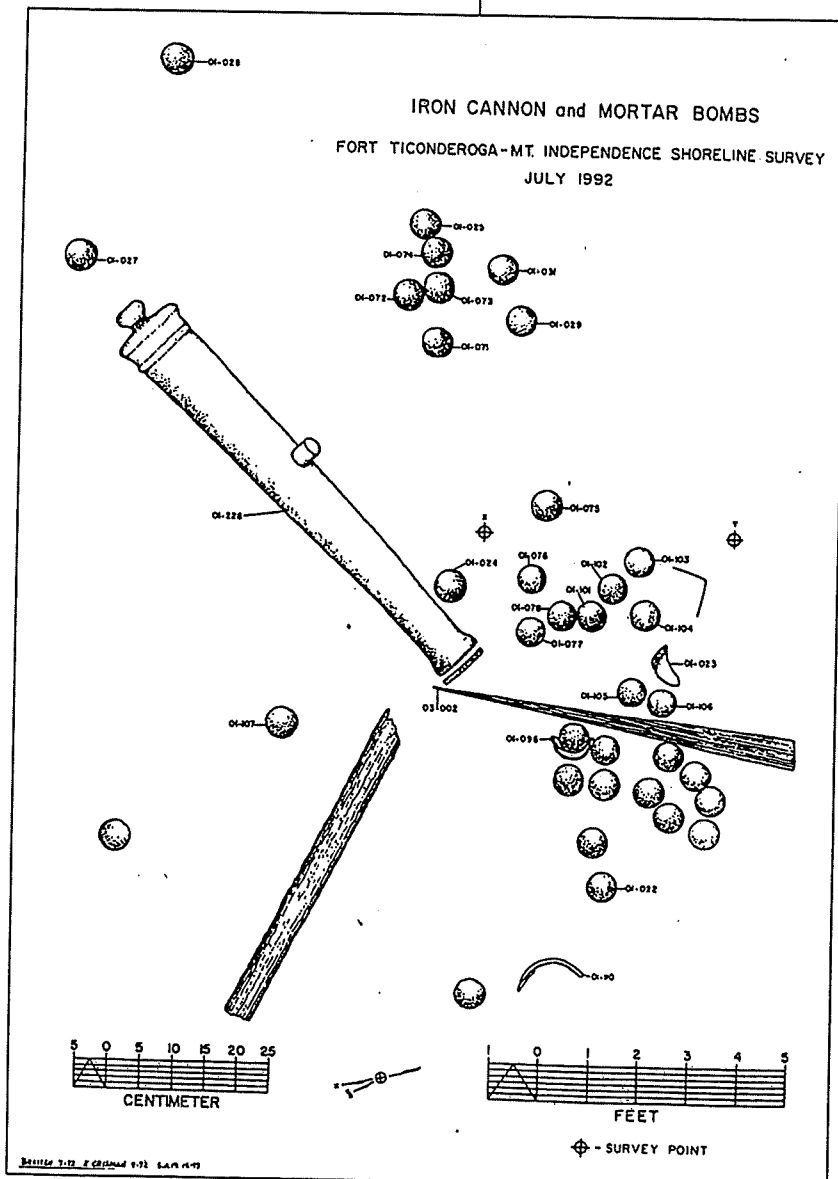




## 1992 Features

### Feature 1 - Iron Cannon and Mortar Bombs.

This feature consisted of an iron cannon and cast-iron mortar bombs, and was discovered in May, 1992, during the electronic instrument survey of the Mount Independence waterfront. The cannon and bombs registered as a substantial 'hit' on a towed magnetometer, and subsequent dives revealed the artifacts that composed the feature. The discovery of such a large and exposed mass of Revolutionary War-related material was surprising, for we had assumed that in spite of the poor visibility most obvious clusters of artifacts off Mount Independence had already been found and recovered by sport divers.



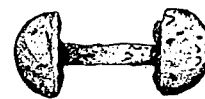
Prior to the start of the 1992 diver-survey project, the project directors spent a day relocating and inspecting this feature in order to determine how it should be mapped and measured. The lakebottom in the vicinity of the feature was of bedrock with pockets of mud, sand, and a scattering of large rocks; the water depth over the feature averaged about eight feet (2.43 m.). The cannon was found to be surrounded by a total of 34 cast-iron, 8-inch-diameter bombs (one additional bomb was found here in 1993). The surfaces of all bombs were covered with iron corrosion products, and we could not determine if they were open and empty, or still fused and filled with powder; every effort was made not to disturb the bombs until their status could be determined (Figure 8).

**Figure 8.**  
**Feature 1 - Iron Cannon and Mortar Bombs.** The cannon was heavily encrusted with iron corrosion product, and the preliminary underwater measurements of the breech and cascabel (shown here), do not accurately reflect the shape of these features. Plan by J. Bratten, K. Crisman, and S. McLaughlin.

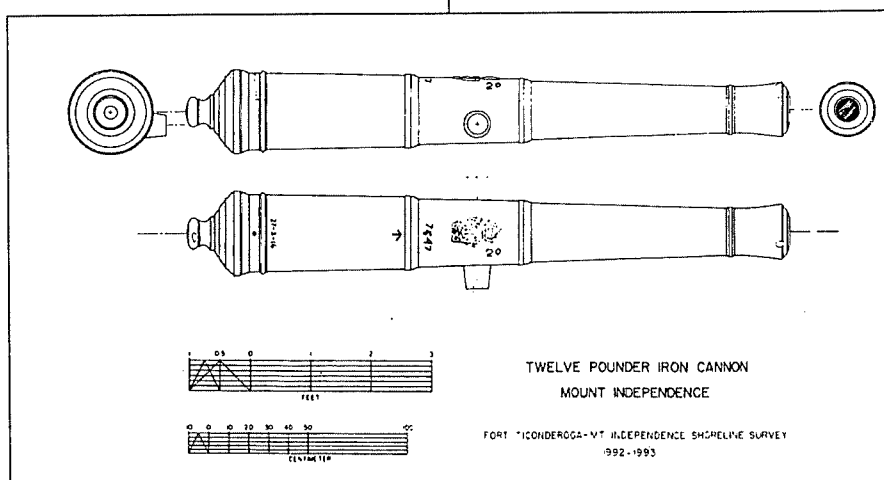
The position of the cannon could be easily plotted on our survey maps by placing a stadia rod at the breech and muzzle and triangulating the positions from shore. The mapping of the mortar bombs was accomplished by placing a grid measuring ten feet (3 m.) by five feet (1.52 m.), over the largest cluster of bombs (which lay adjacent to the cannon's muzzle). The position of every bomb, both within and without the grid, was triangulated with tapes attached to the corners of the grid, and then the location of the grid itself was measured relative to the cannon and by triangulating with our transits from shore. This approach to mapping worked very well in the murky water around the feature, and permitted the drafting of an accurate distribution map.

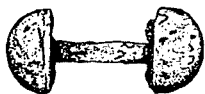
Preliminary measurements of the cannon were recorded, although the thick layer of iron corrosion products on the cannon's surface made it difficult to find details such as reinforcing rings, markings, or the touch hole. The gun was of cast iron, measured 9 feet, 4 inches (2.8448 m.) in overall length, had a maximum diameter at the breech of 17-1/2 inches (44.45 cm.), and a maximum diameter at the muzzle of 12-1/4 inches (31.11 cm.). The bore diameter was difficult to determine, due to the build-up of corrosion; we measured a bore of about 4-1/2 inches, which corresponded to the size of a 12-pounder cannon, but thought it possible that the bore may have originally been slightly larger, and that the gun was perhaps an 18-pounder. When the gun was recovered in 1993 it proved to be a 12-pounder (Figure 9). The gun was missing one of its trunnions, and could not have been mounted on a carriage; the removal of one or both trunnions was a common means of rendering a gun unusable when it had to be abandoned to the enemy.

One 8-inch mortar bomb was recovered for examination (artifact # 01-022). We intentionally selected a bomb that had an open fuse hole for our sample. The fuse hole on the shell was approximately 1-1/2 inches (3.81 cm.) in diameter; little else could be determined about the piece, since the surface was so heavily encrusted. Also recovered from Feature 1 were a cast-iron pot fragment (01-023) and a wedge of wood (03-002), possibly oak, that lay near the cannon's muzzle. The cannon, the other 33 bombs, two pieces of iron strap, and a log-like timber were left in situ for future study.



**Figure 9.**  
**Twelve Pounder Iron Cannon.** The cannon from Feature 1 after it was recovered and conserved in 1993. The cascabel, muzzle and surviving trunnion are marked by sledgehammer blows that were intended to break off pieces and thereby disable the weapon. The job was accomplished when the left trunnion was knocked off the gun tube. Plan by Fred Hocker and S. McLaughlin.





### Feature 2 - Bar Shot Scatter

This feature was discovered during a diver sweep off the northern shore of Mount Independence. The site lay 100 feet (30.48 m.) offshore, under approximately ten feet (3 m.) of water on the upper edge of the steeply-sloping dropoff into the central lake channel. The bottom here consisted of an uneven limestone bedrock, covered with a scatter of limestone rocks and small boulders, and coated over with four to twelve inches (10.16-30.48 cm.) of fine silts. The uppermost two inches (5.08 cm.) of silt was loose and 'oozy' in composition, while the lower layer of this material was relatively firm and compacted.

Feature 2 initially consisted of four iron bar shot of various sizes lying partially or fully buried in the muddy bottom (figure 10). Bar shot 01-001, an unusually large piece of ordnance possibly for a 24-pounder gun, was found adjacent to a large, flat boulder protruding from the mud. A buoy was placed on this shot, and the bottom around it was lightly probed by hand, revealing a smaller bar shot nearby (01-002), and then, about seven feet (2.13 m.) away, two addi-

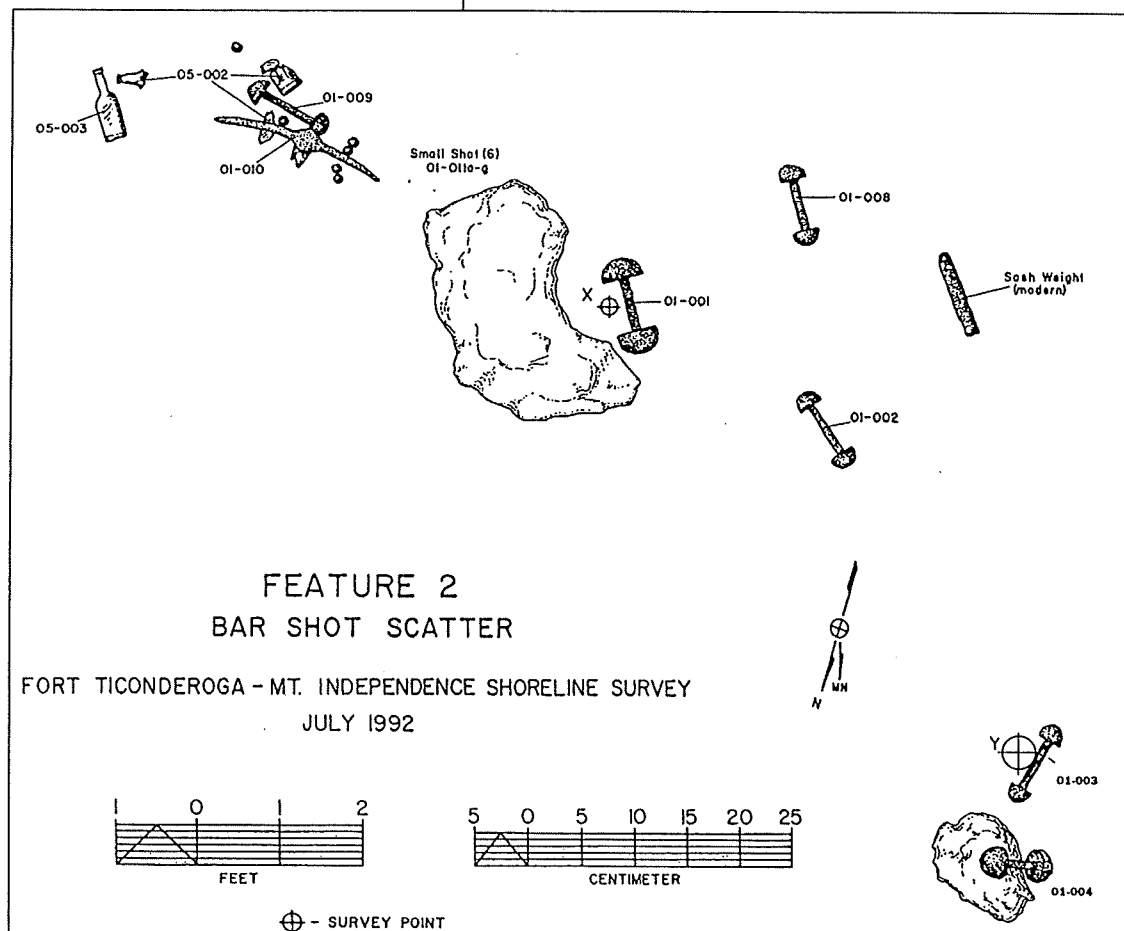


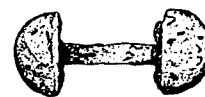
Figure 10.  
Feature 2 -  
Bar Shot Scatter.  
Plan by  
K. Crisman and  
S. McLaughlin.

tional shot (01-003 and 01-004). One of these two shot, 01-004, hung up on a large rock as it sank to the bottom, and was almost entirely exposed above the bottom (because it was not sealed off by the anaerobic mud this shot was heavily crusted over with iron corrosion product).

Subsequent probing around the feature yielded a bar shot buried under two inches (5.08 cm.) of mud (01-008). On the other side of the boulder from bar shot 01-001 a cluster of eighteenth-century artifacts was found under 4 to 6 inches (10.16-15.24 cm.) of silt. This contained one more bar shot (01-009), an iron pickaxe head with remnants of its wooden handle (01-010), six iron grapeshot (01-011), and two dark green alcohol bottles, one whole (05-003) and one shattered (05-002) (Figure 11). One additional find was made in the vicinity of shot 01-002 and 01-008; this was an iron window sash weight that was judged to be of more recent vintage (sash weights are often used as buoy weights or light anchors).

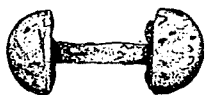
After the extent of the feature was defined by hand probing the relative locations of all finds were carefully sketched and measured. This took a while, due to the complete lack of visibility on the stirred-up bottom. The location of the feature was then plotted by triangulating the position of the buoy placed over shot 01-001 and a second buoy placed over shot 01-003, and the finds were recovered for study and recording. The sash weight was not recovered, and was left in the spot formerly occupied by bar shot 01-001.

The location of Feature 2, inshore of Caisson 2 and in alignment with the general run of the 'Great Bridge,' leaves little doubt that this material was thrown off the side of the bridge sometime in 1777. This feature is very likely the same one that was encountered in this area during the initial survey off Mount Independence in 1983.<sup>4</sup> At that time two bar shot were recovered for study and then re-deposited inside Caisson 2. These two 1983 shot were retrieved from the caisson in 1992, and entered into the artifact catalogue as shot 01-005 and 01-006 (for details of all the artifacts recovered from Feature 2 see Appendix B, the catalogue of finds from 1992).



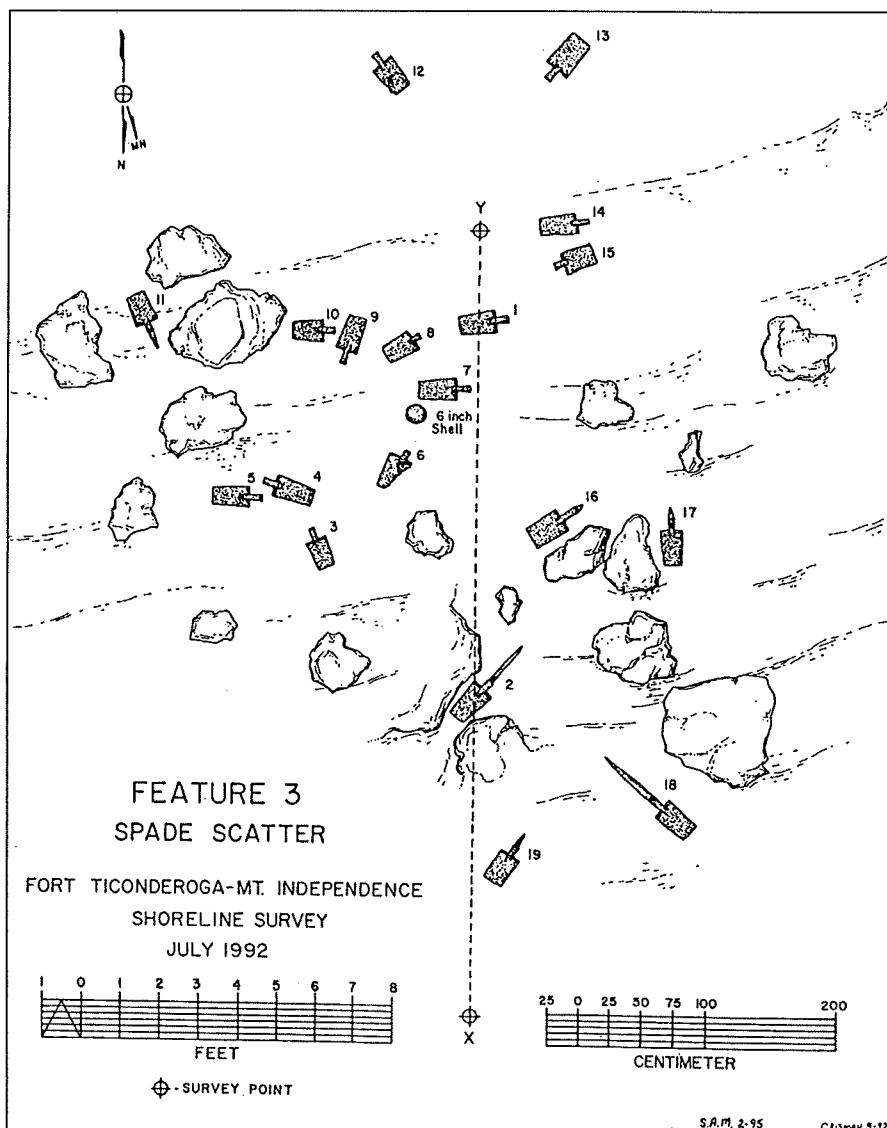
**Figure 11.**  
Dark Green Glass Alcohol Bottles from Features 2 and 4. Bottle 05-003 (left) is from Feature 2 and bottle 05-002 (right) is from Feature 4.  
Photo by K. Crisman.





### Feature 3 - Spade Scatter

This feature consisted of a scatter of 19 iron entrenching spades and a six-inch (15.24 cm.) mortar bomb contained within an area measuring about 20 feet (6.09 m.) in diameter (Figure 12). The spade feature lay 100 feet (30.48 m.) off the northwest shore of Mount Independence, under eight to twelve feet (2.43-3.65 m.) of water. The lake bottom in this vicinity sloped steeply down to the central lake channel, and was composed of outcropping limestone bedrock, limestone rocks and small boulders, with pockets of sand and silt. Feature 3 lay a distance of approximately ten feet (3.04 m.) northwest (and offshore) of Feature 1, and like the cannon and bombs, the spades of Feature 3 were mostly exposed upon the surface of the lake bottom.



**Figure 12.**  
**Feature 3 - Spade Scatter.** The scatter was located on a rocky, sloping bottom; spades 12 and 13 lay under eight feet of water, while spade 19 lay under twelve feet of water.  
Plan by K. Crisman and S. McLaughlin.

Feature 3 was found by a metal detector-equipped diver during the northwest shore transect survey. Once the general extent of the spade scatter was determined, a 20-foot (6.09 m.) baseline tape was placed on the bottom to serve as a mapping reference. Fiberglass measuring tapes were attached to the anchors at each end of the baseline tape, and the position of each find was determined by measuring its distance from each end of the baseline. Every spade within the feature was identified by tying a numbered length of plastic surveying tape to the socket, and the dimensions of the blade and socket of the spades were recorded at the same time as the baseline survey.

The iron blades of the spades were in excellent condition, considering their 215 years of immersion in the lake. The blades all measured between 9 and 12-1/2 inches (22.86-31.75 cm.) in length, and between 6-1/4 and 8 inches (15.87-20.32 cm.) in width across the top of the blade. Several of the spades still contained the deteriorated nubs of their wooden handles within the sockets, and two of them, spades number 2 and 18, had well-preserved lengths of the original handles. Spade #1 was recovered for study and was catalogued as artifact 01-018; the six-inch mortar bomb (01-020) was also recovered for further study (see Figure 6). The remaining spades were left in situ.

