Resume of a Seventeenth-Century Top-Secret Weapon: The Story of the Mount Independence Cannon

by Scott A. McLaughlin

Abstract

Rarely do researchers have the opportunity to write a detailed history of an individual artifact found at an archaeological site. The history of most objects remains unknown or their specific history provides few new and exciting details about the past. The 1993 recovery of a cannon associated with a scatter of Revolutionary War artifacts in Lake Champlain off Mount Independence led the author on a seven-year quest in search of its curious history. Institutions in the United States, Canada, and England were scoured for relevant information, with the assistance of numerous military historians, archivists, librarians, and museum curators. Thanks to their aid it has been possible to reconstruct much of the career and history of the Mount Independence cannon and how this innovative piece of military technology found its way to the bottom of Lake Champlain.

Introduction

In 1992 and 1993 the Lake Champlain Maritime Museum at Basin Harbor conducted an archaeological survey in the waters between Fort Ticonderoga and Mount Independence. During a proton procession magnetometer survey in 1992, an artifact concentration was discovered in Lake Champlain 26.5 m (87 ft) off the shoreline of Mount Independence in 2.4 m (8 ft) of water. A cast iron cannon and a collection of 8-inch mortar shells made up most of Feature 1 (Table 1) and registered as a substantial hit by the magnetometer (Figures 1 and 2). Subsequent dives in 1992 and 1993 revealed the additional artifacts that comprised this feature (Figure 3).

The Mount Independence Cannon

The largest artifact found and recovered from underwater Feature 1 off Mount Independence during the Fort Ticonderoga-Mount Independence Submerged Cultural Resource Survey was the cast iron cannon (artifact no. I.93.711.116), which has a bell-shaped muzzle, spherical breech, knob-shaped cascabel button, and few decorative elements (Figure 4). The left trunnion (artifact no. I.93.711.202) had been broken off and was found approximately 25 m (82 ft) from the cannon (Figure 5). The cannon is 3.02 m (9 ft 11 in) in length with a maximum diameter of just over 40.6 cm (16 in) and a bore diameter of 11.7 cm (4.6 in). It was intended to hurl a 5.45 kg (12 lb) solid cast iron ball and is thus usually referred to as a 12-pounder, even though it shot other projectiles weighing different amounts (Caruana 1994; Gooding 1988).

The 12-pounder cannon originally had a bore of 11.7 cm (4.6 in), length of 2.59-3.20 m (8.5-10.5 ft), and average weight of 1,225.8-1,589.0 kg (2,700-3,500 lb). The point blank range for the heaviest 12-pounders was 670 m (733 yd), and its utmost range was 3,350 m (3,665 yd). The black powder measures for the 12-pounder cannon consisted of 3.2 kg (7 lb) for regular service, 2.2 kg (4 lb 12 oz) for saluting, and 28.4 g (1 lb) for scaling or cleaning the cannon (Fortune 1992 [1778]).

The markings on the tube or barrel of the Mount Independence cannon include a cipher or crest, the numbers 20 and 7547 on the second reinforce, and a British broad arrow and the series of numbers 27-3-16 on the first reinforce

Table 1. Artifact summary for Feature 1.

Feature 1 - Iron Cannon and Shells

Artifact Description	Quantity	Catalogue Number
12-pounder cannon	1	116
grapnel anchor arm	1	068
iron barrel hoop	1	080
10-inch cauldron fragment	3	075, 228
8-inch mortar shell	21	084, 119, 120, 165, 166, 167, 190, 198, 212, 227, 232, 234, 235, 236, 244, 245, 246, 247, 248, 257, 258
grenade fragment	1	276
9-pounder round shot	1	153

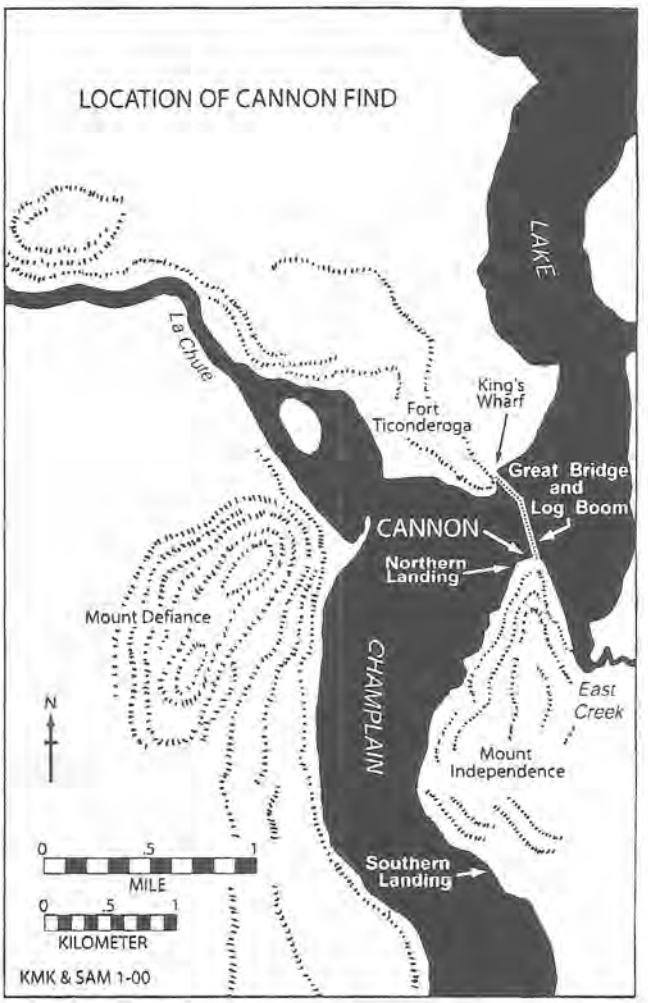


Figure 1. *The location of the cannon find in Lake Champlain off Mount Independence, Orwell, Vermont.*