Eighteenth century documents and prints together confirm that wooden-handled iron spades were typically carried by armies for constructing defensive earthworks or for preparing siege works such as cannon emplacements and trenches.<sup>5</sup> The proximity of the Feature 3 spade scatter to Feature 1 suggests that the cannon, bombs, and spades were all thrown off the same structure, perhaps a dock or a section of the floating bridge, at about the same time. The limited extent of the spade scatter further indicates that they were probably tossed in the water in a mass, perhaps as armloads of entrenching tools carried by one or two men. The good preservation of the handles of spades #2 and #18 may have resulted from their being sunk in slightly deeper water than most of the other spades.

#### Feature 4 - Shovel and Bottles

Feature 4 was encountered off the north shore on July 8, during the same survey dive that yielded Feature 2. The single artifact discovered at this time was an round-bladed iron shovel (01-007); the shovel lay atop a rock and was heavily encrusted with iron corrosion product. The lakebottom in the vicinity of Feature 4 consisted of numerous limestone boulders and outcrops of limestone bedrock, with the spaces between them filled by several inches (or several feet) of compact fine silts. The feature lay along the dropoff to the deeper part of the lake channel, and like Feature 2 was in line with the path of the 'Great Bridge.'

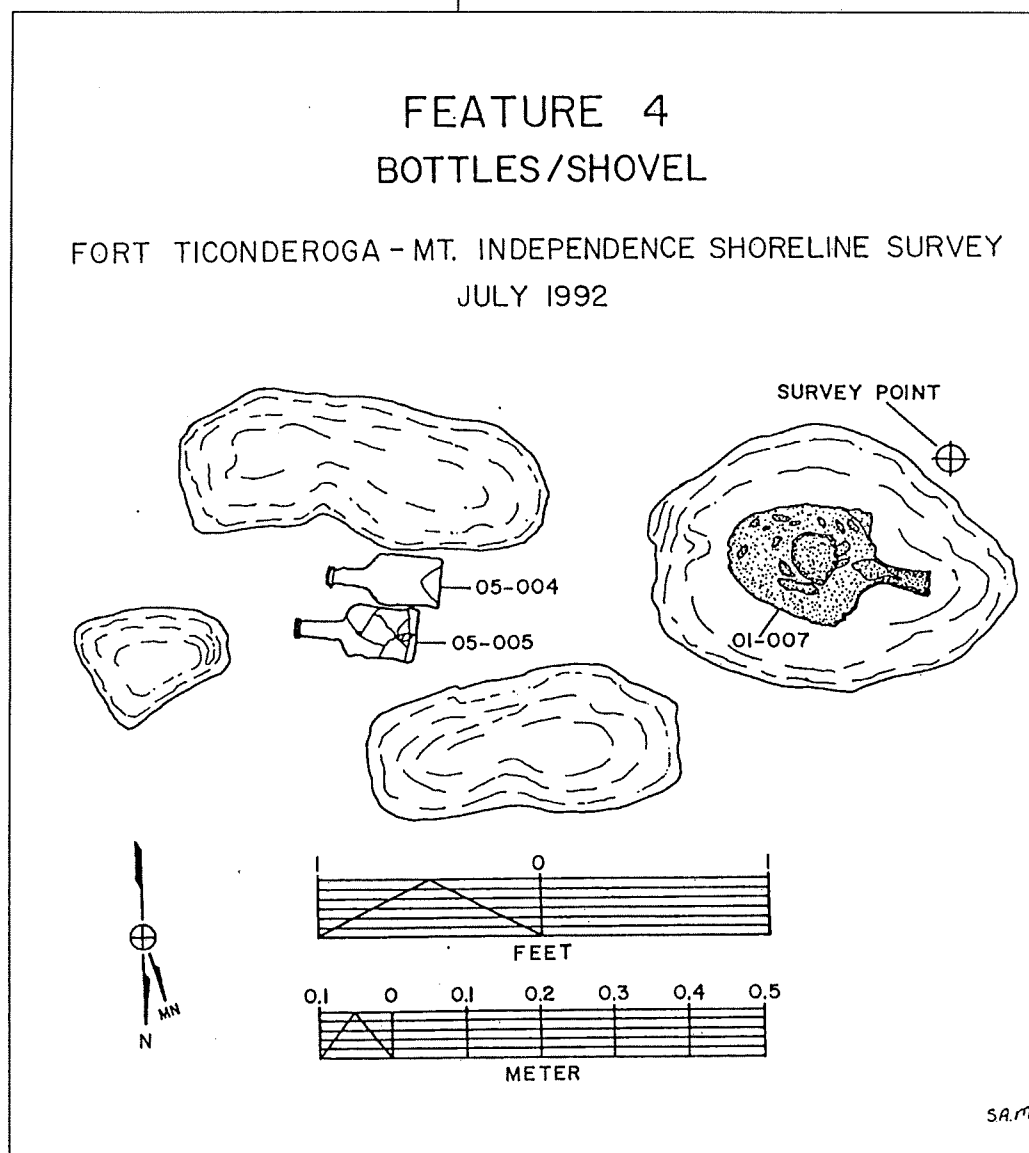




During a subsequent dive on July 10 to record the shovel's provenience and then recover it for study, two dark-green-glass alcohol bottles were discovered three feet (.91 m.) east of the shovel (figure 13). They lay side-by-side under a particularly deep pocket of silt, between several large boulders. One of the bottles, 05-004, was intact (see Figure 11), while the other, 05-005, was shattered but essentially complete, indicating that it probably was damaged after coming to rest on the bottom. All three artifacts were recovered for inspection.

The discovery of the bottles was the result of a random probing in the bottom sediments, and suggests that considerably more material lies in this area, between the boulders and under the silt. Due to the time constraints of the

project we were unable to examine Feature 4 in more detail.



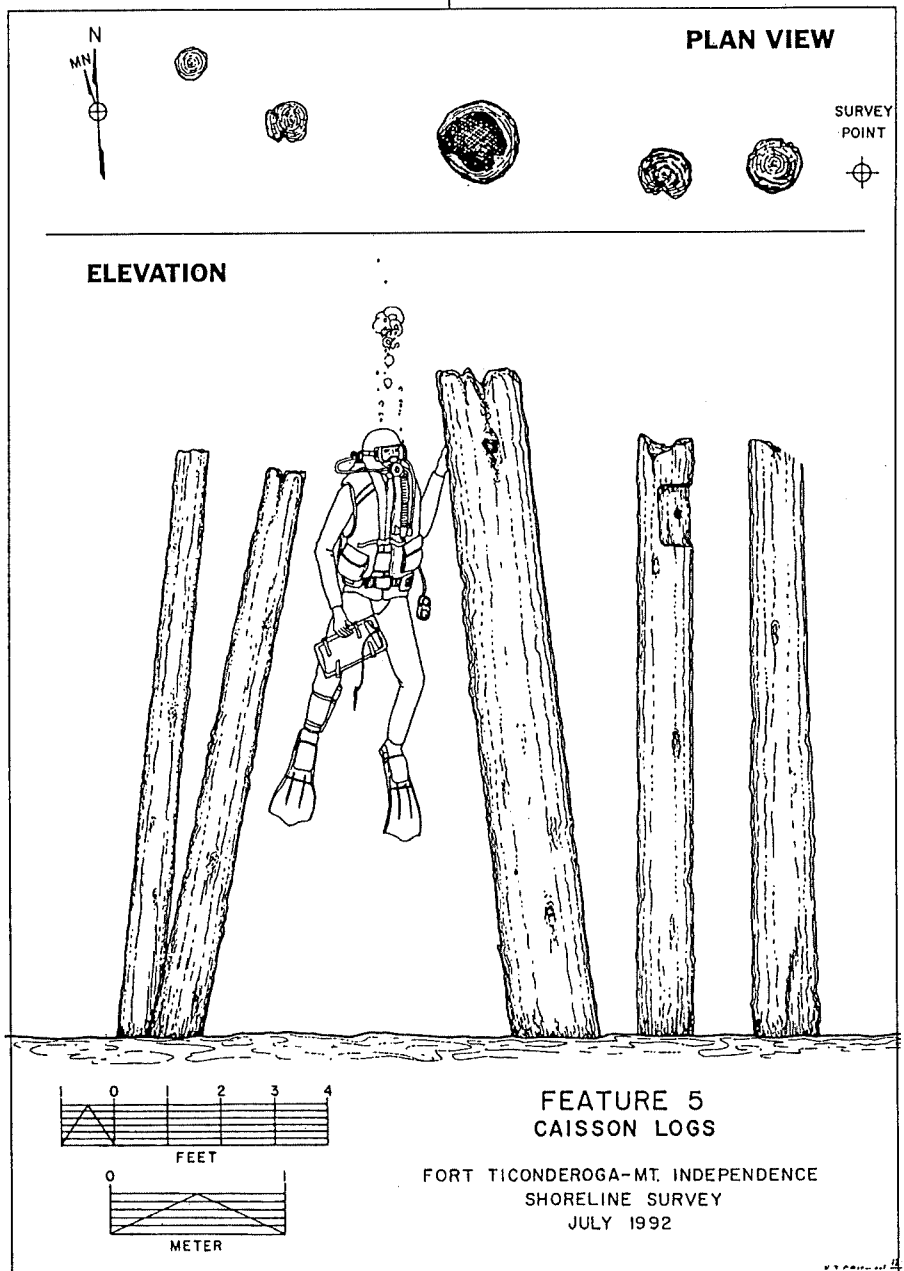
**Figure 13.**  
**Feature 4 - Shovel and**  
**Bottles.** The shovel lay atop a boulder, while the bottles were buried in a pocket of fine silt between two boulders.  
Plan by S. McLaughlin.



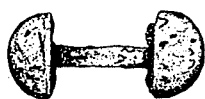
### Feature 5 - Caisson Logs

This feature consists of a row of five large logs jammed upright (and very solidly) into the bottom sediments (Figure 14), 75 feet (22.86 m.) south of Caisson 2 (see figure 3). The feature lies offshore of the dropoff in the central lake channel, with a depth of water averaging approximately 20 feet (6 m.) from surface to lakebottom. The central log in the feature is also the largest, measuring 19 inches (48.26 cm.) in diameter near the mudline and extending vertically up from the bottom a distance of 12 feet, 6 inches (3.81 m.). The smaller logs on either side ranged between 9 and 16 inches (22.86-40.64 cm.) in diameter at the mudline and 6 to 12 inches (15.24-30.48 cm.) in diameter at their tops; all four extended approximately 11 feet (3.35 m.) above the bottom of the lake.

The upper ends of all five timbers were more or less flat, appeared to have been sawn or perhaps cut off squarely with an axe. The severely eroded central log had what resembled a bolt or treenail hole through its upper end, while the first log to the east of the central log had saddle cut into its side near the top. An empty bolt or treenail hole was evident in the center of the saddle. Wood samples were not taken from the logs, but the light brown color, smooth and slightly mushy surface texture, and eroded surfaces were all typical of pine or some other type of softwood.



**Figure 14.**  
**Feature 5 - Caisson Logs.**  
**profile and plan by K. Crisman.**



Feature 5 was an unusual and somewhat inexplicable find. It is unlikely that the logs would have served any useful purpose at this location and depth in 1776-1777, unless they were intended to somehow anchor the bridge structure. The equipment and techniques available to Continental Army Engineer Jeduthan Baldwin and his men for driving these logs into the bottom would presumably have been very limited. The holes and the saddle cut into the one log suggest that these timbers were part of a caisson, perhaps nearby Caisson 2. Two scenarios can be advanced at this time to explain the location and upright attitude of the logs. The first is that they were from the top of a caisson, and were torn free by winter ice and somehow driven into the lakebottom. The second scenario is that these logs are the remnants of a failed caisson that tipped over or collapsed as it was being placed on the bottom. If these logs are part of a typical caisson structure then they should measure about 25 feet in length, which means that they are buried in the bottom to slightly over half of their lengths. Test excavations around the bases of the logs might answer the question of how they ended up in this location.

### The "Great Bridge" Caissons

One of the prime objectives of the 1992 survey at Mount Independence was to inventory and examine the timber and stone caissons that anchored the famed 1777 "Great Bridge." The continued existence of at least some of these structures was confirmed in 1983 during the course of a brief diver survey of the waterfronts below Mount Independence and Fort Ticonderoga. The appearance and approximate dimensions of one well-preserved example off the Vermont shore were recorded at that time to illustrate the assembly of a typical caisson. The full extent of the bridge remains was revealed the following year during the course of a Champlain Maritime Society-Vermont Division for Historic Preservation-sponsored side-scan sonar survey of the lake's southern region. The sonar showed an entire line of caissons (with a few gaps), protruding above the silt of the lake bottom and extending across the channel between Vermont and New York. Between the diver and sonar surveys the existence of the Great Bridge structure was confirmed, and the location and general appearance of the caissons noted. Due to time constraints and other research objectives, however, no further work was undertaken at this time.

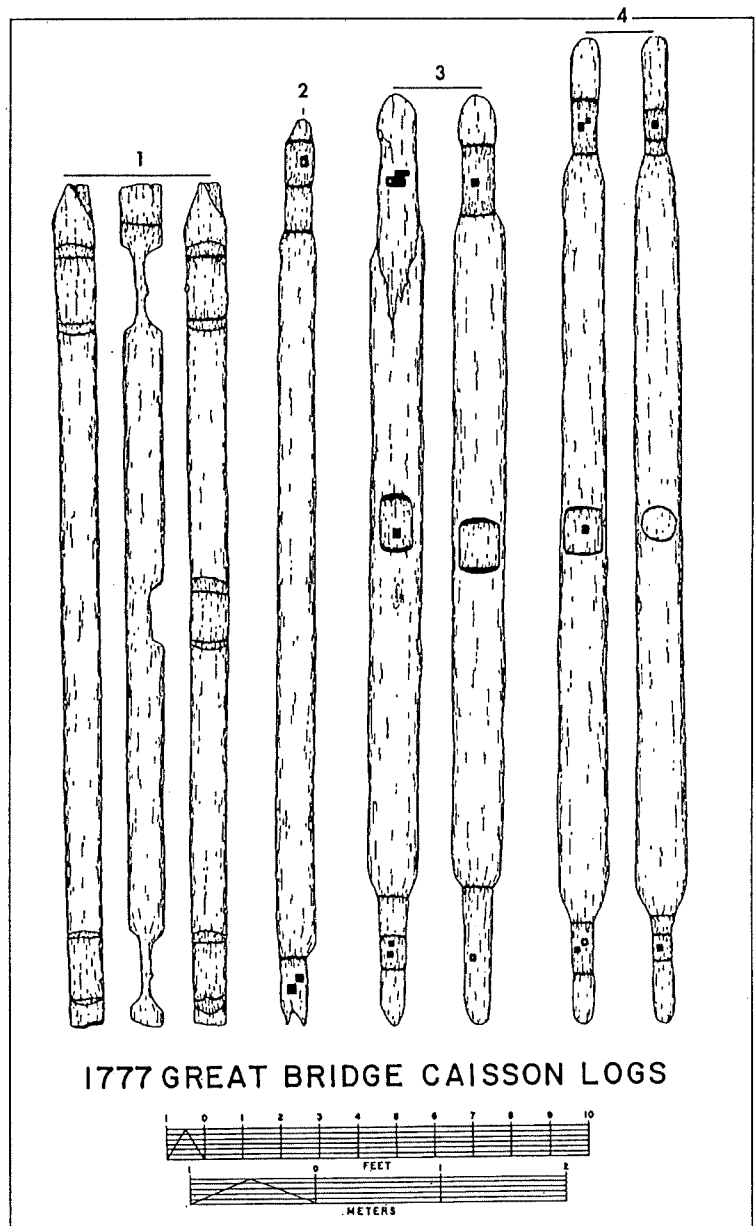
Between 1989 and 1992 at least four caisson logs were dislodged from the bottom and found floating in the waters around Mount Independence (Figure 15). Timber 1 was found during the summer of 1991 and transported to the Chimney Point State Historic Site, where it was recorded in 1992; it has since been placed in storage at the Vermont Division for Historic Preservation (Vt.D.H.P.) storage facility at Plymouth Notch. Timber 2 surfaced at an undeter-

mined time and lodged along the shore of the old canal boatyard south of Larabees Point, Vermont. Timber 3 was found in the fall or early winter of 1991 by Bruce Hedin; in the fall of 1992 it was also transported by the U.S. Army Reserve to the Vt. D.H.P. storage facility at Plymouth. The final caisson log, Timber 4, was found floating along the New York shoreline, secured by staff from the Fort Ticonderoga Museum, and placed on the New York shore at the "King's Shipyard."

All of the caisson logs consisted of straight lengths of softwood, averaging between 21 and 25 feet (6.4-7.62 m.) in length. The ends of each were squared or notched to accommodate stacking in "log cabin" fashion, while Timbers 1, 3, and 4 were also notched in the center to accommodate cross timbers that extended across the middle of the caissons. Three of them (Timbers 2, 3, and 4) had holes drilled through the ends to enable fastening with treenails.

There was no way of determining the caisson from which each log drifted, nor was it possible to determine the reasons for them coming to the surface after over two hundred years of immersion. What was clear, however, was that something was happening to the caissons to affect their stability, and that it was imperative that they be examined as soon as possible to create a baseline of data to monitor and hopefully avert further deterioration. To this end, a substantial part of our survey effort in 1992 was directed toward recording and assessing of the Great Bridge caissons.

We could not focus all of our attention on the caissons in 1992 since the many artifact clusters found off the Mount Independence shore had to be mapped as well. Our work on the caissons therefore had to gather the greatest amount of information with the least number of people. The revised strategy for the 1992 survey was to concentrate the efforts of a four-diver team on recording the dimensions and details of one well-preserved caisson. The other caissons were



**Figure 15.**  
**1777 Great Bridge Caisson Logs.**  
**Drawing by Kyra Bowling.**



all examined, but only briefly by one or at most two divers. The caisson selected for intensive study was the first well-preserved structure to be found off the Vermont shore (Caisson 2). This was the same caisson that was recorded in 1983, and we could therefore use the preliminary plan to guide the efforts of the dive team. While we knew that this caisson was well preserved, we did not know just how well we had chosen until the end of the 1992 survey. Caisson 2 proved to be the most complete and most accessible of all the caissons that we examined. Contemporary accounts of the bridge described 22 caissons placed across the lake channel at regular intervals. With a considerable amount of lakebottom probing all the caissons but one (Caisson 18) would eventually be accounted for in one form or another (the last caisson to be identified, nearest the Vermont shore, was not found until June, 1993). For the purposes of this study the caissons were consecutively numbered 1 through 22, starting at Mount Independence and moving across the channel to the New York shore (figure 16).

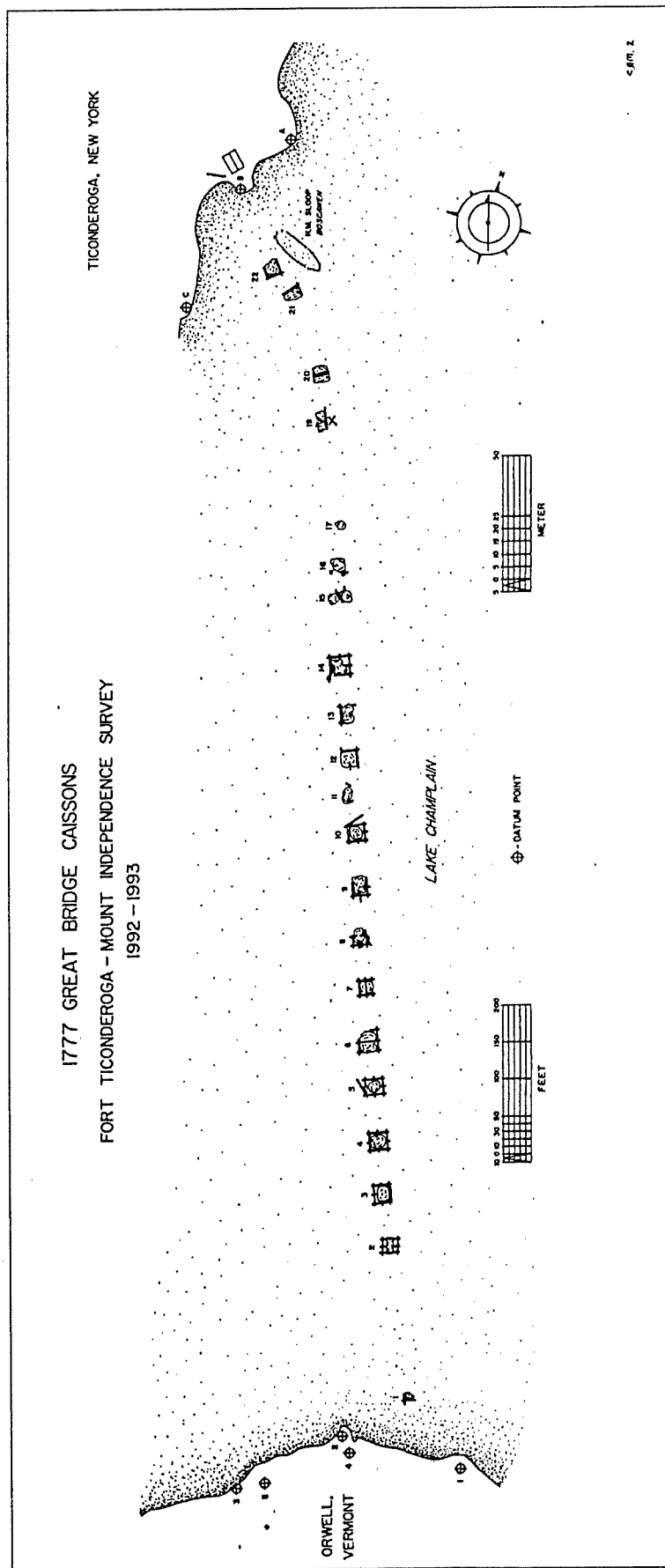


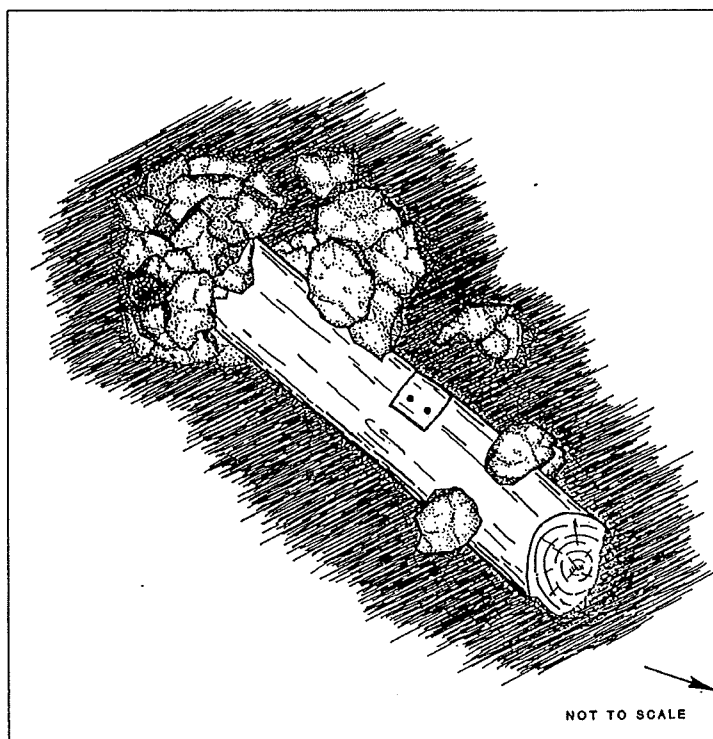
Figure 16.  
1777 Great Bridge Caissons.  
Plan by Scott McLaughlin.

### Caisson 1

This caisson lay approximately 40 feet (12.19 m.) off the north shore of Mount Independence, in approximately 6 feet (1.82 m.) of water. It was located during a systematic diver survey of the near-shore area in 1993. This caisson was in extremely poor structural condition, and consisted (above the lake bottom) of three or four disarticulated large-diameter logs that showed evidence of shaping on their ends. A 5-foot-high (1.52 m.) mound of rocks covering the end of one timber appeared to be part of the stone ballast used to anchor the caisson to the bottom (Figure 17).

Not much sense could be made of the wreckage of Caisson 1, but the disarticulated timbers and stone pile lay midway between Caisson 2 and the Vermont shore, in precisely the location one would expect to find a caisson (based on the approximate 50-foot [15.24 m.] spacing we noted between the other caissons). That Caisson 1 was in poor condition was not surprising: this area was shallow enough to leave the structure exposed to the action of winter ice and human activity, and one or both of these agents combined to pull the timbers apart and scatter them about. Digging beneath the soft, silty lake floor in this vicinity might yield one or possibly two courses of logs still in their "as built" locations.

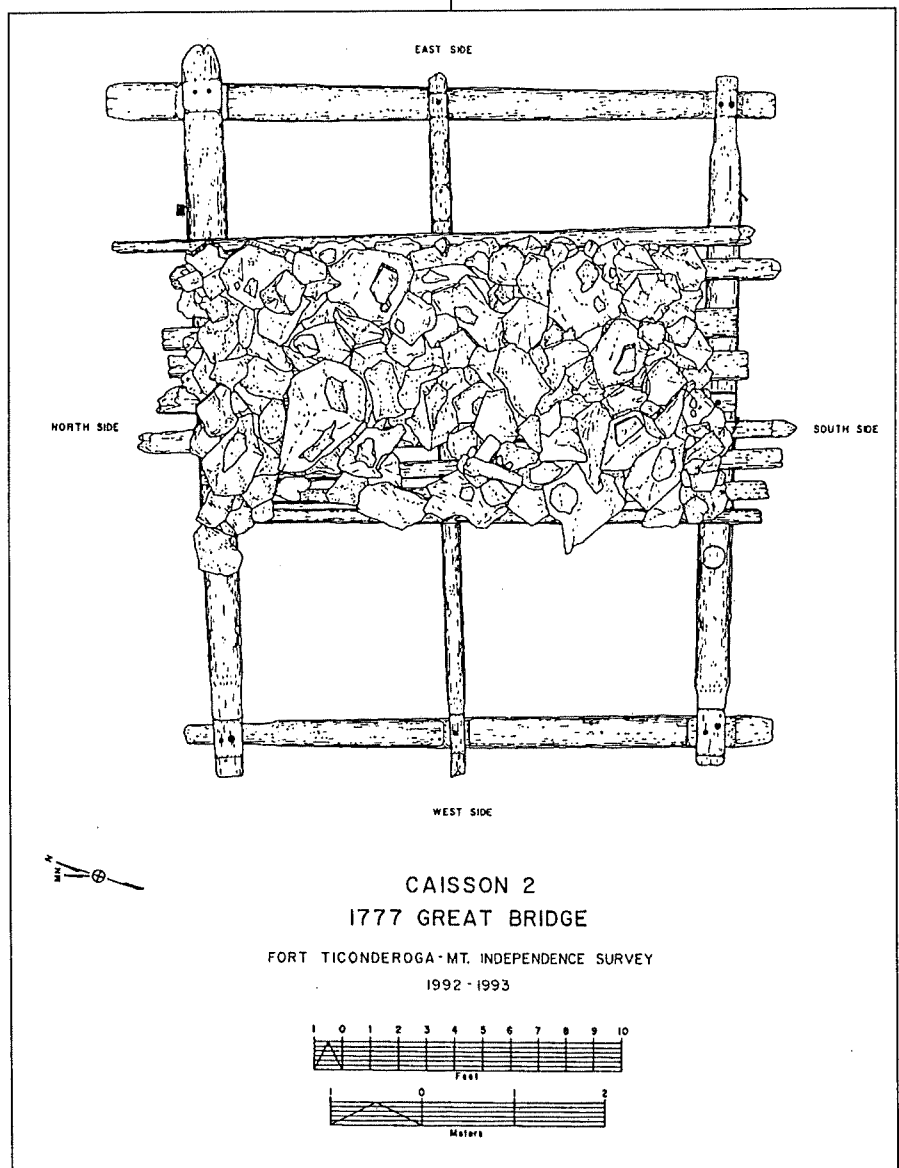
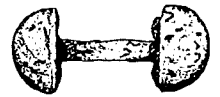
The exposed timbers seemed relatively solid and immovable. Though disarticulated, the remains of this caisson are probably not likely to be accidentally disturbed.



**Figure 17.**  
**Caisson 1. Preliminary**  
**plan - not to scale.**  
**Drawing by Kyra Bowling.**

## Caisson 2

Caisson 2 lies about 250 feet (76.2 m.) off the north shore of Mount Independence, under of 25 feet (7.62 m.) of water. The caisson is in the main channel of the lake, just beyond the slope where the bottom drops from 10 feet (3 m.) to 25 feet below the lake surface. This structure was the first of the caissons to be discovered in 1983, and was found when we unintentionally dropped our anchor into the center of it while preparing to search for the bridge caissons. As noted above, it also happens to be the caisson that extends farthest above the bottom, thereby making it the best choice for extensive measuring. The approximate dimensions of the entire assembly were taken in 1983 to permit preparation of a plan view of the structure; four divers worked intensively on Caisson 2 in 1992, recording the precise dimensions and placement of all the exposed caisson logs (Figures 18 and 19). Test excavations were also conducted at the southwest corner of this caisson to determine how much of the structure was buried beneath the bottom. Small samples of wood were taken from the logs and treenails for identification by Dr. Roy Whitmore, professor emeritus in the Forestry Department at the University of Vermont.



**Figure 18.**  
**Caisson 2 - Plan View of**  
**Existing Structure.**  
**Drawing by J. Cozzi.**

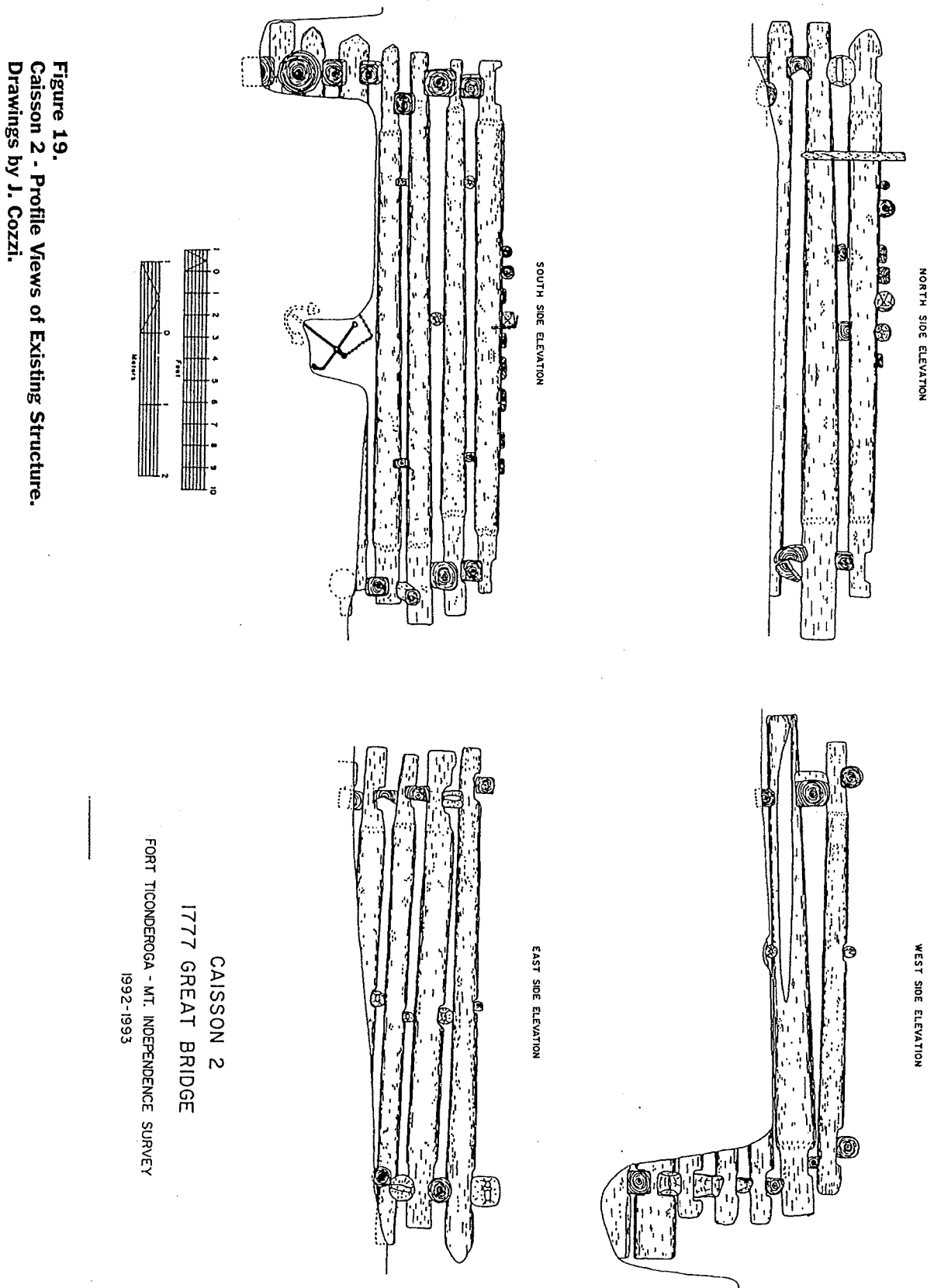


Figure 19.  
Caisson 2 - Profile Views of Existing Structure.  
Drawings by J. Cozzi.



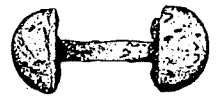
Caisson 2 lies on an uneven bottom, with its southeast corner extending the greatest height above the bottom, approximately 6-1/2 feet (1.98 m.); the northwest corner is the most deeply buried, and extends only 4-1/2 feet (1.37 m.) above the silt. The excavation of the caisson's southwest corner reached a depth of almost 6 to 8 feet (1.82-2.43 m.) below the current lake bottom, and still did not reach the base of the caisson. The measured height of the entire caisson structure in the southwest corner was 11 feet, 6 inches (3.5 m.). Each side of Caisson 2 currently consists of at least seven courses of white pine logs. The diameters of the caisson logs varied considerably, with a trend toward slightly narrower diameters on the upper courses of logs. The largest measured log, near the bottom of the caisson, was 2 feet (60.9 cm.) in diameter, and the smallest was about 1 foot (30.48 cm.) in diameter; the average log diameter was about 14 or 15 inches (35.56-38.1 cm.).

Caisson 2 was rectangular in plan. The logs on the north and south sides of the caisson averaged about 25 feet (7.62 m.) in overall length; the logs on the east and west sides were around 23 feet (7 m.) in length. Overall there was a trend toward shorter logs from the bottom to the top of the caisson, with the result that the caisson tapered as it rose above the bottom. This narrowing was no doubt intentional on the part of Jeduthan Baldwin and his workers, for it would have had the effect of increasing the stability of the caisson and lessening the chance of it accidentally toppling over.

There was no consistent pattern in shaping the log ends for assembling the caisson. The ends of some logs were squared off for a distance of between 2 and 5 feet (.6-1.52 m.), while others were left in their original round form. Most of the logs were notched on their top sides to fit the logs above them; the depths of the notches varied from 1 to 9 inches (2.54-22.86 cm.), depending upon the size of the timbers used on the next course.

The caisson logs were fastened together at the corners with 2 inch (5.08 cm.) square white oak treenails driven into round holes. Each corner has two holes per log, with one hole extending all the way through the top log and into the next log down, and the other going only partway into the topmost log. The caisson was thus treenailed together with an overlapping fastening pattern: each log was held in place at the corners with one treenail extending down into the log below and one extending down from the log above.

This caisson was not an entirely hollow structure: a series of small-diameter logs extended across the inside to strengthen the sides and prevent the entire caisson from twisting out of shape. The cross pieces averaged between 6-1/2 to





8 inches (16.51-20.32 cm.) in diameter, and were placed either singly or in pairs between every course of side logs. They appear to have been held in place at each end by a single treenail driven down into the log upon which the cross-piece rested.

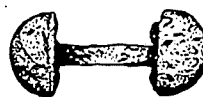
Across what is now the top of Caisson 2 lay nine parallel logs that supported a pile of limestone rocks and boulders. Like the other logs in the caisson these ballast-supporting timbers varied in their dimensions and method of shaping. They averaged between 21 and 23 feet (6.4-7 m.) in length, and ranged from 11-1/4 down to 6 inches (28.57-15.24 cm.) in diameter; some of the ballast supports were planks, measuring about 12 inches (30.48 cm.) wide by 3 inches (7.62 cm.) thick. The ends of one plank were attached to the lower side logs by a single treenail; no other fasteners were evident on these pieces, and thus they must have been held in place by the weight of the stones and by being sandwiched in place by the lower and upper courses of side logs. The log platform for the ballast once extended all the way across Caisson 2, but the loss of the structure's upper side logs has allowed some stones to drop off the caisson and their underlying support timbers to float away.

The north face of the caisson had a 4 foot, 9-inch (1.44 m.) wooden post nailed to the two uppermost side logs. The post measured 4 inches (10.16 cm.) by 3 inches (7.62 cm.) in section, and was held in place by three square iron spikes (two in the lower log and one in the upper log). A pattern of four iron spikes driven into the uppermost two logs on the south face showed that a similar upright post was once fastened there as well. The purpose of the two posts is not immediately evident, but they were most likely used either as guides for the builders in fitting log courses, or they might have been added as temporary reinforcing while the ends of the side logs were being treenailed in place.

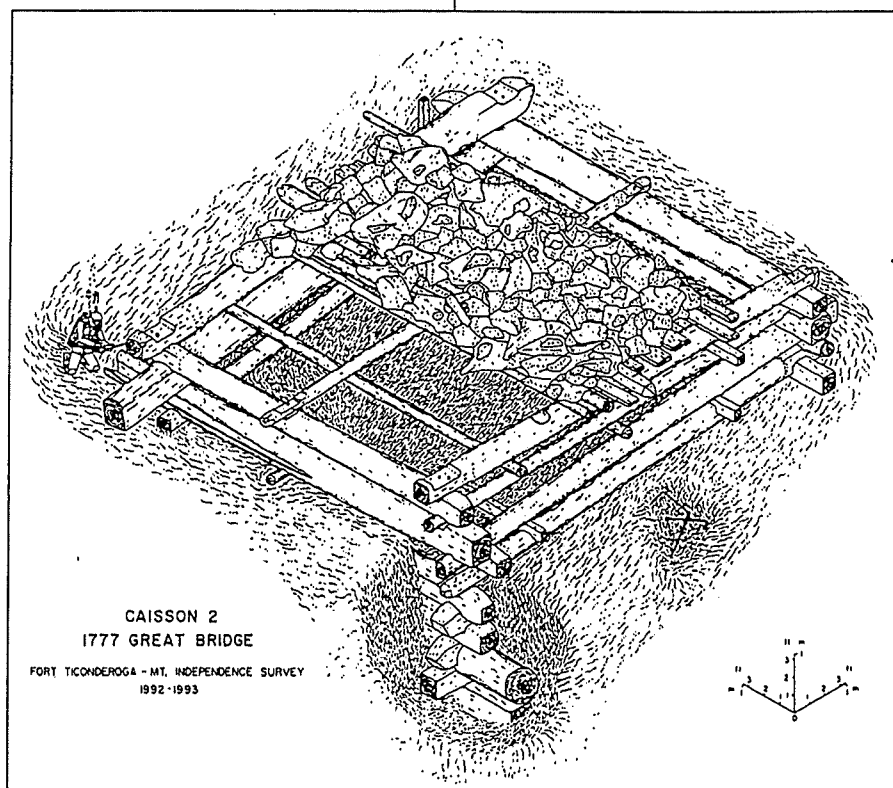
The excavation of the caisson's southwest corner indicated that at least half of the structure lies beneath the mud (Figure 20). Digging here did not positively reach the bottom of the caisson (we ran out of time and the extremely compact silts at the lower depths were difficult to remove), but probing with a thin metal rod suggested that there were no more courses of logs. A thick layer of bark and wood chips was encountered in the lowest level of the corner excavation, debris that was probably generated during the construction of the caisson. The debris layer suggests that 6 or more feet (1.82 m.) of lakebottom sediments have accumulated since the building of the bridge in 1777.