(Figure 6). At the time, artillery were marked with various information throughout their lifetimes. The most obvious indicator of the origin of artillery is a mark of property. A fleur-de-lis or broad arrow was often chiseled or cast into French and British government property, respectively. The broad arrow chiseled into the Mount Independence cannon indicates that the cannon was the property of the British government and that it had passed its proofing. After a British cannon was cast, it was tested for defects, and, if it passed, a broad arrow was generally chiseled into the piece. Prior to the nineteenth century, no rules dictated where the broad arrow was to be placed. However, most seem to have been prominently displayed on the top of the barrel with the arrow pointed toward the muzzle (Gooding 1988:24). The broad arrow on the Mount Independence cannon is deeply chiseled into the piece at the forward end of the first reinforce.

The most prominent marking on a European piece of ordnance is often the badge or cipher of the monarch during whose reign the piece was cast. The cipher was usually cast into the second reinforce of the piece using standard molds that were used for all pieces manufactured at a foundry (Gooding 1988:21). The cipher on the Mount Independence piece should be that of a British monarch. However, an extensive search at the Royal College of Arms in London, England and of numerous publications has revealed no match.

The number 7547 chiseled into the rear of the second reinforce of the Mount Independence cannon is an inventory number similar to a serial number. The registration number makes the cannon immediately identifiable as a cannon aboard H.M.S. *Essex* (1679), a third-rate ship in the Royal Navy. The registration number was chiseled into the gun during an extensive inventory called the 1696 Survey. This British national ordnance survey lists 14,815 guns. The exact dates when the survey was carried out are unknown, but it appears to have occurred around 1694 to 1703. The 1696 Survey was the only major British ordnance survey prior to the nineteenth century that produced registration numbers that were chiseled into the pieces. The numbers cut into the ordnance during the survey were large, slightly irregular, engraved by hand across the gun, and virtually always in the region of the first or second reinforce. The survey appears to have been the project of George Browne, a prominent, successful artillery officer, who was also given titles of the Master Gunner of England and Colonel of the Royal Artillery during the survey (Caruana 1994:110, 116).

The series of numbers 27-3-16 on the first reinforce represent the cannon's weight. To help distinguish between artillery of the same caliber, a system was introduced in the seventeenth century whereby the weight of the barrel was used, along with the caliber or bore diameter, when describing a piece. The different weights for 12-pounders used by the Royal Navy during the late seventeenth century was 1,372.9 kg (3,024 lb) for light 12-pounders, 1,550.9 kg (3,416 lb) for medium 12-pounders, and 1,728.8 kg (3,808 lb) for heavy 12-pounders (Tanner 1903:237). To identify the weight of an artillery piece, all ordnance was weighed, after it was manufactured, and marked with its weight, often chiseled on the breech or first reinforce near the vent or occasionally just over or under the cascabel. The numbers were always chiseled in groups of three, separated by a dash or a dot. The first number represents the whole units of long hundredweight (lcwt), in which 1 lcwt is equal to 112 pounds (lb). The second is quarters of one long hundredweight (lqtwt), in which 1 lqtwt is equal to 28 lb, and the third represents the whole units of pounds (lb). So the heft of the Mount Independence cannon, marked with the numbers 27-3-16, in pounds is (27 times 112) plus (3 times 28) plus 16, making a total of 1,418.3 kg (3,124 lb). This weight makes the Mount Independence cannon a light 12-pounder. If the barrel had been re-bored during its career, the new weight and date of the boring would have been chiseled on the first reinforce just before it was proofed again (Gooding 1988:20-21).

The number 20, chiseled into the right side of the second reinforce of the Mount Independence cannon, is an inventory number placed on the cannon by the master gunner of the H.M.S. *Essex*. When cannon were received on board, either