During the recording of Caisson 2 an iron folding-stock anchor was discovered buried in the mud alongside the south face of the structure. The anchor was

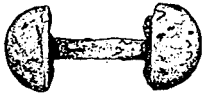
located after a diver followed a concreted length of iron chain from the top of the caisson down into the mud, where it was still attached to the top of the anchor. This style of anchor (with a folding stock) existed by at least the second decade of the nineteenth century, but they do not appear to have been widely employed until the middle and later decades of the century. The anchor was too small to have come from a steamship or other large vessel, but would have been appropriate for a canal boat, a sloop or schooner, or some type of smaller craft. It was clearly was lost (or abandoned) after it hung up on the side of the caisson and could not be dislodged.



Caisson 2 was not the source for any of the four caisson timbers found between 1989 and 1992: it had not changed in any obvious way since the preliminary recording in 1983. The caisson could undergo deterioration in the future, however, if it is accidentally or intentionally mistreated. The stone ballast piled atop the assembly is loose, and some of the rocks can easily be dislodged. One large boulder precariously balanced along the edge of the caisson actually came loose during the 1992 survey and buried itself in the soft bottom; fortunately no divers were underneath it at the time. The combination of loose rocks and low to non-existent visibility makes this caisson a potential hazard for sport divers.

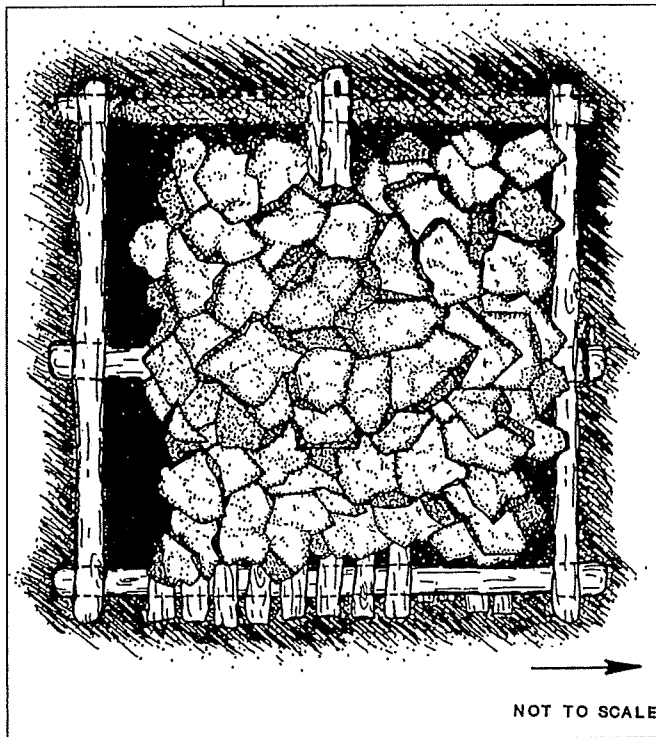


**Figure 20.**  
**Caisson 2 - Perspective View of Existing Structure.** The caisson corner in the foreground was excavated to a depth of six to eight feet by Joseph Cozzi. Drawing by J. Cozzi.



### Caisson 3

This caisson lies approximately 50 feet (15.24 m.) northwest of Caisson 2, further out in the central channel of the lake and under about 25 feet (7.62 m.) of water. The structure was more deeply-buried than Caisson 2, with the timber sides extending out of the mud a maximum of 3 feet (.91 m.); the stone ballast pile on top protruded an estimated 3 to 4 feet (.91-1.21 m.) above the mud. The row of ballast-supporting timbers lying across the top of the caisson was relatively intact, with approximately ten logs and two thick planks supporting rocks up to 3 feet (.91 m.) in diameter (Figure 21).



The overall dimensions of Caisson 3 were recorded in 1992, and proved to be roughly similar to the dimensions of Caisson 2. The four sides were: East - 23 feet, 10 inches (7.26 m.); South - 20 feet, 11 inches (6.36 m.); West - 22 feet, 5-1/2 inches (6.83 m.); North - 26 feet (7.92 m.). The inspection of Caisson 3 was necessarily brief, but divers found its form and methods of assembly to be the same as those observed on Caisson 2. While Caisson 3 appears to be more deeply buried, its surviving structure is probably equal to that of Caisson 2 (assuming, of course, that the builders also placed the ballast platform seven or eight courses up from the bottom).

**Figure 21.**  
**Caisson 3. Preliminary plan -**  
**not to scale.**  
**Drawing by Kyra Bowling.**

A length of iron chain, heavily concreted with iron corrosion products, was looped over the protruding end of a cross-timber in the middle of Caisson 3's north side. The chain was followed 3 feet (.91 m.) into the mud, but nothing was found; further digging along the chain would likely lead to an anchor lodged against the side of the caisson.

The deeply-buried state of Caisson 3 and the substantially-intact ballast pile together provide this structure with a high level of stability and protection. The uppermost logs on the north and south faces of the structure appeared to be held down only by treenails or a few rocks, and could potentially work loose at some time in the future.

#### Caisson 4

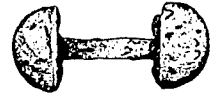
This caisson was located and buoyed, but the diver assigned to inspect the structure confused its buoys with those of Caisson 5, and instead inspected the latter structure. Thus, while we know that Caisson 4 still exists, we have no record of its appearance and condition.

#### Caisson 5

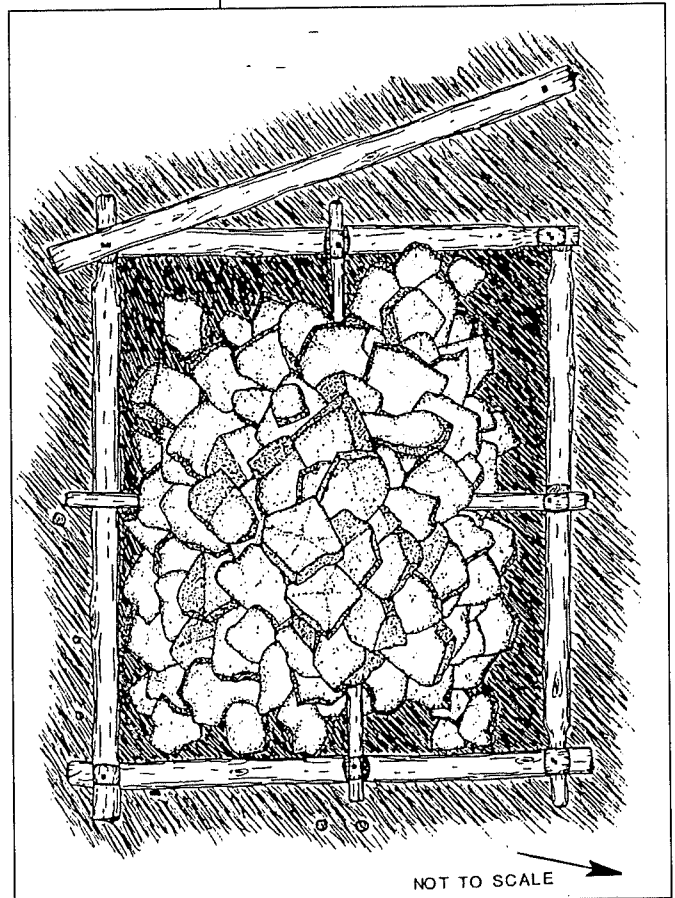
Caisson 5 was similar in most respects to Caisson 2, although like most of the others we examined it was more deeply buried in the lake bottom. At the southeast corner of the structure the uppermost course of logs protruded only 7 inches (17.7 cm.) above the bottom, while three courses of logs protruded 3 feet (.91 m.) above the bottom along the caisson's north side (Figure 22). The stone ballast pile in the center was apparently quite extensive, although neither of the two divers who recorded the structure reported finding the ballast-supporting log platform (it may be farther down in the mud).

Like Caisson 2, Caisson 5 was rectangular rather than square in shape. The east and west sides measured 21 feet (6.4 m.) and 22 feet (6.7 m.), respectively, in overall length, and the north and south sides each measured 25 feet (7.62 m.) in length. The structure was similar in construction to Caisson 2.

Perhaps the most interesting feature of Caisson 5 was a series of upright posts stuck in the lake bottom around the outside of the structure. A short distance out from the center of the east side two 3-1/2-inch-diameter (8.89 cm.) posts extended approximately 7 feet (2.1 m.) above the bottom; an identical post was found near the center of the caisson's south side. Two small poles, 1-1/2 inches (3.81 cm.) in diameter and 2-1/2 feet (76.2 m.) high, also protruded from the mud off the caisson's south side. An upright plank, 3-1/2 inches (8.89 cm.) wide, was noted directly adjacent to the east side, near the southeast corner; it was probably similar in form and function to the upright post found nailed to the side of Caisson 2.



**Figure 22.**  
Caisson 5. Preliminary plan -  
not to scale.  
Drawing by Kyra Bowling.





The location and vertical orientation of the posts around Caisson 5 is assuredly more than just an accident of nature. The most likely explanation for the posts is that they were used as guides or reinforcements during the building of the caisson; in his March 9, 1777 diary entry Colonel Jeduthan Baldwin noted: "Sunk 10 Cassoons & put down many of the posts."<sup>6</sup> Are these Baldwin's posts? The posts were probably driven into the bottom to assist in the proper placement of Caisson 5, and would have been 30 or more feet (9.14 m.) in length originally. They would have kept the structure from shifting sideways and falling apart during the construction process, a problem that Baldwin encountered during the building of the caissons at Mount Independence.<sup>7</sup> Similar posts were noted on other mid-channel caissons.

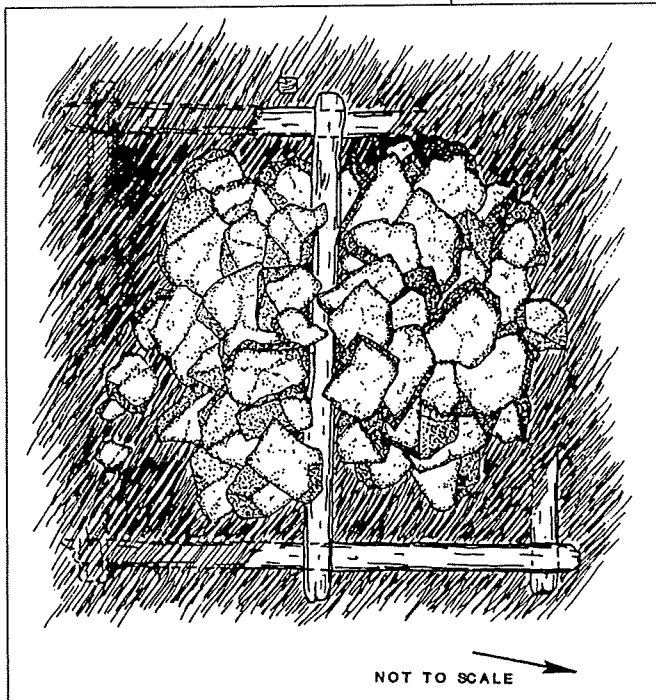
During the survey both divers noted one end of a side log along the caisson's western face had fallen out of place. This log is now held in place only by a treenail through the other corner. If the log had much buoyancy it probably would have floated away already, but the possibility of it floating up some day cannot be discounted. The structure otherwise seemed well-anchored on the lake bottom by sediments and the overlying rock pile.

### Caisson 6

This caisson was more deeply buried than any of the previous caissons, and it was therefore difficult to learn much about the extent or condition of the

assembly. The northeast corner of Caisson 6, the most exposed portion of the structure, protruded about 8 inches (20.32 cm.) above the lake bottom. Two other corners were found by touch, under 6 inches to 2 feet (15.24-60.96 cm.) of soft sediments. The fourth corner was obscured by a tree limb (probably modern) that had lodged over the caisson. The center of the caisson had an exposed cross-timber anchored down by ballast rocks. An upright timber, extending 2 to 3 feet (60.96-91.4 cm.) above the bottom, was noted adjacent to the center of the caisson's south side (Figure 23). Construction features seemed typical of those seen on Caisson 2.

Caisson 6 appeared to be well protected and stable beneath its covering of silt and rocks.



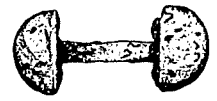
**Figure 23.**  
**Caisson 6. Preliminary plan - not to scale.**  
**Drawing by Kyra Bowling.**

## Caisson 7

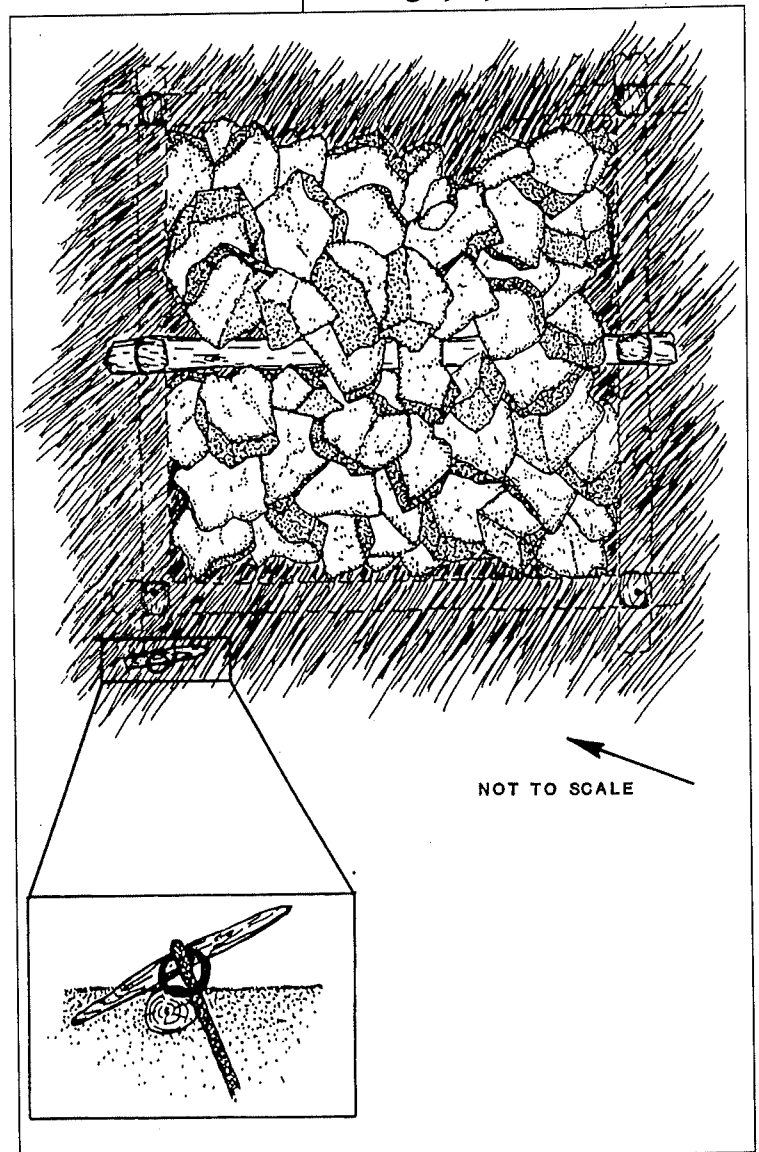
Caisson 7 was even more thoroughly buried than Caisson 6, with all of its corners and sides buried under 6 to 24 inches (15.24-60.96 cm.) of sediments. The outlines of the top were traced by probing in the mud by hand. A cross-timber lying on the center of the caisson was slightly exposed above the lake bottom, and the ballast rocks protruded 2 to 3 feet (60.96-91.4 cm.) above the silt as well (Figure 24). While the inspection of the structure was limited, it appeared to follow the same patterns seen (or felt) on Caisson 2. At two of the corners the square treenails employed for fastening were felt by the diver surveying the caisson.

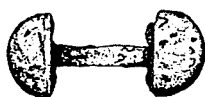
A large iron anchor was discovered at Caisson 7's northwest corner, and like those found on the other caissons was clearly lost by its owners after it hooked the buried logs and refused to budge. It had a wooden stock composed of two pieces that was estimated to be about 5-1/2 feet (1.67 m.) in length. The anchor's ring was about 8 inches (20.32 cm.) in diameter and 1-1/2 inches (3.81 cm.) thick. The shank was about 2 inches (5.08 cm.) in diameter, and was at least 3-1/2 feet (1.06 m.) in length (the lower part of the anchor could not be reached beneath the mud). This anchor was clearly very large (based on the length of the stock), and possibly pre-dated the middle of the nineteenth century, when folding-stocked anchors became quite common on the lake. Was it from a Revolutionary War vessel, a sailing merchant craft, or an early steamer? We'll probably never know.

The diver who examined Caisson 7 found large quantities of coal and coal clinkers in the uppermost 2 feet (60.96 cm.) of lakebottom sediments, with the greatest concentrations about 1 foot (30.48 cm.) below the surface. This material is a relic of the lake's age of coal-burning steamships (circa 1858-1950), and was deposited by passing steamers as they cleaned out their fire boxes. The coal and slag was found on and around the other caissons in the middle of the lake channel. Similar deposits of coal refuse have also been encountered



**Figure 24.**  
Caisson 7. Preliminary plan -  
not to scale.  
Drawing by Kyra Bowling.





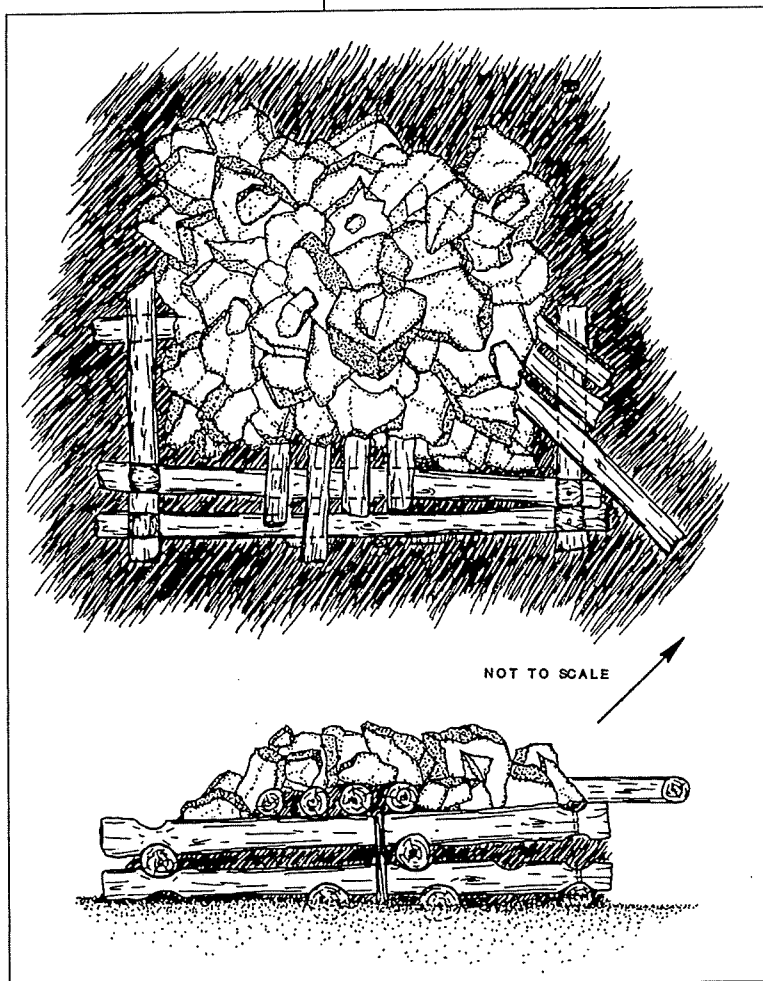
in the horse ferry wreck sunk in Burlington Bay, Vermont.

Like Caisson 6, Caisson 7 is well-protected and stabilized by its mud covering; the exposed cross timber seems well-anchored by ballast stones, and is unlikely to come loose.

### Caisson 8

This caisson appears to have tipped over at some point in time since 1777; the top of structure is slanted over at a dramatic angle, while one side (the south side) sticks up off the bottom by as much as 4 feet (1.21 m.), the opposite (north) side was buried beyond reach beneath the bottom (Figure 25). It was impossible to tell when the caisson toppled over, but winter ice pressing against the now-missing upper structure may have been responsible for the collapse.

Like Caisson 2, Caisson 8 appears to be intact up to the level of the lowest stone ballast platform. Seven ballast-supporting timbers were noted, four of them in situ, extending perpendicular to the exposed south side, and three of them lightly out of position, lying diagonally across the caisson's southeast corner. Two 3-inch-diameter (7.62 cm.) upright posts were noted, one at the caisson's northeast corner, extending 2 to 3 feet (60.96-91.44 cm.) above the bottom, and the other in the center of the caisson's south side, extending about 3 feet above the bottom. These appear to have served the same purpose as the three posts that surrounded Caisson 5, that is, guiding the placement or steadying the caisson as it was constructed.



**Figure 25.**  
**Caisson 8. Preliminary plan -**  
**not to scale.**  
**Drawing by Kyra Bowling.**



Caisson 8 seemed relatively stable, although the logs composing the upper courses of the south side could potentially work loose in the future.

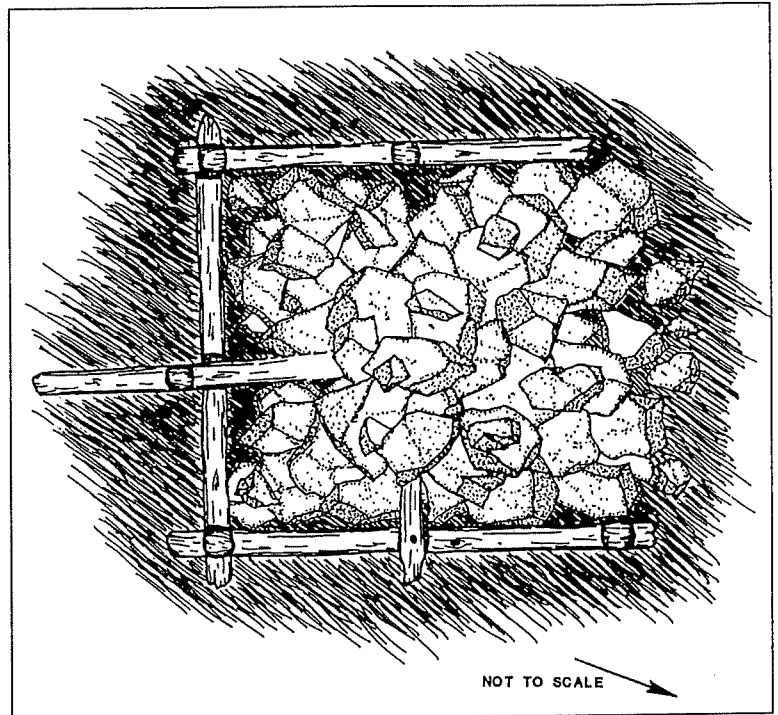
### Caisson 9

Only the uppermost course of timbers on three sides of this caisson were exposed above the lake bottom, from 6 to 15 inches (15.24-38.1 cm.); the north side was entirely buried under sediments and a spill of ballast rocks (Figure 26). The south side of the caisson measured 20 feet, 2 inches (6.14 m.) in length, and the east side 21 feet (6.4 m.) in length. The uppermost cross timber in the center of the east south side apparently slid out of position at some point, and now protrudes about 6 feet (1.82 m.) out from the caisson.

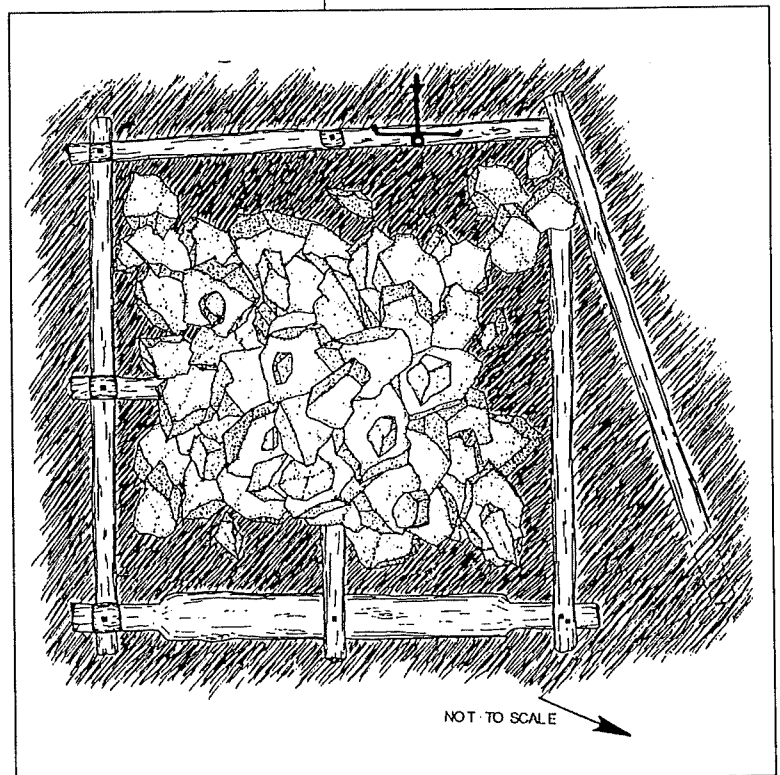
The caisson is mostly buried, and had no obvious loose timbers.

### Caisson 10

The uppermost courses of timber of all four of this caisson's sides were exposed above the bottom (Figure 27). It resembled Caisson 2 and the other caissons in its form and assembly. The uppermost log on its north side has detached from the northeastern corner, and lies at an angle to the rest of the caisson, with the loose end buried about 1 foot, 9 inches (53.34 cm.) below the mud. If dislodged from the bottom this log could potentially float off, but for now it appears secure.

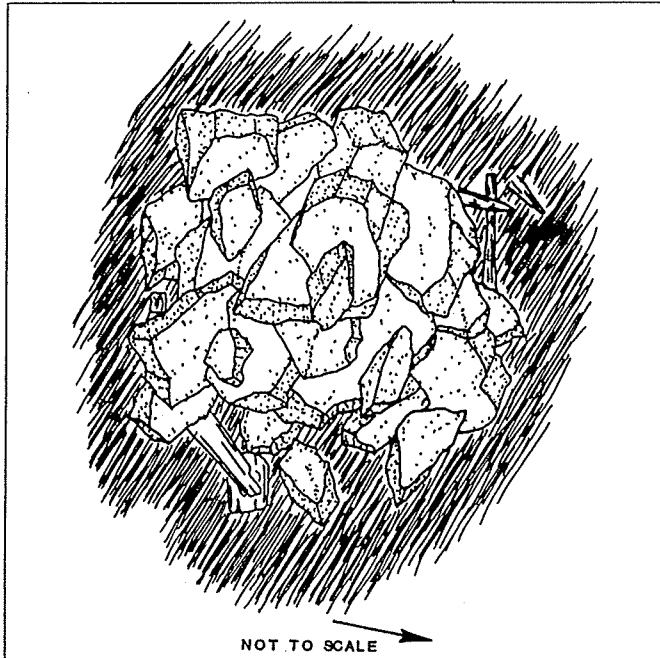


**Figure 26.**  
**Caisson 9. Preliminary plan - not to scale.**  
**Drawing by Kyra Bowling.**



**Figure 27.**  
**Caisson 10. Preliminary plan - not to scale.**  
**Drawing by Kyra Bowling.**

**Figure 28.**  
**Caisson 11.**  
**Preliminary plan - not to scale.**  
**Drawing by Kyra Bowling.**



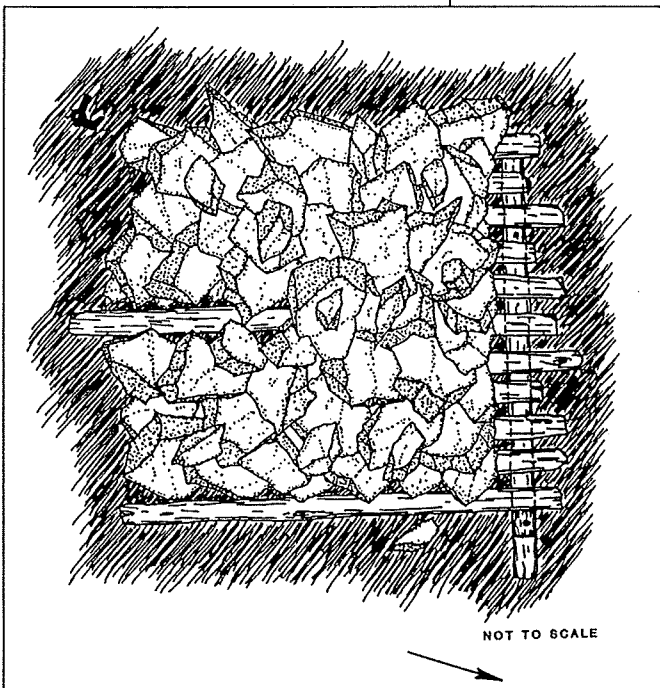
Two upright wooden posts were found a short distance from Caisson 10's east side. One, about 4 inches (10.16 cm.) in diameter, protruded about 2-1/2 feet (76.2 cm.), and the other, 6 to 8 inches (15.24-20.32 cm.) in diameter, stuck up about 3 feet (.91 m.). They are much like the posts noted near Caissons 5 and 8.

An iron folding stock anchor was lodged against the uppermost log on the west side of the caisson.

### Caisson 11

The wooden structure of this caisson was deeply buried beneath the bottom, and only one corner could be found by hand probing, 2 to 3 feet (60.96-91.44 cm.) below the mud (Figure 28). Probing with a metal rod indicated more timber 3 to 5 feet (.91-1.52 m.) below the sediments. The stone ballast pile was the only really obvious part of this caisson: it protruded above the bottom about 3 feet (.91 m.), and was about 10 feet by 15 feet (3.04-4.57 m.) in extent. Three posts were found in the approximate location of one corner, extending 4 to 6 feet (1.21-1.82 m.) out of the mud. A fourth vertical post was located near the opposite corner, extending about 2 feet (60.96 cm.) from the mud. All four seem to have been guide posts.

**Figure 29.**  
**Caisson 12.**  
**Preliminary plan - not to scale.**  
**Drawing by Kyra Bowling.**



This caisson is not in much danger of disturbance. If the rock pile is at the same height as the pile on Caisson 2, then the structure of Caisson 11 may extend more than 15 feet (4.57 m.) beneath the lake bottom.

### Caisson 12

Like Caisson 11, this caisson had only its stone ballast pile protruding above the mud of the lake bottom. Probing by hand revealed the northeast corner and most of the north side, including approximately eleven of the logs or planks that made up the ballast-supporting platform (Figure 29). The east, south, and west sides of the caisson were obscured by deep mud and ballast stones.

In the area near the caisson's southwest corner the surveying diver found a 5-inch-diameter (12.7 cm.) pole that

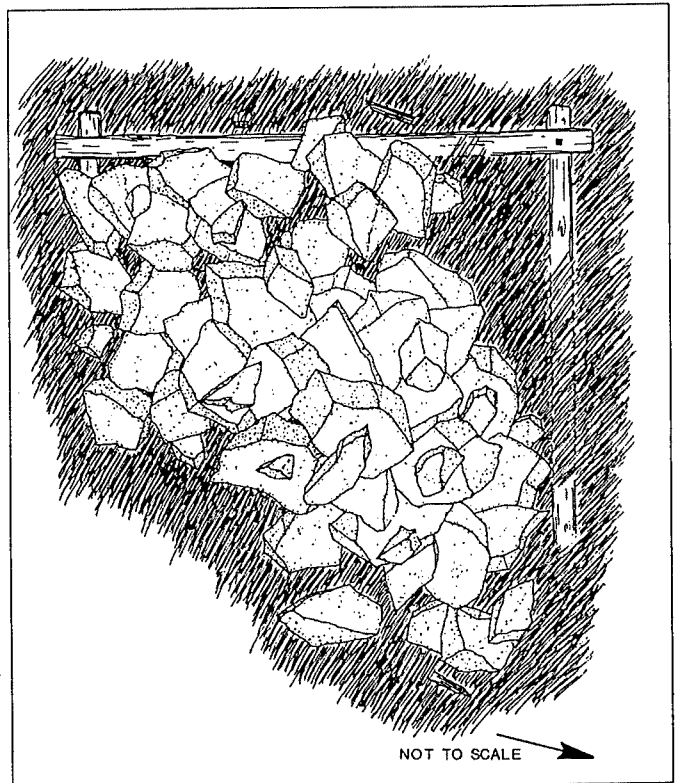
stuck up from the lake bottom a distance of 8 feet (2.43 m.). It was similar to the posts noted on Caisson 5, and may have been used as a guide post in the caisson's construction. At the base of this guide post lay an iron folding-stock anchor of substantial dimensions. The anchor had a stock 4 to 5 feet (1.21-1.52 m.) in length, a ring 8 inches (20.32 cm.) in outside diameter, and a shank 3 inches (7.62 cm.) in diameter.

The survey diver noted a great many freshwater clams beneath the mud, but fewer coal clinkers, suggesting that Caisson 12 was off to the side of the path normally taken by steamboats when they passed over the bridge. The diver also noted that while working on the caisson he distinctly felt water movement caused by the wake of a passing motor boat - at a depth of 20 feet (6.09m.)! This motion may well account for the caisson logs that have floated to the surface in recent years. The continual rocking caused by boat wakes in the summer months could easily loosen timbers from weakened treenail fastenings or overlying ballast stones. This caisson, however, appears to be well-protected from casual disturbance by virtue of its buried state.

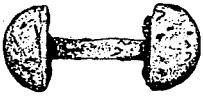
### Caisson 13

Only the western side of this caisson protruded above the mud, and that was only by the height of a few inches (Figure 30). Beyond the corners the northern and southern sides of the structure disappeared into the mud. Two 2 inch by 6 inch (5.08-15.24 cm.) upright planks were found along the western side, protruding about 4 feet (1.21 m.) above the lake floor. Their location, directly alongside the logs, suggests that they may have been attached to the side in the same fashion as the square post seen on Caisson 2. A round post, with bark still attached to it, extended 4 feet (1.21 m.) above the mud along the east side of the Caisson 13.

The only substantial portion of the caisson to stick up off the bottom was the stone ballast pile. The entire structure is well-protected by bottom sediments, and seemed quite stable.



**Figure 30.**  
**Caisson 13. Preliminary plan -**  
**not to scale.**  
**Drawing by Kyra Bowling.**



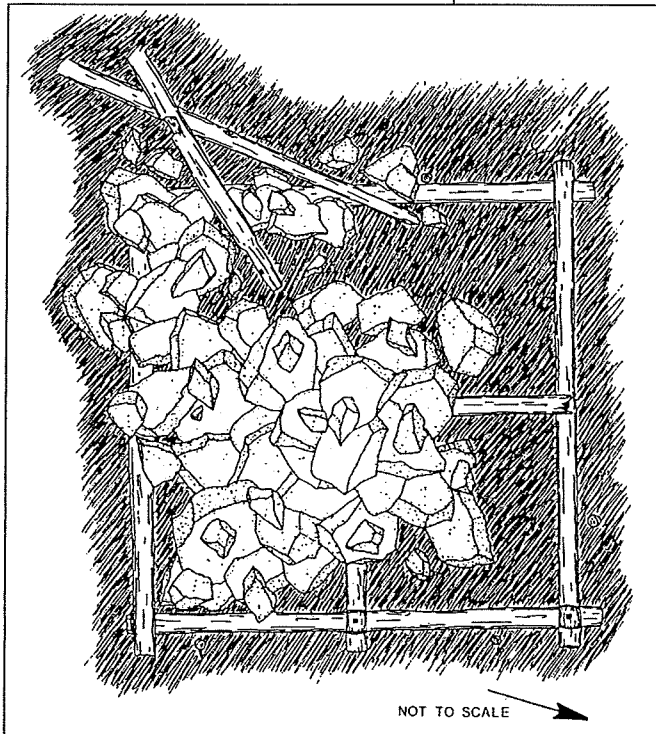
#### Caisson 14

The eastern side of this caisson protruded from the mud, the northern side was half-buried but could be traced over its entire length, and the southern and western sides could be only partially traced (Figure 31). The southwestern corner of the caisson was obscured and inaccessible due to deep mud and rocks that had fallen off the ballast pile. Three large, unattached logs were

found along the western side of the caisson. Two of them had no obvious distinguishing features, and thus could not be definitely associated with the bridge assembly; the third log had a squared end and was notched in the center, and was clearly part of Caisson 14. This shaped log was jammed diagonally into the bottom of the lake, with about 16 feet (4.87 m.) of its length protruding from the mud.

Four round wooden posts, each about 6 inches (15.24 cm.) in diameter, extended out of the bottom around the caisson, with one on the west side, one on the north side, and two on the east side. One of the two posts on the east side was spiked to the logs of the caisson, and probably served more as a form of reinforcement than as a guide.

The disarticulated caisson log on the western side of the structure could potentially work its way free of the bottom someday, but the other elements of the caisson seemed fairly stable.



**Figure 31.**  
**Caisson 14. Preliminary plan -**  
**not to scale.**  
**Drawing by Kyra Bowling.**

#### Caisson 15

This caisson was in poor condition, at least above the lake bottom. It consisted of two piles of ballast rocks, with a broken timber protruding from the mud between them (Figure 32). Articulated portions of the caisson assembly could not be felt above or below the mud, although the structure may be intact somewhere beneath the lake floor.

#### Caisson 16

This caisson, too, was deeply buried, and on the surface of the lake floor consisted of only a pile of ballast rocks. Extensive probing in the mud around the rocks revealed one of the caisson's corners, the southeast corner, and a row of log or plank ends from the timber platform that supported the ballast rocks (Figure 33). The timbers were buried under about 3 feet (.91 m.) of mud, and not much could be learned about them, except that the caisson corner was

fastened like the others by a square treenail driven into a round hole.

Caisson 16 is undoubtedly both stable and well-protected by the sediments that cover it.

### Caisson 17

The only evidence of Caisson 17 was a couple of rocks that protruded above the smooth surface of the muddy lake bottom in the place where we would have expected to find the seventeenth caisson. If we had not known that a caisson was once located there its existence would never have been apparent. Presumably at least part of the caisson's timber structure can still be found under the mud, but time constraints prevented us from digging down to it.

### Caisson 18

No evidence of Caisson 18 was found, although like Caisson 17 some of the timbers might still lie under the lake floor. This caisson lay in the path of steamboats going to and from the Fort Ticonderoga steamboat landing, and it is possible that the structure was intentionally pulled apart or dredged out of the way to assure safe navigation. Test excavations or surveying with a sub-bottom profiler might reveal articulated structure under the mud.

### Caisson 19

The visible remains of this caisson lie under 6 to 8 feet (1.82-2.43 m.) of water, and consist of stone ballast protruding above the lake bottom (Figure 34). Mixed in with the stones were two exposed timbers that may or may not have been part of the caisson structure (there were no obvious features on the timbers such as notches or treenail holes). Probing in the mud along the east side of the stone pile revealed two additional large timbers, but these, too, could not be positively associated with the caisson.

Other features of interest included a large, unidentifiable iron object heavily crusted over with corrosion products (it measured roughly 2 inches [5.08 cm.] thick and 2 feet [60.96 cm.] by 1-1/2 feet [45.72 cm.]). A wooden-stocked iron anchor was found near the northeastern corner of the ballast pile; the dimensions of the anchor were not recorded, but it appeared to be relatively large.

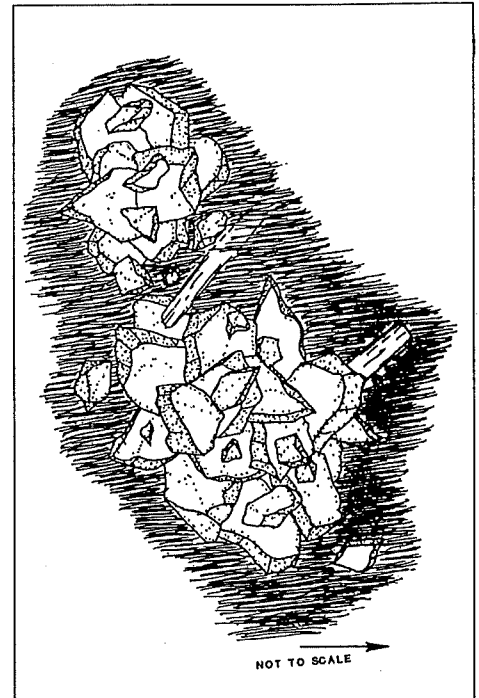


Figure 32.  
Caisson 15. Preliminary plan -  
not to scale.  
Drawing by Kyra Bowling.