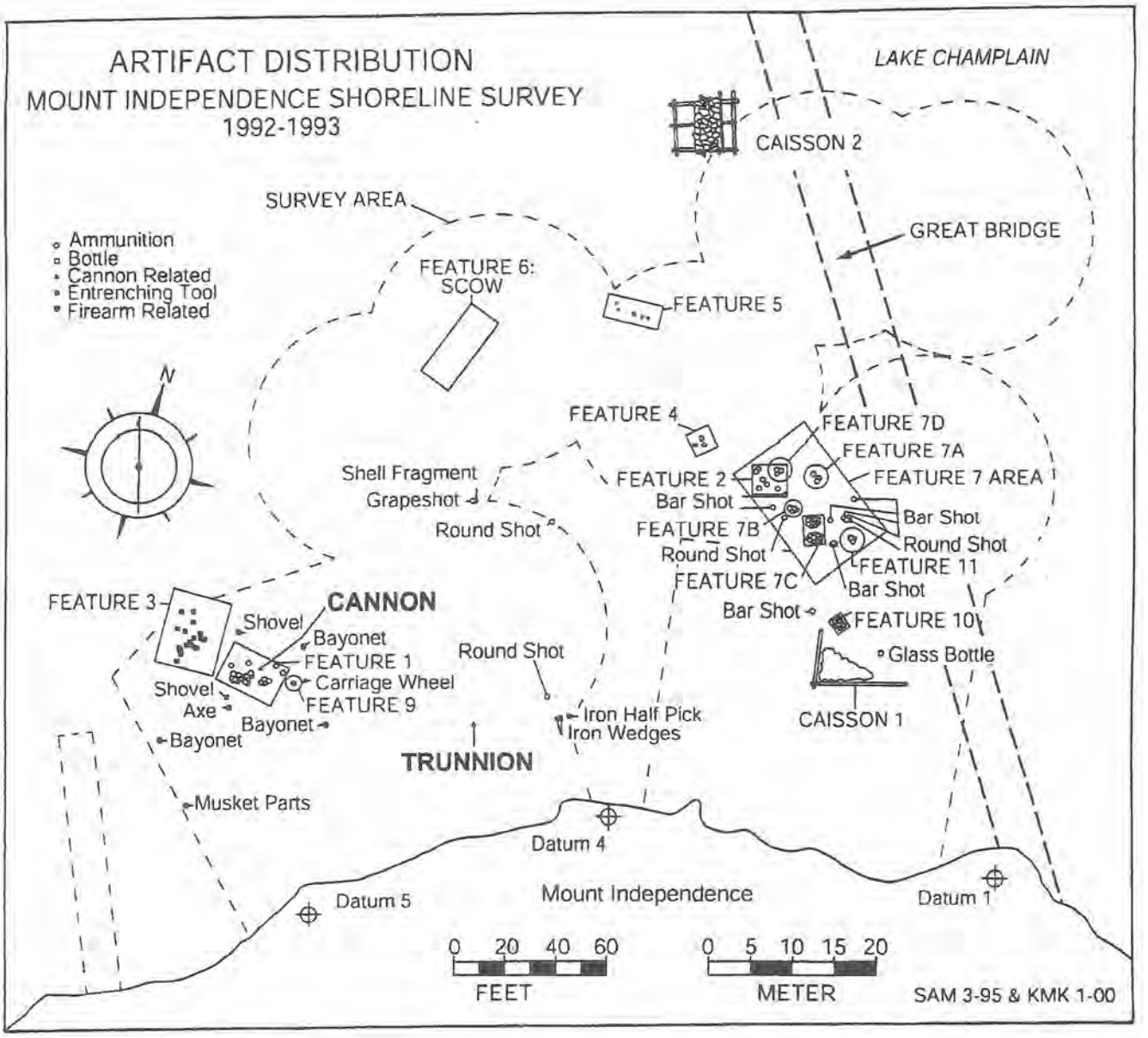


Figure 2. *Some of the American Revolutionary War artifacts found in Lake Champlain off Mount Independence.*

upon first fitting out or before its first refitting, the master gunner chiseled the number 20 over the right trunnion and on the bracket of its corresponding carriage. The guns and carriages on the starboard side of the vessel were marked on their right side and those mounted on the port side of the vessel were marked on their left side. The forward most gun on the port side was numbered one and the highest number was the aftermost gun on the starboard side (Lavery 1998:32). The Mount Independence cannon has only one gun placement number, suggesting it was only aboard one vessel during its use. The cannon was placed in the stern along the starboard side of the vessel.

Each piece of artillery performed very differently under specific situations, requiring that the gunner gain his understanding of each piece through simple trial and error. This information was often noted in a log by the master gunner and referred to when necessary. It was critical that the piece be returned to the same position aboard the vessel to achieve the same results, and, to ensure this, numbers were chiseled into each piece. The master gunner also kept a log on the history of each piece and its equipment to determine when maintenance was necessary (Seller 1994 [1691]). Each carriage was also designed to ensure that the cannon was at the proper height over the sill of its corresponding gun port (Lavery 1998:32).

The Mount Independence cannon also appears to have been engraved with an inscription on the first reinforce, based

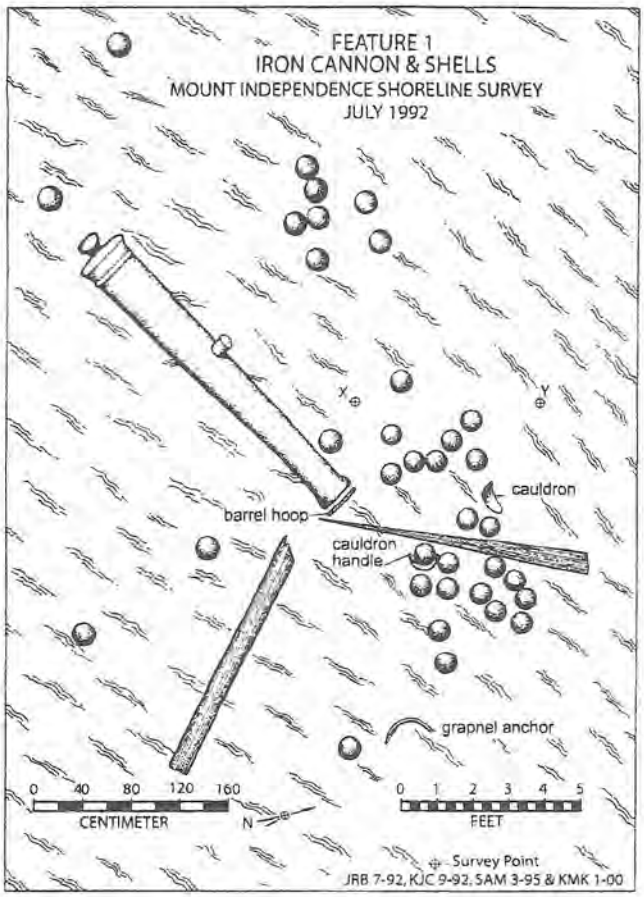


Figure 3. *Feature 1 consisted of the Mount Independence cannon and a collection of 8-inch mortar shells.*