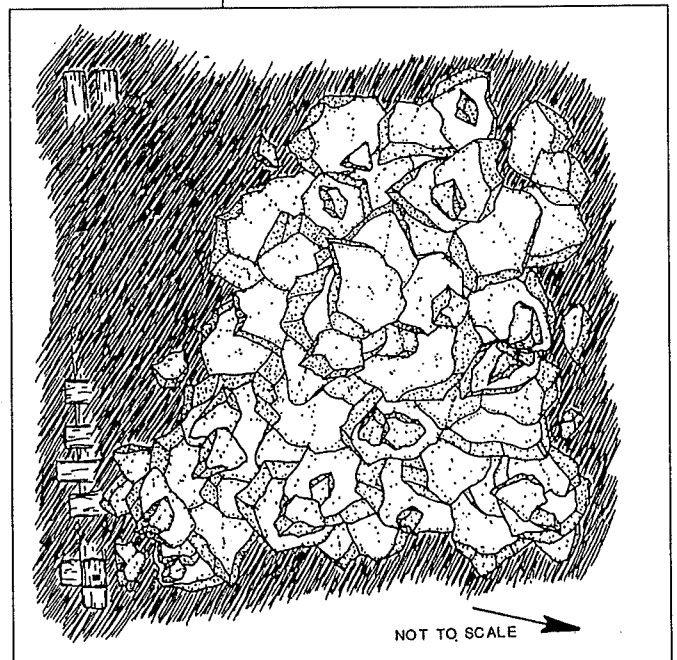
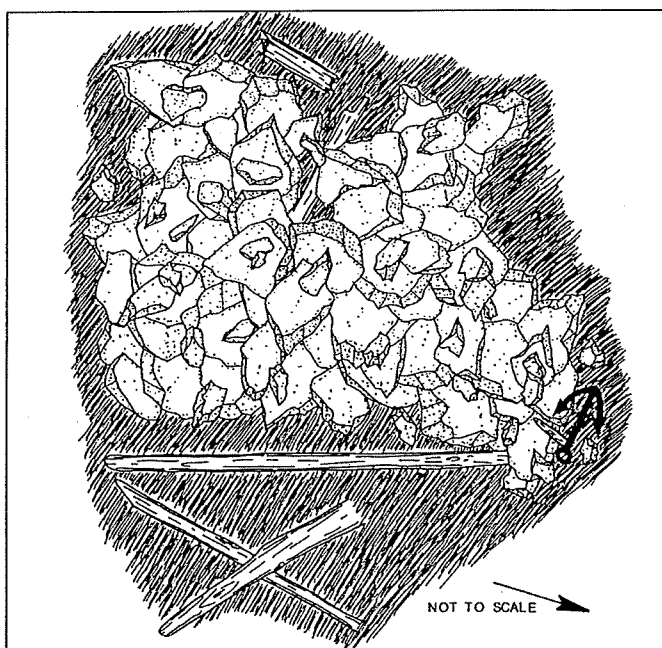
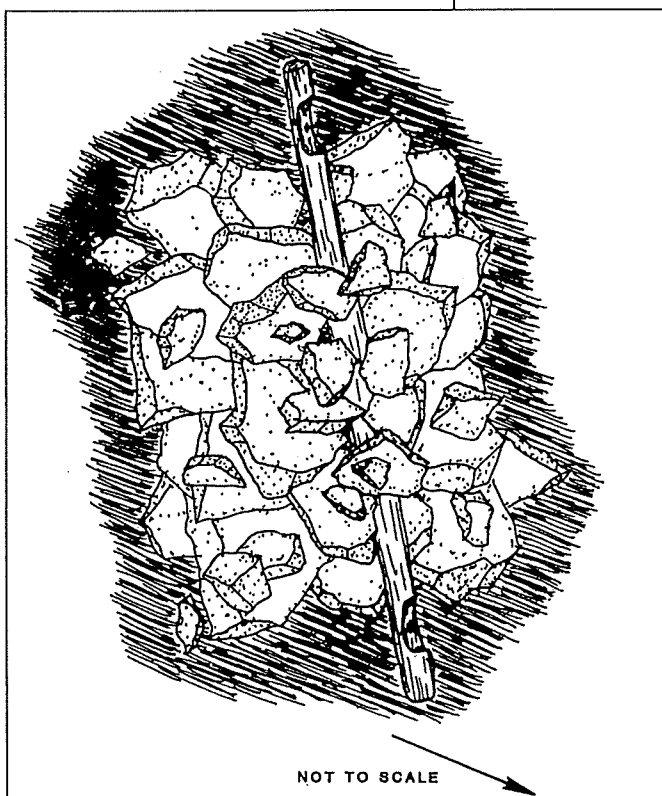


Figure 33.  
Caisson 16. Preliminary plan -  
not to scale.  
Drawing by Kyra Bowling.



**Figure 34.**  
**Caisson 19. Preliminary plan -**  
**not to scale.**  
**Drawing by Kyra Bowling.**



Like the other caissons that were mostly buried, any surviving structure that exists should be well-protected and preserved by the mud.

#### **Caisson 20**

Caisson 20 lay under 6-1/2 feet (1.98 m.) of water, and consisted of an approximately-square pile of ballast stones with a caisson cross-timber extending through the middle of the pile (Figure 35). The cross timber was clearly part of the original structure, and not a piece of driftwood, since the ends were notched and drilled with treenail holes for attaching the timber to the side logs. Probing beneath this timber to a depth of about 24 inches (60.96 cm.) failed to uncover any other caisson logs. A round wooden post, about 5 inches (12.7 cm.) in diameter, extended about 12 inches (30.48 cm.) above the mud on the south side of the ballast pile.

More of the caisson structure is likely to exist beneath the lake floor. The cross timber in the ballast pile is partly covered by stone, but could potentially be loosened by divers removing ballast stones, or a fouled boat anchor.

#### **Caisson 21**

Only traces of this caisson, in the form of a few partly-exposed ballast stones, were encountered by the survey divers. No timbers were evident, and the stones were buried so deeply that it was difficult to even trace out the approximate shape of the pile. Caissons 21 and 22 were in the midst of the French and Indian War-era "King's Shipyard," and were adjacent to at least two wrecks from that era. It is very possible that they were in fact part of dock structures built in the 1750s or 1760s, structures that may have been built upon or modified by the American engineers during the bridge building in 1777.

**Figure 35.**  
**Caisson 20. Preliminary plan - not to scale.**  
**Drawing by Kyra Bowling.**

## Caisson 22

This caisson lay nearest the New York shore, under about 5 to 6 feet (1.52-1.82 m.) of water. The uppermost log on the caisson's south side could be seen and measured (it extended 26 feet, 9 inches [8.15 m.] from end to end), and part of the east and west sides could be followed just beneath the mud (Figure 36). The north side of the caisson was buried too deeply to reach by hand probing. The visible construction features matched those seen on Caisson 2. The stone ballast pile entirely filled the center of the caisson, suggesting that the logs and planks that composed the ballast-supporting platform were complete. As with the other caissons, we can assume that several feet of articulated caisson structure lies beneath the sediments and is in a well-preserved condition.

Caisson 22 lies alongside the buried hull of the British sloop *Boscawen*, a warship built at Ticonderoga in 1759 during the French and Indian War. *Boscawen* was excavated by the Fort Ticonderoga Museum and the Champlain Maritime Society in 1984-1985.

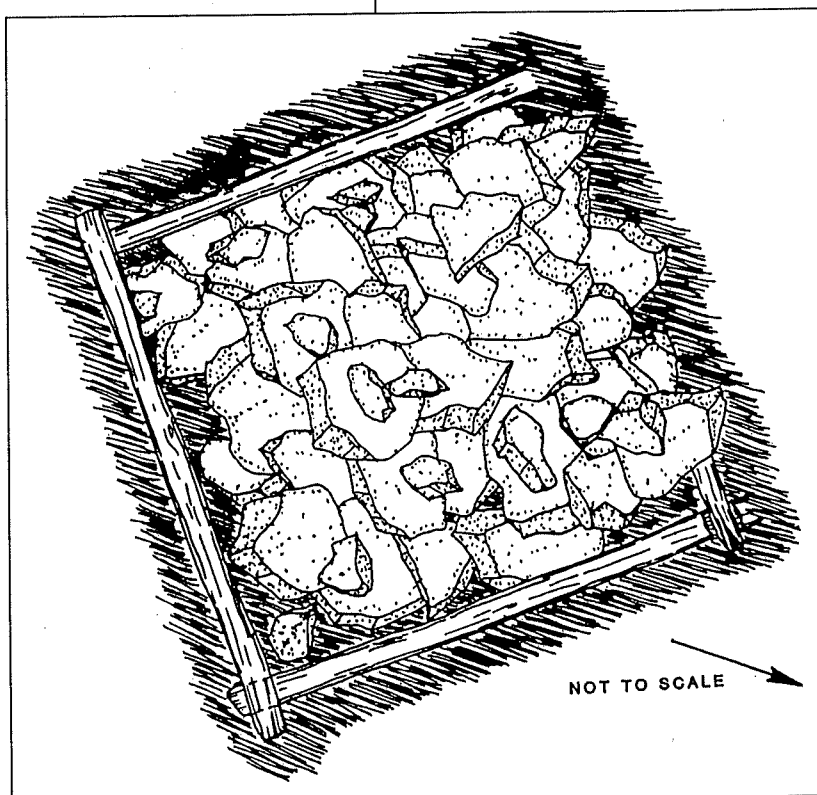
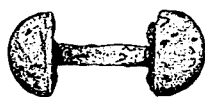


Figure 36.  
Caisson 22. Preliminary plan -  
not to scale.  
Drawing by Kyra Bowling.



## The Construction and Destruction of the Caissons

The 1992 Great Bridge survey, undertaken 215 years after the construction of this massive timber-and-stone structure, revealed that a surprising amount of material and information still lies on and beneath the bottom of the lake. Intact structure or at least traces of structure were found for 21 of the 22 caissons; only Caisson 18 proved impossible to find. The intensive study of Caisson 2 showed that at least 11-1/2 feet (3.5 m.) of the sides, representing seven or eight courses of pine logs, existed between the bottom of the caisson and the platform built to support the stone ballast. If Jeduthan Baldwin and his workmen were consistent in their construction practices, and placed the lower ballast platforms at a uniform height on all of the caissons, then almost all of these structures could be preserved to the height of Caisson 2. The caissons that are mostly or entirely buried in the mud should also be well preserved, with original construction features and tool marks still evident on the log surfaces.

The archaeological study suggested that Baldwin and his men probably built the bridge caissons one course at a time, working through holes chopped through the ice. The general sequence of construction for each caisson must have been to cut a hole that approximately matched the outside dimensions of the structure. Long poles, consisting of trimmed saplings, 30 or more feet (9.1 m.) in length, were inserted around the edge of the ice opening, and pushed down into the soft mud bottom. These would ensure that the caisson descended properly, with the correct orientation, and that the logs on the lower courses did not work loose and float off. The poles could also have prevented the force of the current from "bending" and breaking the caisson apart as it descended. Examples of these poles were noted adjacent to Caissons 5, 6, 8, 10-14, and 20.

The logs for the caisson were then dragged out on the ice, where they were shaped, drilled, and otherwise prepared for assembly. The first two or three courses of timber may have been pre-assembled alongside the hole, very likely with more treenail fastenings than were noted on the upper courses of logs. The pre-assembled base would then have been carefully pushed and dragged into the opening using oxen, horses, and human labor. Once the foundation for the structure was floating in the opening, the workmen proceeded to drag up new logs, set them in place on top the previous courses, and pin them together with treenails. The weight of the upper logs no doubt pressed the caisson down into the water. After a certain number of log courses were in place (seven or eight), the workmen laid a crude platform across the top, and began piling on limestone rocks from nearby cliffs on Mount Independence and along the New York shore.

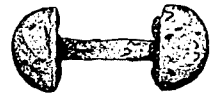


Additional courses of logs would then be added above the ballast platforms, and the rate of the caisson's submergence could be regulated by tossing in more ballast at the appropriate time. The workmen no doubt added at least one more ballast platform near the top of each caisson to hold the upper part of the assembly in place. Even after the lowest logs of the caisson touched bottom construction continued, for the caisson had to sink several feet into the soft mud before it reached the more compact sediments that would firmly support the structure.

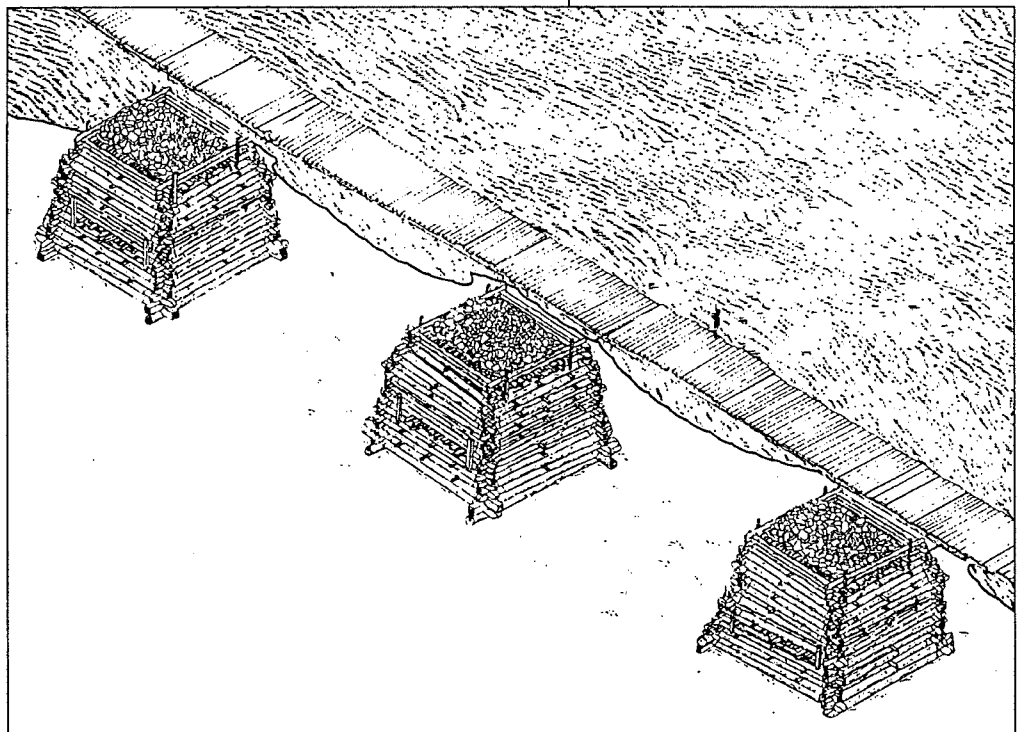
Throughout the construction process cross-timbers would be placed through the middle of the caisson to provide additional strength and stability to their hollow, box-like shapes. From time to time the bridge builders also spiked poles or lengths of plank to the sides of the caisson, to provide additional vertical reinforcement to the structure.

The timing of the construction was no doubt crucial. Baldwin and his men had to be finished before the ice broke up on the lake, but prior to the breakup they could not allow the ice sheet to get too near the sides of finished caissons or they would run the risk of having all their hard work undone in a very short time. Once each caisson was finished troops must have been detailed to stand guard and chop up ice that threatened to form around the top courses of logs. Baldwin no doubt recognized that his creation would last only a short while before waves and ice would begin to loosen everything up (Figure 37).

The arrival of the British in July of 1777 ended any maintenance of the bridge, and their decision to burn the tops of the caissons before retreating from the lake that fall surely hastened deterioration. The winter of 1777-1778, unless it was particularly mild, must have seen the damaged tops of at least a few caissons being knocked off by ice. Every spring for the next several years



**Figure 37.**  
**Conjectural Isometric View -**  
**1777 Great Bridge.**  
**Drawing by J. Cozzi.**





probably saw a multitude of caisson logs drifting around the Ticonderoga-Mount Independence area and washing up on shore. The disintegration of the caissons would have been greatest in the first one or two decades, and thereafter would have slowed as the structures sank further into the bottom and reached a state of relative equilibrium. Individual caissons were no doubt damaged from time to time when struck by passing ships or hooked by anchors.

The dislodged caisson logs recently found floating on the lake were very likely loosened or dislodged during a 1983 or 1984 incident in which a State of New York Department of Environmental Conservation research vessel hung its trawling net up on a caisson and yanked it free, freeing four or five caisson timbers.<sup>8</sup> A second possible cause for the floating timbers is the large, fast-moving, over-powered boats that pass through this section of the lake every summer. As noted earlier, the motion generated by these craft can easily be felt under twenty feet of water, and with time and repetition some of the more lightly-secured timbers could work their way free. The buoyancy of the logs after over 200 years under water is remarkable, but not unique: the same phenomenon has been noted on pine timbers from very old shipwrecks around the lake. The resin in the wood seems to preserve air spaces over many decades.

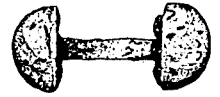
We were not able to identify which caisson(s) were the source of the four logs found floating on the lake prior to the 1992 survey. Some of the more exposed caissons (2,3,5,8,9,10) are potentially vulnerable to accidental or intentional disturbances, including trawler nets, boat wakes, anchor dragging or fouling, and diver incursions. The others are sufficiently buried to protect them from most forms of disturbance (channel dredging excepted).

## Conclusions

The 1992 Mount Independence Underwater Survey identified two Revolutionary War-era structures off the northern shore of Mount Independence. One of these structures, the floating "Great Bridge" between Mount Independence and Fort Ticonderoga, was frequently mentioned in the historical record, but the details of its design and construction were not well documented. Sonar and diver searches revealed evidence, in the form of timbers or stone ballast, of 21 caissons that anchored the bridge. Inspection of all caissons, and intensive recording of one of them, has revealed the techniques of construction and their general appearance in 1777. The study of the lower caisson structures in 1992 was also an essential first step in the management and protection of these archaeological resources. In the two centuries since they were built the forces of nature and human activity have combined to pull the caissons apart and disperse their timbers. The surviving remains are now mostly buried in the bottom, but boat wakes, fouled anchors, diver activity, and dredging could result in more logs working loose and floating away.

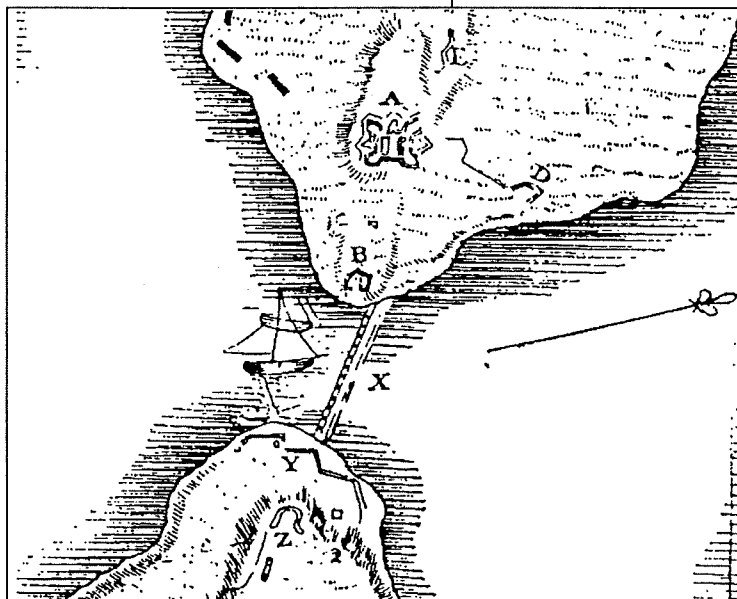
The preliminary survey of the lakebottom along the path of the floating bridge turned up evidence of bridge debris and dump sites. Feature 5, the collection of five logs protruding from the bottom near Caisson 2, clearly represents debris from the bridge structure itself, although we could not determine if it was the remains of a caisson that collapsed during construction or part the upper structure of a completed caisson. Feature 2 (the bar shot scatter) and Feature 4 (the shovel and two bottles) are both dump sites containing materials thrown off the bridge. The bottles may have been tossed in the lake as refuse, but the tools and munitions were undoubtedly dropped in the lake to deny them to a foe. We could not positively determine which side threw them in the lake, but the hasty, disorganized retreat of the American forces in July of 1777, and the systematic destruction of the two fortifications by the retreating British Army in the fall of that year, suggest that much of the military equipment dumping was the work of British troops. If the materials found in Features 2 and 4 were deposited here by the British, then we can say with some certainty that the section of bridge extending out from the Vermont shore was kept intact by the British until late 1777. The near-shore portions of the bridge, on both the Vermont and New York shores, would have been useful to the British as docks for loading and unloading men and supplies.

Unlike the "Great Bridge," the second structure we encountered in 1992 was not well defined either historically or archaeologically. This was the dock or wharf that extended about 100 feet (30.48 m.) out from the northwest shore of





**Figure 38.**  
Detail of St. Clair Map, Showing a Vessel Moored to a Possible Dock Off the Northwest Shore of Mount Independence. The dock appears to lie over the area where the cannon, mortar bombs, and spades were encountered in 1992. Detail from a map attached to *Proceedings of a General Court Martial...of Major General St. Clair*, published in *Collections of the New-York Historical Society for the Year 1880*.



Mount Independence. We did not locate any obvious structural remains here, although the bottom was littered with chunks of limestone rock that could have been used to anchor a timber dock. The best evidence for the existence of the dock was the cannon, the mortar bombs, and the shovels found near the edge of the dropoff. The close proximity of these finds argues for some type of fixed structure extending out from shore, for if these materials had been dumped from boats they would likely have been more widely scattered. The artifacts found inshore of the cannon-bomb-shovel cluster, namely the felling axe, the door lock, and the bayonet and musket parts, were likely dropped off the side of the dock.

The American forces building up the fortifications along the mount's north end would have required adequate shoreside structures to receive boats carrying people, ordnance, and supplies in 1776 and 1777. The northwest shore dock may also have been used by vessels setting up standing and running rigging after they had their masts stepped at the nearby "masting rock." Of the many contemporary maps showing Mount Independence in 1776-1777, only one, from the court martial records of American General Arthur St. Clair, hints that a dock may have existed in this vicinity (Figure 38).<sup>9</sup>

It may truly be said that we only examined the tip of the iceberg at Mount Independence in 1992. The two weeks we spent on the site indicated the extent of the archaeological materials to be found in this vicinity. With the assistance of funds provided by the Vermont Legislature through the Division for Historic Preservation, we returned to Mount Independence in 1993 to complete the examination of the lake bottom adjacent to the north shore and to recover and conserve artifacts found in 1992 and 1993. The cannon, mortar bombs, shovels, shot, tools, and other materials in Features 1-4 were brought back to Lake Champlain Maritime Museum for conservation, along with many new finds made in 1993. Metal detector surveys and systematic excavation along the bridge corridor yielded considerable numbers of round, bar, and grape shot, mortar bombs, grenades, bayonets, two wooden grapeshot boxes, and personal possessions such as shoes and a copper skillet. These finds will eventually be displayed at a visitor center on Mount Independence. Analysis of the finds continues, and the results will be presented in future publications.



## **Appendix A**

**The 1992 Mount Independence  
Phase I  
Underwater Archaeological Survey**

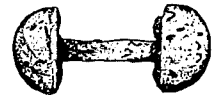
**Survey Data**

**Prepared by:  
Scott McLaughlin**



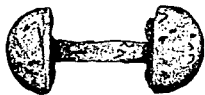
Mt. Independence Artifact Inventory

Artifact Number	Artifact Description	Provenience
01-001	bar shot	Feature 2
01-002	bar shot	Feature 2
01-003	bar shot	Feature 2
01-004	bar shot	Feature 2
01-005	bar shot	Feature 2
01-006	bar shot	Feature 2
01-007	round shovel	Feature 4
01-008	bar shot	Feature 2
01-009	bar shot	Feature 2
01-010	pick axe	Feature 2
01-011	7 grapeshot	Feature 2
a-g		
01-012	2 grapeshot	?
01-013	1 grapeshot	?
01-014	eyebolt with ring	Feature 2
01-015	?	?
01-016	flintlock musket	Transect K - 26'
01-017	iron rod	Transect M - 27'
01-018	spade	Feature 3
01-019	mortar bomb	Feature 1
01-020	mortar bomb	Feature 3
01-021	axe	Transect 2 - 58'
01-022	mortar bomb	Feature 1
01-023	iron pot fragment	Feature 1
01-024	mortar bomb	Feature 1
03-001	treenail	Caisson 2
03-002	wooden wedge	Feature 1
03-003	treenail	Caisson 2
05-001	pottery	?
05-002	glass bottle	Feature 2
05-003	glass bottle	Feature 2
05-004	glass bottle	Feature 4
05-005	glass bottle	Feature 4



Reference Points for New York Shore Survey

Reading from Datum	Reference Point	Degrees	Distance
A	Datum 1	172.50	-----
C	Datum 1	166.00	-----
A	Datum 2	177.50	-----
C	Datum 2	172.33	-----
A	Datum 3	182.33	-----
C	Datum 3	176.75	-----
A	far New York cliff past Datum C	209.00	-----
C	far New York cliff past Datum C	192.20	-----
A	right edge of middle silo	67.50	-----
B	right edge of middle silo	66.75	
A	left edge corner of white house	90.66	-----
B	left edge corner of white house	89.50	-----
C	left edge corner of white house	87.25	-----
A	far right edge of white Carillon Dock	187.50	-----
B	far right edge of white Carillon Dock	185.50	-----
C	far right edge of white Carillon Dock	183.25	-----
A	Datum B	225.75	94' 11"
A	Datum C	211.66	-----
C	Datum A	31.66	-----



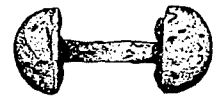
Reference Points for Vermont Shore Survey

Reading from Datum	Reference Point	Degrees	Distance
1	Datum 2	284.75 or 269.00	167' 9"
2	Datum 3	243.50 or 228.25	160' 8"
3	Datum 2	63.50	160' 8"
1	Datum 4	278.50	153' 6"
1	Fort Ticonderoga Flag Pole	329.00 or 329.75 or 313.25	-----
2	Fort Ticonderoga Flag Pole	331.75 or 316.25	-----
3	Fort Ticonderoga Flag Pole	332.00	-----
1	Pell Boathouse	349.00 or 349.75 or 333.25	-----
2	Pell Boathouse	354.25 or 338.75	-----
3	Pell Boathouse	354.33	-----
1	Lightening Rod on top of Larrabees Point Cupola	30.00 or 30.50 or 14.25	-----
2	Lightening Rod on top of Larrabees Point Cupola	31.50 or 16.00	-----
3	Lightening Rod on top of Larrabees Point Cupola	31.66 or 32.50	-----
1	Larrabees Point Red Marker Buoy	26.33	-----

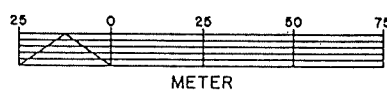
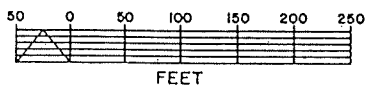
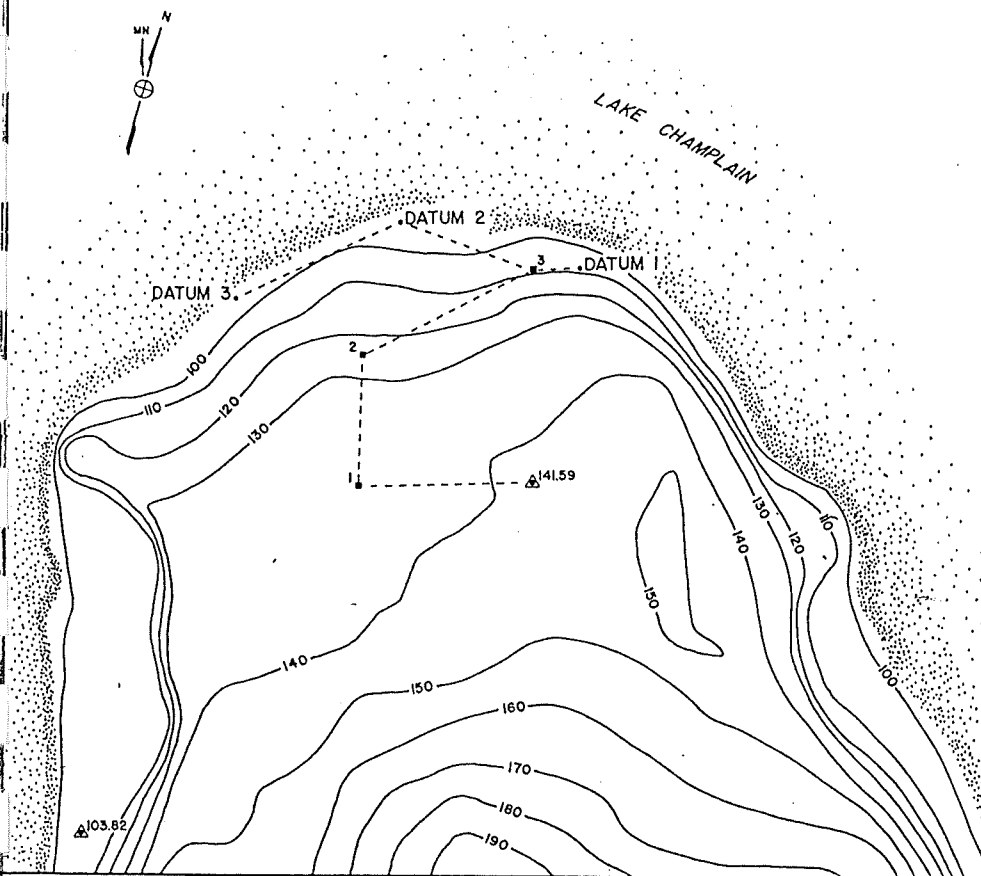
Mt. Independence Survey Tie-ins

Reading from	Reference Point	Degrees	Distance
Bench Mark (141.59')	Survey Point 1	268.25	154' 9"
Survey Point 1	Survey Point 2	1.25	118' 4"
Survey Point 3	Datum 1	87.25	43'
Survey Point 3	Datum 2	290.50	127' 2½"





# MT. INDEPENDENCE SURVEY 1992



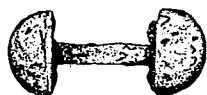
■ - Survey Point

▲ - Bench Mark

Contour Interval 10 Feet

Source: Photo Science, Inc., Mt. Independence (04-25-91)

S.A.M. 2-95



Ticonderoga, New York Shoreline Points

Reading from Datum	Shoreline Point Number	Degrees	Distance from Transit
A	1	28.75	15'
B	1	42.00	56' 4"
C	1	193.66	40'
A	2	6.00	29' 10"
B	2	34.66	45' 8"
C	2	199.30	25' 10"
A	3	359.25	45' 04"
B	3	33.00	33' 7"
C	3	207.10	17' 1"
A	4	347.00	61' 00"
B	4	41.66	23' 8"
C	4	190.66	12' 7"
A	5	352.50	101' 00"
B	5	82.50	16' 11"
C	5	122.50	7' 2"
A	6	357.25	115' 02"
B	6	113.25	8' 8"
C	6	148.66	13' 4"
A	7	2.50	132' 03"
B	7	198.25	5' 8"
C	7	25.00	26' 8"
A	8	5.75	149' 08"
A	9	8.50	169' 08"
B	10	304.75	19' 2"
B	11	8.66	31' 7"
B	12	331.25	25' 3"
B	13	310.33	27' 3"
B	14	295.50	50' 7"
B	15	289.33	29' 3"
B	16	268.66	40' 10"
B	17	254.75	52' 9"
B	18	240.66	68'
B	19	229.50	80' 1"
B	20	219.75	93'
B	21	213.00	100' 6"
B	22	209.00	115' 1"
B	23	205.66	132' 5"
B	24	204.25	148' 4"
B	25	205.00	-----



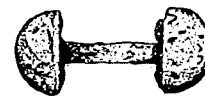
Orwell, Vermont Shoreline Points

Reading from Datum	Shoreline Point Number	Degrees	Distance from Transit
1	1	96.75	59' 7"
1	2	89.25	40' 8"
1	3	78.75	27' 7"
1	4	40.75	17'
1	5	6.00	19' 6"
1	6	325.75	20' 11"
1	7	277.00	34' 4"
1	8	271.25	58' 6"
1	9	272.00	67' 1"
1	10	271.75	95' 10"
1	11	270.75	110' 2"
1	12	270.25	126' 5"
1	13	271.00	144' 10"
1	14	268.25	152' 2"
1	15	272.25	159' 9"
1	16	273.75	166' 8"
1	17	273.00	174' 3"
2	18 (9)	236.25	125'
2	19 (10)	232.25	139' 1"
2	20 (11)	230.00	152' 5"
2	21 (12)	229.25	167' 3"
2	22 (13)	228.50	181' 8"
2	23 (14)	230.00	199' 4"
2	24	171.75	27' 2"
2	25	202.25	42' 3"
2	26	220.50	71' 4"
2	27	215.00	94' 4"
2	28	222.00	127' 3"
2	29	222.75	148' 5"
2	30	227.00	133' 6"
3	31	237.75	133' 3"
3	32	240.25	116' 1"
3	33	239.00	103' 3"
3	34	239.50	83' 1"
3	35	240.50	64' 5"
3	36	240.00	51' 4"



Orwell, Vermont Tree Line Points

Reading from Datum	Shoreline Point Number	Degrees	Distance from Transit
1	1	109.25	50' 3"
1	2	123.50	44' 9"
1	3	136.00	36' 10"
1	4	169.25	30' 3"
1	5	209.00	35' 5"
1	6	227.50	42' 8"
1	7	240.00	70' 5"
1	8	246.00	77' 8"
1	9	255.50	110' 5"
1	10	257.50	130' 1"
2	1	171.25	27' 2"
2	2	202.25	42' 3"
2	3	220.50	71' 4"
2	4	215.00	94' 4"
2	5	222.00	127' 3"
2	6	222.75	148' 5"
2	7	227.00	133' 6"
2	1	316.00	9' 2"
2	2	252.00	12' 7"
2	3	230.50	30' 0"
2	4	237.00	47' 10"
2	5	239.00	59' 9"
2	6	236.00	75' 6"
2	7	237.50	94' 8"
2	8	236.25	107' 3"
3	1	171.00	16' 7"
3	2	101.25	18' 6"
3	3	235.00	52' 2"
3	4	214.00	49' 4"
3	5	215.00	68' 0"
3	6	225.75	69' 3"
3	7	220.75	83' 3"
3	8	227.00	96' 11"
3	9	231.75	116' 11"
3	10	235.25	124' 4"

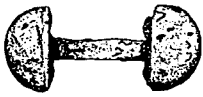


New York Underwater Features

Readings from Datum	Feature Name	Degrees
A	French sloop sternpost	172.75
C	French sloop sternpost	87.00
A	French sloop port side	175.25
C	French sloop port side	95.50
A	French sloop starboard side	178.75
C	French sloop starboard side	93.50
A	French sloop stem	181.33
C	French sloop stem	105.25
A	Boscawen sternpost	167.25
C	Boscawen sternpost	75.00
A	Boscawen stem	188.75
C	Boscawen stem	50.00
A	east rock pile	195.25
C	east rock pile	155.50 and 144.75
A	west rock pile	197.00
C	west rock pile	172.50 and 167.25

Vermont Underwater Features

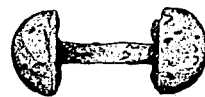
Feature Number	Feature Name	Datum 1 Bearing	Datum 2 Bearing	Datum 3 Bearing
1	Iron Cannon and Mortar Bombs	X=287.75 Y=285.50	X=287.00 Y=285.00	X=8.66 Y=9.66
2	Bar Shot Scatter	X=331.50 Y=331.00	X=34.00 Y=31.00	X=50.75 Y=49.25
3	Spade Scatter	X=295.50 Y=288.50	X=295.00 Y=288.00	X=359.50 Y=356.25
4	Bottles/Shovel	326.75	20.25	44.25
5	Caisson Logs	330.0	10.0	36.00

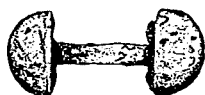


1777 Great Bridge Caissons

Reading from Datum	Caisson Number	Location of Point	Degrees
1	1	north corner	322.33
4	1	north corner	51.33
5	1	north corner	61.00
1	1	corner	318.50
4	1	corner	48.33
5	1	corner	60.00
1	2	center	339.25
2	2	center	11.50
3	2	center	33.25
C	2	center	177.66
1	2	north corner	327.75
2	2	north corner	0.00
3	2	north corner	17.25
1	2	south corner	322.75
2	2	south corner	356.00
3	2	south corner	16.00
1	2	east corner	326.75
2	2	east corner	1.00
3	2	east corner	18.50
1	2	west corner	324.00
2	2	west corner	355.25
3	2	west corner	14.50
1	3	north corner	345.50
2	3	north corner	11.00
3	3	north corner	27.50
1	3	south corner	341.50
2	3	south corner	8.00
3	3	south corner	26.75
1	4	north corner	347.25
2	4	north corner	9.00
3	4	north corner	24.25
1	4	south corner	343.50
2	4	south corner	5.75
3	4	south corner	22.50
1	5	north corner	346.75
2	5	north corner	5.75
3	5	north corner	20.75
1	5	south corner	345.25
2	5	south corner	4.00
3	5	south corner	19.00

Reading from Datum	Caisson Number	Location of Point	Degrees
1	6	north corner	348.25 or 349.00
2	6	north corner	4.50
3	6	north corner	17.50 or 17.75
1	6	south corner	346.50 or 346.25
2	6	south corner	2.25
3	6	south corner	16.00 or 16.30
1	7	north corner	349.50
2	7	north corner	4.50
3	7	north corner	15.75 or 15.50
1	7	south corner	347.50
2	7	south corner	2.50
3	7	south corner	14.50
1	8	north corner	350.00 or 349.75
2	8	north corner	3.00
3	8	north corner	3.50 or 13.33
1	8	south corner	348.25 or 348.00
2	8	south corner	1.50
3	8	south corner	3.00 or 12.50
1	9	north corner	350.75
2	9	north corner	13.00
3	9	north corner	1.50 or 12.50
A	9	north corner	173.75
C	9	north corner	162.25
1	9	south corner	349.00
2	9	south corner	12.00
3	9	south corner	3.00 or 11.50
A	9	south corner	175.00
C	9	south corner	163.75
A	10	north corner	173.50
C	10	north corner	160.75
A	10	south corner	175.00
C	10	south corner	162.66
A	11	north corner	174.50





Reading from Datum	Caisson Number	Location of Point	Degrees
C	11	north corner	160.70
A	11	south corner	175.00
C	11	south corner	161.66
A	12	north corner	173.50
C	12	north corner	158.66
A	12	south corner	175.00
C	12	south corner	160.75
A	13	west corner	173.50
C	13	west corner	158.75
A	13	south corner	174.75
C	13	south corner	159.00
A	14	north corner	173.25
C	14	north corner	155.25
A	14	south corner	175.50
C	14	south corner	157.66
A	15	center	171.75, 173.25, or 173.75
C	15	center	151.25 or 152.00
A	16	center	173.50
C	16	center	149.00 or 149.66
A	16	north corner	172.40
C	16	north corner	148.50
A	16	south corner	173.66
C	16	south corner	149.25
A	17	center	172.33
C	17	center	144.50
A	19	north corner	172.33
C	19	north corner	126.00
A	19	south corner	173.75
C	19	south corner	132.00
A	20	north corner	170.33
C	20	north corner	114.25
A	20	south corner	174.37
C	20	south corner	118.50
A	21	north corner	177.33
C	21	north corner	79.00
A	21	south corner	175.66
C	21	south corner	84.00
A	21	east corner	175.50





Reading from Datum	Caisson Number	Location of Point	Degrees
C	21	east corner	84.25
A	21	west corner	182.66
C	21	west corner	83.00
A	22	north corner	186.66
C	22	north corner	61.50
A	22	south corner	189.33
C	22	south corner	70.75

Vermont Shoreline Transect Data

Reading from Datum	Transect Number	Buoy or Marker	Degrees	Distance
2	1	buoy	280.00	-----
3	1	marker	33.00	53' 7"
2	2	buoy	270.50	-----
3	2	buoy	331.75	-----
3	2	marker	31.25	49' 0"
3	3	marker	27.75	44' 8' "
3	4	marker	29.00	39' 9"
3	5	buoy	326.50	-----
3	5	marker	28.00	35' 1"
2	6	buoy	270.50	-----
3	6	marker	29.50	29' 9"
3	7	marker	30.00	24' 4"
2	8	buoy	266.75	-----
3	8	marker	33.50	18' 4"
3	A	marker	36.00	57' 10"
3	B	marker	37.50	62' 9"
3	C	marker	138.13	67' 10"
3	D	marker	39.00	73' 0"
3	I	marker	249.70	66' 2"
2	J	marker	250.90	60' 9"
2	K	marker	250.10	55' 9"
2	K	buoy	307.40	-----