on regular rows of grooves believed to be tool marks (Figure 7). A rubbing and black and white photographs were taken of the area with various oblique lighting. The photographs were then scanned, digitized, processed, and enhanced with computer software by David Farrington of the Polaroid Corporation. The effort met with no success in distinguishing even a possible letter. It cannot be claimed with certainty that these are the eroded remains of an inscription. Yet, four characteristics do suggest such a conclusion: (1) the marks are in rows with fairly uniform spacing between the rows; (2) the heights and distances between the marks appear to be uniform; (3) the rows and marks are perpendicular to the centerline of the cannon; and (4) marks of this kind only appear on the upper surface of the first reinforce and are not apparent elsewhere on the cannon.

The rubbing, photographs, and observations support the belief that the grooves are the remnants of an inscription. Although inscriptions on cast iron guns are extremely rare, the unique quality of the iron of the Mount Independence cannon allowed for detailed inscriptions. Five similar cast iron cannon dating from 1671 to 1673 had variations of the inscription "P. Rupertinoe, Sir Thomas Chicheley [1613-1699], Knight, Master General of His Majesty's Ordnance" on their first reinforce. The guns also had their weight engraved near the base ring, the cipher of King Charles II beneath a crown on the second reinforce, and the initials "JB" or "FB" near the vent field. These initials are believed to be that of John Browne, Jr. and another member of the Browne family of gunfounders, respectively (Committee of the Royal Artillery Institution 1906:38). Most seventeenth-century iron ordnance has no founders or foundry marks at all. This practice did not become a common custom until the eighteenth century (Brown 1989:321). What was once inscribed on the Mount Independence cannon is currently unknown, but likely something similar to the inscription above and may be identifiable with further analysis.

Rupertinoe Guns

During the middle of the seventeenth century, the Dutch and English were the leading maritime trading nations of Europe, and became involved in a series of wars. During the Second Anglo-Dutch War (1665-1667), the Dutch fleet attempted to invade England in 1667, causing panic among the public and British Parliament. This event and the constant threat of renewed warfare with Netherlands allowed King Charles II to obtain money from Parliament for a re-armament program of the Royal Navy. The most significant outcome of this program

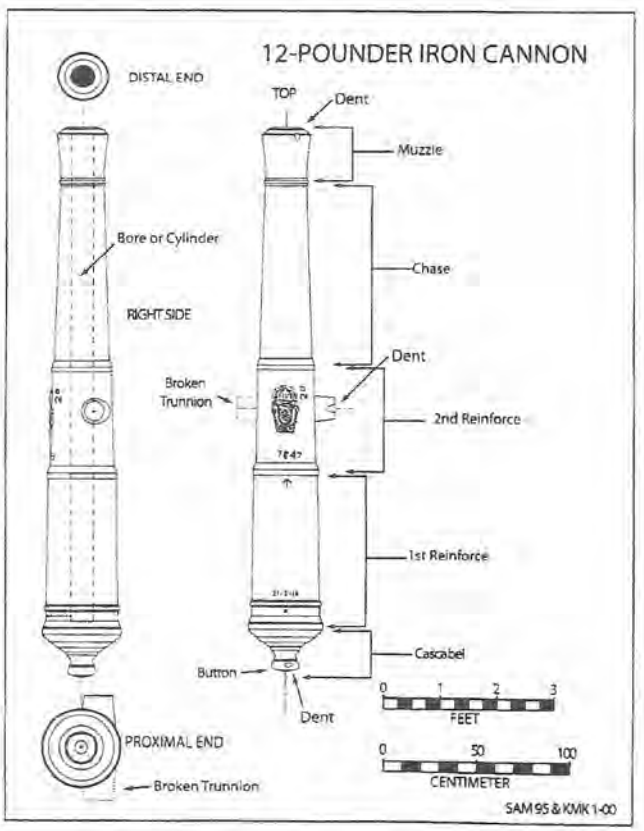


Figure 4. *The Mount Independence cannon* (after Hoyt 1986: Figure 2; Roth 1989:Figure 3).

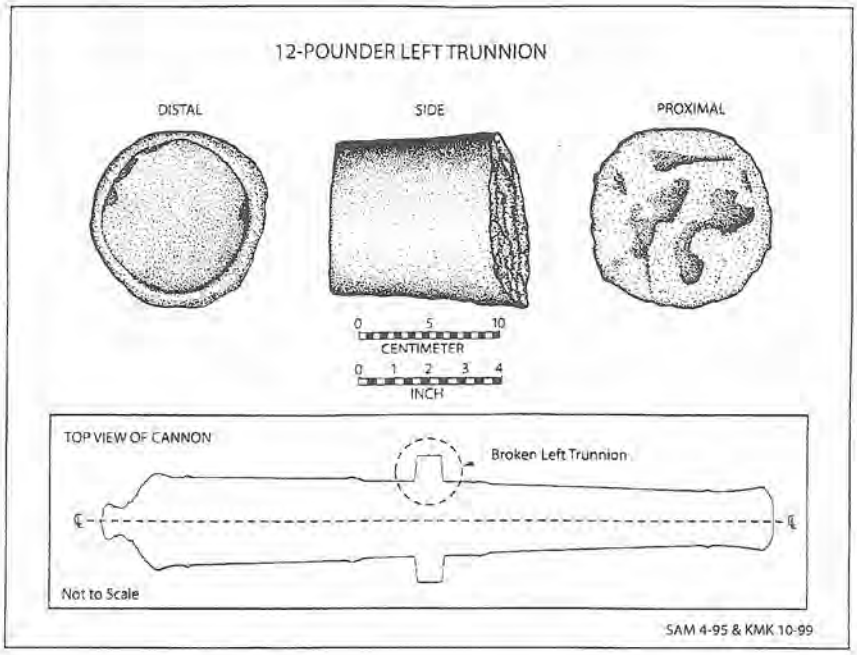


Figure 5. *The broken left trunnion from the Mount Independence cannon.*

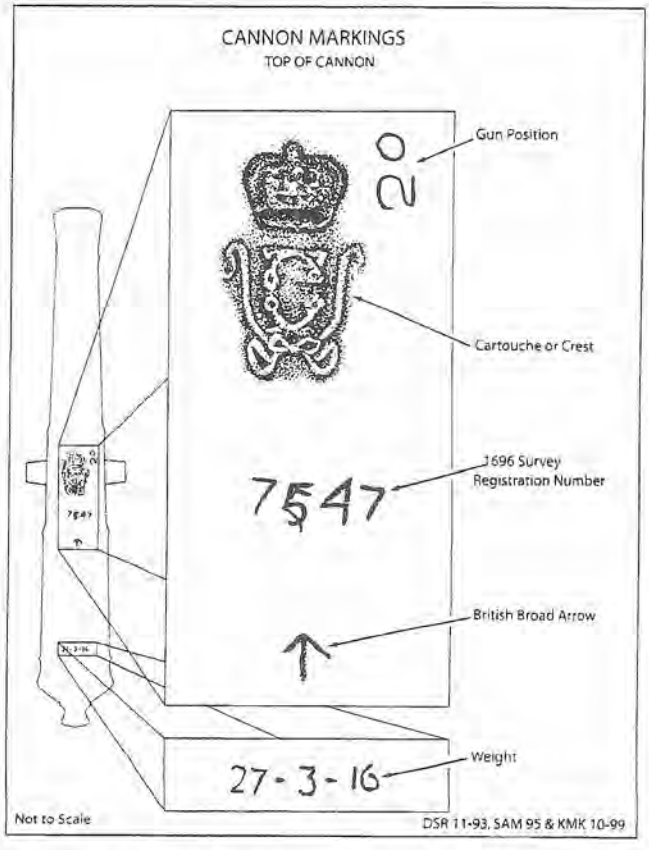


Figure 6. *A detail of the markings on the Mount Independence cannon.*

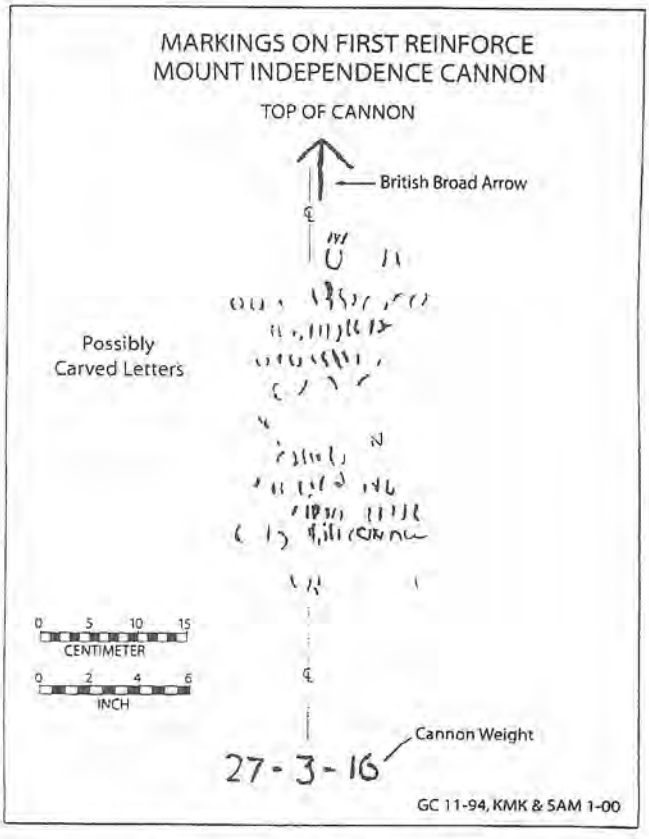


Figure 7. *The markings on the first reinforce of the Mount Independence cannon.*

was the creation of a new design and type of ordnance called the Rupertinoe gun attributed to Prince Rupert (1619-1682), a cousin of King Charles II. This new gun was actually the result of a collaboration between a number of people, including Prince Rupert; Jonas Moore (1617-1679), the Surveyor of the Ordnance; and John Browne, Jr., His Majesty's Gunfounder. All three men were members of the Royal Society and had an interest in ordnance design and the production of a sound pattern of artillery. John Browne, Jr. was a member of a famous family of gunfounders that dominated the industry from 1596 until the Revolution of 1689 (Caruana 1994:56, 77). In 1651, after his father's death, John and his brother George carried on their father's business at their main factory in Horsmonden, England (Blackmore 1976:14). The Browne brothers later expanded their works to include foundries in Bedgebury, Brenchley, Chiddingfold, and Rotherfield, England. The Browne family cast Rupertinoe guns from approximately 1671 until King Charles II's death in 1685 (Elvin 1984:11; Kennard 1986:50-51).