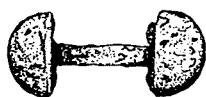
## Artifacts from Vermont Shoreline Transects

Transect Number	Description	Catalogue Number	Distance out from Shore
8	musket parts		41'
8	bayonet		68'
7	nothing		-----
6	nothing		-----
5	nothing		-----
4	shovel		82'
4	shovel		84' 5"
4	shovel		90'
3	shovel		81'
3	shovel		94'
2	door lock		50'
2	axe	01-021	58'
2	shovel		65'
2	shovel		82'
2	shovel		88'
2	shovel		90'
2	2 shovels		90' 8"
1	shovel		80'
1	shovel		82'
1	shovel		88'
1	shovel		90' 4"
1	2 shovels		100'
A	bottle with screw cap		32'
A	shovel		87'
B	bottle		34'
C	7" metal rod		100'
D	16 spikes and a bayonet		60' 6"
D	4" dia. round pointed piece of wood, 1' long		80' 10"
D	modern crampons, leather, and spikes		100'
E	log		59'
E	carriage wheel		69'
E	modern jug		72'
F	glass		40'
G	corked pint whiskey bottle		80'

The 1992 Mount Independence Phase One Underwater Archaeological Survey



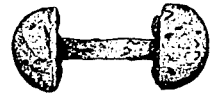
Transect Number	Description	Catalogue Number	Distance out from Shore
H	log		44'
H	gigantic bicycle-like chain		90'
I	log		40'
I	log		55'
I	log		60'
I	leather shoe sole		74' 9"
I	3" oval shaped iron bar, 5' long		81' 3"
I	treenail		96' 7"
J	log		54'
J	log		61'
J	planks with spikes		81'
K	flintlock musket	01-016	26'
K	5' metal rod with holes at both ends		43'
K	log		56'
K	log		61'
K	log		69'
K	bottle		72' 10"
K	planks		91'
L	pane of glass		20'
L	flintlock musket	01-016	27'
L	modern barrels		33'
L	log		40'
L	metal pipe		45'
L	log		55'
L	piece of leather		65'
L	timber 4.5' x 5"		91'
L	5' long piece of wood with nails		92' 5"
L	clear glass bottle		100'
M	iron rod	01-017	27'
M	unknown modern object		96'
N	log		47'
N	22' long pipe		89'
O	log		48'



Transect Number	Description	Catalogue Number	Distance out from Shore
O	log		62'
O	pipe		75'
O	small wood pieces		95'
P	modern bottle		2' 8"
P	modern jug top		9' 7"
P	modern bottle neck		11' 11"
P	6" iron concretion		30' 1"
P	1" plank with iron fasteners		59' 11"
P	log		81'
Q	modern glass		17' 1"
Q	anchor with folding stock 2.5-3' long		53'
Q	rod with cup at one end		57' 5"
Q	circular leather fragment		67' 4" (1' 6" S)
Q	charred timber		71'
R	numerous modern bottles		30'
R	anchor with folding stock 2.5-3' long		54'
R	5 plank fragments		62-70'
S	2 modern bottles		27'
S	modern bottle		63'
S	plank fragments		62-70'
T	log		51'
T	log		54'
T	log		57'
U	half a brick		18'
U	leather shoe sole		81' 11"
V	log		46'
V	modern metal object		95'
W	log		46'
W	piece of bone		53'

Miscellaneous Artifact Locations

Description	Catalog Number	Datum 1 Bearing	Datum 2 Bearing	Datum 3 Bearing
1 large bar shot		314.00	17.50	34.25
2 small bar shot		313.25	14.75	32.50
cannon cascabel		-----	273.50	356.25
cannon muzzle		-----	271.75	351.50
cannon trunnion		-----	272.50	354.00
Feature 1 grid		-----	270.50	353.00
Feature 1 grid		-----	272.50	352.00
Feature 1 grid		-----	269.00	348.50
Feature 1 grid		-----	271.50	347.50
flintlock musket	01-016	-----	280.80	42.00
shovel		309.75	4.00	28.00





## Appendix B

The 1992 Mount Independence  
Phase I  
Underwater Archaeological Survey

### Preliminary Catalogue of Artifacts

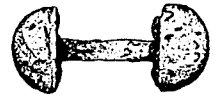
Prepared by:  
Victor Campano  
Texas A&M University

## Introduction

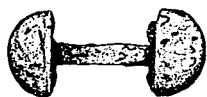
One of the primary objectives of the 1992 underwater archaeological survey off the northern shore of Mount Independence was to determine the quantity, condition, and location of Revolutionary War-related artifacts and structures. A considerable amount of material was encountered during the project, and representative samples were temporarily recovered from the lakebottom off the northern end of Mount Independence. The purpose of recovery was to get a better idea of the nature and condition of these artifacts, since the low to non-existent visibility prevented us from seeing them on the bottom. All recovered objects were photographed, measured, drawn, and closely examined. The Lake Champlain Maritime Museum was not prepared to undertake conservation treatments at this time, nor did the objectives of the survey include permanent recovery and treatment of finds. For these reasons everything was redeposited on the bottom in a secure location after the conclusion of the cataloguing process. The objects listed below were permanently recovered in 1993 (along with several hundred other Revolutionary War-era items), conserved in a laboratory at the Maritime Museum, and added to the permanent collection of Mount Independence-related artifacts maintained by the State of Vermont Division for Historic Preservation.

## Tools

This category of artifacts includes the twenty entrenching spades, one shovel, a felling axe, and a pick axe. All are good examples of the types of tools employed by eighteenth-century armies for the construction of fortifications, siege lines, cantonments, and other military works.



- 01-018      Iron entrenching spade. Overall length 16-1/2 inches, blade length 11-7/8 inches, socket length 6-1/8 inches, blade width measured from the shoulders of the blade 5-3/4 inches, cutting edge width 5-7/8 inches. Iron socket contains fragment of wooden handle. Relatively minor corrosion. Rectangular in shape with a flange at the top for pushing with the foot. The top one-half inch of the blade is bent forward to form the flange. This tool is very similar to the type 1 classification found at Fort Stanwix, a Revolutionary War fortification site in central New York.<sup>1</sup> From Feature 3, spade #1 (see feature plan, Figure 12). Nineteen of the twenty spades located in 1992 were found in the Feature 3 cluster; this particular spade was selected as a good representative example of the spades.
  
- 01-007      Iron round bladed shovel. Overall length 15-1/16 inches, blade length 9-13/16 inches, socket length 6-1/2 inches, blade width measured at the shoulders 9-1/4 inches, cutting edge width is approximately 5 inches in width. Unlike the entrenching spade (01-018), there is no flange to accommodate pushing down with the foot. Moderate to heavy corrosion of the blade (this artifact was found atop a flat rock, and was thus not protected by a covering of fine bottom sediments). From Feature 4, in close proximity to bottles 05-004 and 05-005 (see feature plan, Figure 13).
  
- 01-021      Iron felling axe. Overall length 11-15/16 inches, 8-1/4 inches maximum blade width. Heavy concretion around the haft-hole and poll. This artifact is probably a felling axe because it does not have the single flat side of a broad axe. It closely resembles a type of felling axe used specifically to cut down trees, the Kent type, which was common in the last quarter of the eighteenth century.<sup>2</sup> From northwest shoreline survey area (see Figure 4).
  
- 01-010      Iron Pick axe. Overall length 2 feet, 2 inches (from tip to tip along the top of the pick). One end tapers down to a point 3/8 of an



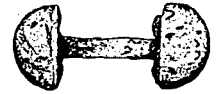
inch wide while the other end of the axe head flares out to a flat wedge shape 1-1/2 inches wide. A fragment of the wooden handle remains inside the haft hole (remaining handle length is 2-3/4 inches at its longest point). The haft hole is 3 inches long and 1-1/2 inches wide. This pick resembles the "B" type excavated at Fort Stanwix.<sup>3</sup> It is designated as a "large" pick common to the 18th century which measures 21 to 22 inches long. The pick head is in good condition with minor corrosion spots. From Feature 2 (see Figure 10).

## Ordnance and Small Arms

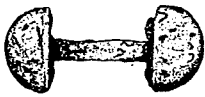
This category of artifacts includes bar shot, mortar bombs, grape shot, and one musket. The range of bar shot sizes discovered at this site is quite remarkable. This variety suggests that Mount Independence was armed with many different sizes of guns, which of course would have complicated supplying the batteries during action.

- 01-001      Iron bar shot. Overall length 15-1/16 inches, 6-1/2 inches wide, bar length 7-7/8 inches, bar 1-1/2 inches square. Some iron concretion on both hemispheres. According to Mendel Peterson's British Iron Gun Table, this bar shot most likely fit a 24- or 32-pounder cannon<sup>4</sup>. From Feature 2 (see Figure 10).
  
- 01-002      Iron bar shot. Overall length 12-1/4 inches, 4-1/16 inches wide, bar length 7-5/16 inches, bar width 15/16 of an inch square. Minor corrosion of both hemispheres and bar. Peterson's table indicates this bar shot was intended for use in a 9-pounder cannon. From Feature 2 (see Figure 10).
  
- 01-003      Iron bar shot. Overall length 12-15/16 inches, 3-15/16 inches wide, bar length 7-3/4 inches, bar width 1 inch square. Heavy concretion on one hemisphere. Hemisphere diameter indicates shot cast for a 9-pounder cannon. From Feature 2 (see Figure 10).
  
- 01-009      Iron bar shot. Overall length 12-15/16 inches, 4-1/8 inches wide, bar length 8 inches, bar width 1-1/16 inches square. Some corrosion on bar and hemispheres but minimal concretion build up. Peterson's table indicates this shot was cast for a 12-pounder cannon. From Feature 2 (see Figure 10).





- 01-006 Iron bar shot. Overall length 12-7/8 inches, 5-3/8 inches wide, bar length 7-1/8 inches, bar width 1 inch square. Concretion buildup on the bar has distorted its shape. Peterson's table suggests that this shot was cast for use in an 18- or 24-pounder cannon. This shot was originally found in 1983, in the vicinity of Feature 2.
- 01-004 Iron bar shot. Overall length 12-15/16 inches, 5-1/4 inches wide, bar length 6-7/8 inches; bar width 1-5/16 inches square. Considerable concretion build-up on both hemispheres and bar (the result of this shot lying upon a rock, rather than under the surrounding fine sediments). Probably a 12 or 18-pounder bar shot. From Feature 2 (see Figure 10).
- 01-005 Iron bar shot. Overall length 12-1/8 inches, 3-15/16 inches wide, bar length 7-3/16 inches, bar width 3/4 of an inch square. Deformation of one hemisphere caused by heavy concretion. Cannon table indicates that this is a 9-pounder bar shot. This shot, like bar shot 01-006, was originally found in 1983 in the vicinity of Feature 2.
- 01-008 Iron bar shot. Overall length 12-5/8 inches, 4-5/16 inches wide; bar length 7-3/8 inches, bar width 1-5/16 inches square. Concretion build up on both hemispheres and bar. Cannon table suggests that this was probably a 12-pounder shot. From Feature 2 (see Figure 10).
- 01-020 Iron mortar bomb. Outside diameter 6 inches, fuse hole diameter approximately 1 inch (the fuse itself was missing). Some corrosion on surface. Bomb diameter indicates that its usage was in a "Royal" type British mortar which was introduced in the later 1720s.<sup>5</sup> Early model Royals used the 5.8 inch caliber design which was later changed to a 5.62 inch caliber muzzle. From Feature 3 (see Figure 12).
- 01-022 Iron mortar bomb. Outside diameter 8 inches. Fuse hole diameter is approximately 1-1/2 inches (the fuse itself was missing). Minor corrosion on surface. This type of mortar bomb was probably used for the British eight-inch mortar which was introduced in the later 1720s. From Feature 1, where it was one of thirty-four eight-inch mortar bombs found in the vicinity of an iron cannon (see Figure 8).



- 01-011a-g Iron grape shot. Diameters: one shot 1-7/16 inches, one shot 1-1/2 inches, four shot 1-9/16 inches, one shot 1-5/8 inches. The seven shot are pitted with corrosion. Grapeshot were designed for use against people, small boats, and other hard-to-hit targets. Several shot (usually nine) were fired in a single charge. A stand of grapeshot consisted of an iron or wooden base and spindle surrounded by cast iron balls and enclosed in a canvas bag. These six grapeshot were recovered from Feature 2 (see Figure 10).
- 01-016 Flintlock musket. Overall length 56-5/8 inches, barrel length 40-3/4 inches. Heavy concretion around the cock, frizzen, and pan. The pan is possibly of brass. All other metal parts are iron. The trigger guard is missing, but the weapon otherwise appears to be in very good condition. This particular musket is similar to a French Charleville type 1763, although the brass pan only appears on the later 1777 model.<sup>6</sup> According to Harold L. Peterson, all French-made muskets had a .69 caliber barrel and they also had their barrels fastened to their stocks by three iron rings. After recovery and conservation treatments in 1993 the name "Pomeroy" was found stamped on the lock plate, indicating that it was manufactured by Seth Pomeroy of Northampton, Massachusetts. From northwest shoreline survey area (see Figure 4).

## Bottles

This category includes four green-glass free-blown bottles. Two of the bottles were intact, and the other two, though broken, were substantially complete. The type of bottle represented by these four examples typically contained wine or spirits, although they occasionally were filled with other types of liquid.

- 05-002 Green glass bottle. Overall length 8-13/16 inches, neck length 2-13/16 inches, lip diameter 1-3/16 inches, shoulder diameter 3-7/8 inches, base diameter 4 inches. Bottle is broken on the shoulder and side of body. This bottle appears to be a type of wine style container which was used to hold not only wine, but also other liquids such as vinegar and beer.<sup>7</sup> According to Jones and Smith, bottles such as this one first appeared in the 1760s and were quite common in the late eighteenth century. The stringer on this particular bottle is downtooled with a flattened lip<sup>8</sup>. From Feature 2 (see Figure 10).

- 05-003 Green glass bottle. Overall length 10-3/4 inches, neck length 3-3/8 inches, lip diameter 1-3/8 inches, shoulder diameter 3-7/16 inches, base diameter 3-5/8 inches. Bottle has no cracks but surface area around left shoulder and body exhibits moderate exfoliation. Bottle is otherwise in fairly good condition. Smith and Jones believe that the sloped lip and flattened string rim indicate a wine-type bottle. From Feature 2 (see Figure 10).
- 05-004 Green glass bottle. Overall length 9-7/16 inches, neck length 2-3/4 inches, lip diameter 1-3/8 inches, shoulder diameter 4 inches, base diameter 4-1/16 inches. No cracks. Two large air bubbles within the glass on the neck. Other bubbles near base and within body. Body is in excellent shape. V-shaped string rim and a sloped lip. From Feature 4 (see Figure 13).
- 05-005 Green glass bottle. Overall length 9-3/8 inches, neck length 3 inches, lip diameter 1-3/8 inches, shoulder diameter 3-7/8 inches, base diameter 4-3/16 inches. Shoulder and body are broken and several pieces are missing. Jones and Smith identify this form as a wine-type bottle.<sup>9</sup> The stringer is flattened and the lip is sloped. From Feature 4 (see Figure 13).



## Miscellaneous

This category includes two treenails, a wooden wedge, an iron rod, an iron pot base, and an unidentified iron object. The purpose of the iron rod (01-017) has not been determined as yet and the unidentified iron object (01-014) seems to be a fastener of some kind but further examination and conservation are necessary.

- 01-014 Iron object. Overall length 6-3/16 inches, 2-3/4 inches maximum width. Heavy concretion build up over the entire object. The artifact resembles a bolt with an iron ring attached.
- 01-017 Iron rod. Overall length 18-1/4 inches, average width 1 inch. Heavily corroded with heavy concretion build up.
- 01-023 Iron pot fragment. Overall height 5 inches, 7-5/16 inches wide. Wall thickness 5/16 of an inch. Length of the single leg 2-1/8 inches. This fragment was part of a small 3- or 4-legged iron



- cooking pot. From Feature 1 (see Figure 8).
- 03-001      Wooden treenail. Overall length 12-1/2 inches overall length, 1-3/8 inches at widest point. Moderate erosion along entire treenail, except at one end where heavy erosion has taken place. This artifact was found in Caisson 2, where it pinned together the caisson logs.
- 03-003      Wooden treenail. Overall length 11 inches, 1-3/8 inches wide. Possibly oak. Bevelled cut on one end, sides have flat planes were treenail was shaped by some sort of carving tool. This artifact was found in Caisson 2, where it pinned together the caisson logs.
- 03-002      Wooden wedge. Overall length 7 feet, 1/2 inch, 1 foot wide on flat side. Possibly oak. Moderate erosion near center of wedge. This timber was found near the canon, but may be a piece of drift wood. From Feature 1 (see Figure 8).

## Notes



1. See the companion volume to this report, Arthur B. Cohn, *The Great Bridge: "From Ticonderoga to Independant Point,"* (Basin Harbor, Vermont: Lake Champlain Basin Program, 1995), for a detailed history of Mount Independence during and after the Revolutionary War.
2. David R. Starbuck and William Murphy, "Archaeology at Mount Independence: An Introduction," and Dennis E. Howe, William Murphy and Marjorie Robbins, "The Southern Battery at Mount Independence," in David R. Starbuck, ed., *The Journal of Vermont Archaeology*, Volume I (Burlington, Vt.: Vermont Archaeological Society, 1994), pp. 115-140. The bibliographies for these two articles contain an up-to-date listing of recent terrestrial archaeological studies on Mount Independence.
3. Paul R. Huey, Senior Scientist, New York Bureau of Historic Sites to Giovanna Peebles, Vermont State Archaeologist, January 19, 1995.
4. R. Montgomery Fischer, ed., *A Report on the Nautical Archaeology of Lake Champlain* (Burlington, Vt.: Champlain Maritime Society, 1985), pp. 41-45.
5. Brian Leigh Dunnigan, *Seige - 1759: The Campaign Against Niagara* (Youngstown, N.Y.: Old Fort Niagara Association, Inc., 1986), p. 110; *The Pennsylvania Gazette* (Philadelphia), January 27, 1742, p. 4, col. 1; John Knox, *An Historical Journal of the Campaigns in North America for the Years 1757, 1758, 1759, and 1760* (Freeport, N.Y.: Books for Libraries Press, 1970), Volumes I-III passim; G.D. Scull, ed., *The Montrossor Journals*, Collections of the New York Historical Society (New York: The New York Historical Society, 1882), p. 179 and *passim*.
6. Thomas Williams Baldwin, ed., *The Revolutionary War Journal of Col. Jeduthan Baldwin 1775-1778* (Bangor, Me.: Printed for the De Burians, 1906), p. 94.
7. *Ibid*, pp. 96, 97, 99.
8. Giovanna Peebles, Vermont State Archaeologist to Arthur Cohn, Director of the Lake Champlain Maritime Museum, October 20, 1993.
9. New York Historical Society, *Proceedings of a Court Martial for the Trial of Major General St. Clair*, Collections of the New York Historical Society (New York: New York Historical Society, 1881).



## Notes for Appendix B

1. Lee Hanson and Dick Ping Hsu, *Casemates and Cannonballs*, Publications in Archaeology 14 (Washington, D.C.: U.S. Department of the Interior, 1975), pp. 198-199.
2. Eric Sloane, *A Museum of Early American Tools* (New York: Wilfred Funk, Inc., 1964), p. 13.
3. Hanson and Hsu, pp. 100-101.
4. Mendel Peterson, *History Under the Sea: A Handbook for Underwater Exploration* (Washington, D.C.: Smithsonian Institution, 1965), p. 80.
5. David McConnell, *British Smooth-Bore Artillery: A Technological Study* (Ottawa: Minister of the Environment, 1988), pp. 115-120, 290-291.
6. Harold L. Peterson, *The Book of the Continental Soldier* (Harrisburg, Pa.: The Stackpole Co., 1968), pp. 136-138.
7. Olive R. Jones and E. Ann Smith, *Glass of the British Military* (Ottawa: Minister of the Environment, 1985), pp. 13-14.
8. Olive Jones and Catherine Sullivan, *Glass Glossary* (Ottawa: Minister of the Environment, 1989), p. 77.
9. Jones and Smith, p. 20.