The designers of the Rupertinoe gun were faced with the problem of reducing the weight, increasing the accuracy and strength, and making the gun more manageable than contemporary artillery. These attributes needed to be achieved without the undesirable characteristics of excessive recoil and a tendency to overheat. Generally, economic determinates of cannon founding (e.g., whether a nation was at war or peace) did much to dictate the price and, therefore, drove the founder's selection of technique and materials rather than performance considerations. This was certainly not the case, however, with the Rupertinoe guns produced by the Browne family for King Charles II (Caruana 1994).

During the middle of the seventeenth century, the British system of categorizing guns, called the nominal system, consisted of quaint and exotic names (e.g., falcon, culverin, saker), whereas other European countries had adopted the poundage system, a simpler method of classifying guns by the weight of their shot. Slowly a new gun principle was being established whereby varying lengths and hence weights of the same caliber would be used according to where the gun was to be employed. Many guns had three varying sizes, giving rise to the short, medium, and long or light, medium, and heavy categories for each gun. The Rupertinoe gun design incorporated the new intermediate calibers from the poundage system, including the 3-, 6-, 12-, and 24-pounder, and those of the older nominal system. The most popular gun size from the poundage system to be accepted by British gunfounders, including the Browne family, was the 12-pounder. However, the poundage system was not entirely adopted by British gunfounders until 1716 (Caruana 1994:xv, xvi, 70, 72).

John Banning, an employee of John Browne, Jr., probably delivered the cannon found at Mount Independence, along with 129 other Rupertinoe guns, to the stores at Woolwich, England, on 24 July 1676. The invoice notes that the ordnance was contracted for on 17 January 1675. The invoice lists sakers, 3-pounders, 6-pounders, 24-pounders, culverins, demi-culverins, and fifteen 2.75 m (9 ft) 12-pounders, ranging in weight from 1335.7 to 1520.0 kg (2942-3348 lb) (Banning 1676). The unusual aspects of Rupertinoe guns were their construction from high quality iron, annealing and turning of the casting, and apparently exclusive manufacturing by the Browne family (Caruana 1994:77).

The Rupertinoe guns have a seemingly high tensile strength, good machinability, toughness, ductility, and resistance to wear, fatigue, and corrosion. Exactly what the ingredients are and what steps were involved in making these artillery pieces is unknown. This is in large measure due to the fact that the Browne family kept the process a highly prized secret. A number of theories, however, exist surrounding the fabrication of Rupertinoe guns. Three basic types of cast iron, gray, mottled, and white, were made during the seventeenth century and are distinguished by the various amounts of carbon. The Rupertinoe cannon were likely made from recycled ordnance, reducing the amount of slag in the metal and making a stronger gun. The cannon were probably white cast iron which contains a higher carbon content, is harder, and more resistant to wear and compression. Yet, white cast iron is generally more brittle than other cast irons. The general process of gunfounding changed little from the middle of the sixteenth century to the nineteenth century. The process of casting ordnance was generally the same and can be found in a number of recently edited contemporary publications (Beer 1991; Jackson and Beer 1974; Kennard 1986; Smith and Gnudi 1959 [1540]). How this process varied for the Rupertinoe guns is still largely unknown even today.

The Mount Independence cannon, according to its invoice, was annealed or heat-treated. Annealing is a heat treatment process used to improve the mechanical properties of cast iron and to eliminate the residual stress caused during the initial cooling process of the casting. Stress develops in casting because the surface loses heat more rapidly than the interior, causing differential cooling and contraction. The process of heat-treating involves a controlled heating and cooling of the casting at various rates and requires a furnace large enough to accommodate the casting and vast quantities of fuel. The process can be used to affect the durability, hardness, ductility, strength, and machinability of the casting by changing the molecular structure of the iron. The gun-founders may have also attempted to turn the metal into cast-steel during the annealing process by packing the cannon in fine charcoal and baking it for an extended period. The cannon could also have been made from some form of crucible steel, but historians today believe this process was not invented until 1740. The exact annealing process used by the Browne family is unknown, and we do not know whether the cannon was annealed before and/or after it was turned on a lathe. Evidence of the process used to make the cannon, however, remains in the structure of its iron fabric and can be determined through detailed materials analysis (Elliott 1988:126-139).

The outside of the Mount Independence cannon was turned on a lathe, something not typically done to cast iron artillery due to the characteristics of the metal, which generally did not allow for this process. The net result of the Browne family's technique was a far better looking and stronger piece than the standard rough cast iron product. Since the piece was

stronger, it could also be made lighter, and this was another claimed advantage. It is also possible that the cannon was cast solid and the entire bore was cut out by a lathe. Prince Rupert, who experimented with boring devices may have used this technique. However, the equipment necessary for this method is recognized by historians as having been invented later in the middle of the eighteenth century. Rupertinoe guns were inevitably more expensive, and this was their downfall, for the standard rough cast iron gun was perfectly adequate for the task it had to perform. The price of Rupertinoe guns was £60 (equivalent today to $8,808) per 1.02 metric tons (1.0 long ton) during the 1670s. This was a staggering sum, since the standard rough iron gun ranged from £16 to £24 (equivalent to $2,349 to $3,523) per 1.02 metric tons (1.0 long ton). The Mount Independence cannon cost Parliament approximately £84 (equivalent today to approximately $12,284). Consequently, the only warships known to have been armed exclusively with Rupertinoe guns were the first-rate prestige ships *Royal Charles* (1673), *Royal James* (1675), and *Royal Oak* (1674), with the exception of the H.M.S. *Essex*, built in 1679 (Caruana 1994:77, 79).

H.M.S. *Essex* and the Mount Independence Cannon

As the Third Anglo-Dutch War (1672-1674) ground to a close in 1674, the Secretary of the Admiralty Commission, Samuel Pepys (1633-1703), pointed out to King Charles II that England was in third place in naval superiority behind the French and Dutch. After much effort, Pepys, a member of the House of Commons, and King Charles II convinced Parliament to authorize the construction of thirty ships: one first-rate with 100 or more guns, nine second-rates with ninety guns, and twenty third-rates with seventy guns. This construction project was called the 1677 Thirty Ships Program. The design of the new ships and armament were influenced by the King and Pepys, who insisted on establishing standards in men, rigging, and ordnance for each rate to simplify maintenance and operations (Fox 1980:153-154, 156).

King Charles II constructed these vessels as impressive symbols of his power and the Crown's long-claimed sovereignty over the seas. But more importantly, he needed immense ships for the new naval tactic called the line-of-battle, in which fleets normally attempted to sail into battle with their ships in a single file formation (Davies 1992:10). This arrangement gave every vessel a clear field of fire and allowed excellent mutual support. It presented only the well-armed broadsides to the enemy, giving them no opportunity of inflicting murderous raking fire through the vessel's vulnerable bow or stern. It also permitted the commander to retain some degree of control over the course of events. The line of battle demanded considerable organization and only large ships could expect to survive. Fleets of the seventeenth and eighteenth century often comprised seventy-five ships or more, and the line could stretch 11-16 km (7-10 mi) (Fox 1980:29). The ships in the fleet also demanded large numbers of men and guns to defend them. The complement of men and guns for a warship varied according to the area in which it was deployed and the state of national and international affairs. So official establishments laid down distinct complements for peacetime and war at home and abroad (Davies 1992:11).

Naval guns of the seventeenth century were smooth bore muzzle-loaders made of either bronze or cast iron. Each ship was assigned a mixture of caliber guns, generally with one or two different sizes on each deck. The armament establishment for a given vessel depended upon several factors, including the number of available gun ports, and the strength, size, and stability of the vessel. The Royal Navy's warships were classified according to their strength into six rates, the first-rate being the most powerful and the sixth-rate, the weakest (Fox 1980:20).

Due to lack of space and manpower at the Royal shipyards, it was necessary to make use of private shipyards for the construction of some of the vessels in the 1677 Thirty Ships Program. *Essex* was constructed by contract, signed on 20 February 1678, along with three other vessels, *Exeter* (1680), *Suffolk* (1680), and *Kent* (1679), all third-rate ships (Pool 1966:18-19). Shipwrights Henry Johnson, his son, Henry Johnson, Jr., and William Collins completed the construction of *Essex* on the Thames River in Blackwall, England in 1679, but the vessel was not immediately launched. *Essex* had a length of 45.8 m (150 ft 2 in), breadth of 12.2 m (40 ft 1 in), depth of hold of 5.1 m (16 ft 9.5 in), draught of 5.5 m (18 ft), and calculated burden of 1,081 metric tons (1,064 long tons) (Fox 1980:175; Pool 1966:18; Tanner 1903:268-269). *Essex* was typical of the seventy-gun ships of the 1677 program, as far as the vessel's armament was concerned (Figure 8). The proposed ordnance establishment of 1685 determined the armament of these vessels, which consisted of four 3-pounders, fourteen sakers, twenty-six 12-pounders, four culverins, and twenty-two demi-cannon (Fox 1980:191). The total crew aboard *Essex* was to consist of 300 men during peace, 380 men when at war abroad, and 470 men during war while near England. The numbers of guns were to consist of sixty-two during peace, sixty-two during wartime when abroad, and seventy during wartime near home (Tanner 1903:268-269). The largest establishment of gun crews was 310 men: six men to each demi-cannon, four men to each 12-pounder, three men to each saker, and two men to each 3-pounder (Archibald 1968:126; Clowes 1966 [1903]).

England enjoyed relative peace between 1674 and 1688, and the Admiralty Commission at Royal Navy yards placed most of the vessels constructed for the Thirty Ships Program, including *Essex*, in reserve. The vessels were largely neglected and the results were appalling to King Charles II, who dismissed the commission in 1684 and personally assumed the position of Lord High Admiral. Before much could be done with the rotting and neglected vessels, King Charles II died in February 1685. He was succeeded by his brother, the Duke of York, who became King James II (1633-1701) and quickly established a Special Commission for the Recovery of the Navy, with Pepys as the principal executive (Fox 1980:171).

In 1689, England became involved in a series of wars, including the Nine Years War (1689-1697), which consisted

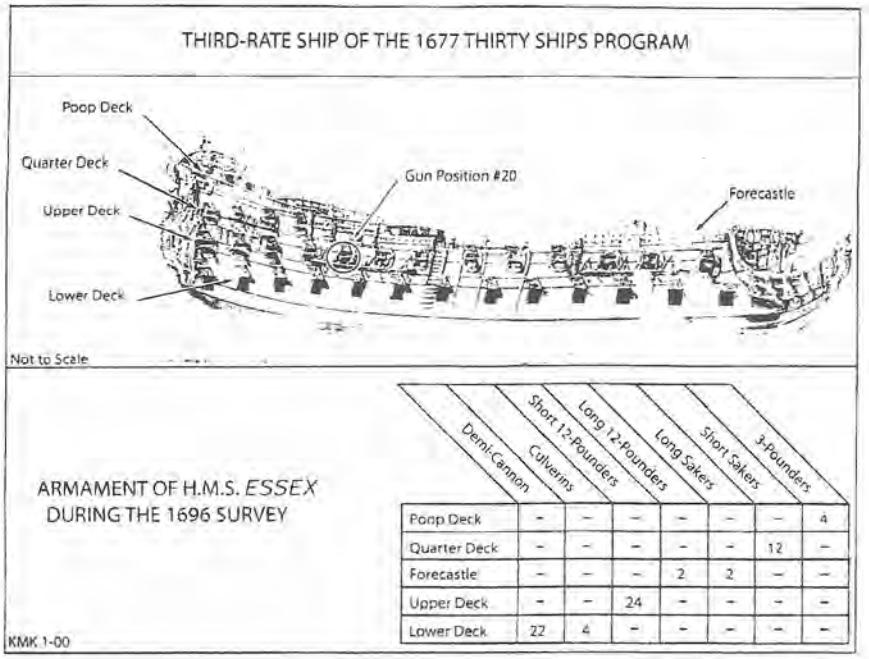


Figure 8. *A seventeenth-century third-rate English ship similar to H.M.S. Essex* (after Fox 1980:Figure 192).

of mostly small actions by the Royal Navy against French merchantmen (Harding 1995:99, 101, 103). As the active naval vessels came to need extensive repairs, *Essex* was put into service. *Essex* was equipped, rigged, provisioned, and manned at Chatham and Blackstakes between 1 October 1693 and 19 January 1694 for what appears to be the first time (Wright 1695). Four of the demi-cannon in the original gun establishment for the vessel were replaced with culverins. This action may have been an effort to reduce the stress on the aging vessel. However, this reduced the vessel's firepower from 558.0 kg (1,229 lb) to 532.5 kg (1,173 lb) of shot (Caruana 1994:92, 100).

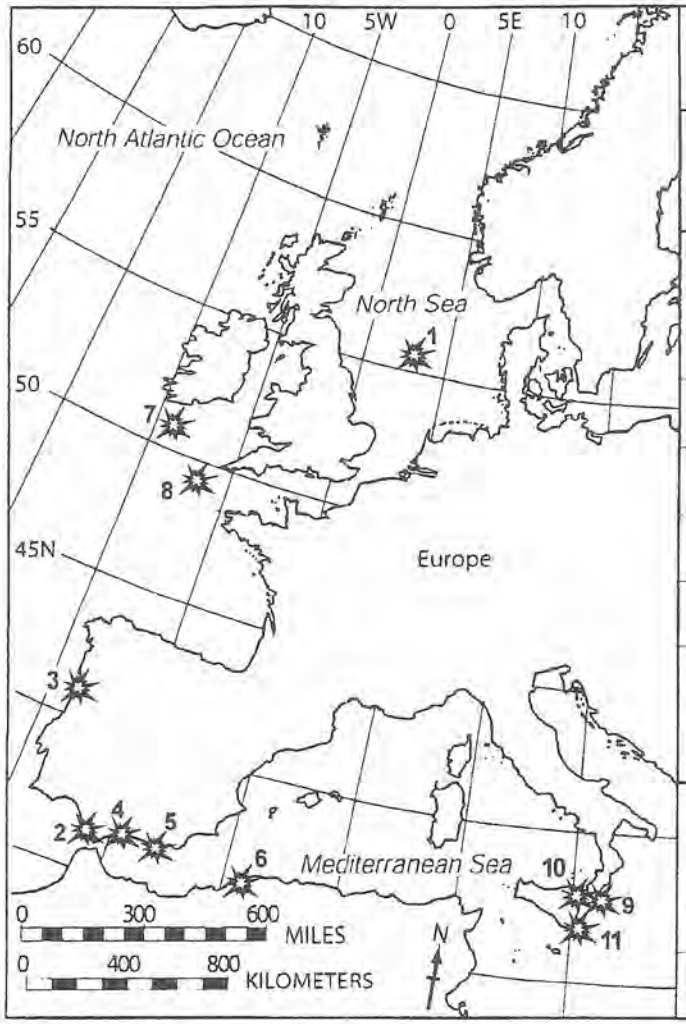
Shortly after the vessel's launch, in April, 1694, *Essex* captured a French galliot and a French 12-gun ship of war in the North Sea (Figure 9). In early 1694, *Essex* joined the Blue Fleet, whose function was to cripple French trade. Using Cadiz, Spain as a base port, *Essex* patrolled the Western Mediterranean with as many as 103 other British vessels, effectively accomplishing its task (Harding 1995:104).

When the armament of the Royal Navy was inventoried during the 1696 Survey, as noted above, *Essex*, likely with its original guns, had a total of seventy British-made cannon on board. The guns included twenty-two 2.9 m (9.5 ft) demi-cannon, four 3.4 m (11 ft) culverins, two 3.2 m (10.5 ft) 12-pounders, two 3.1 m (10 ft) sakers, twenty-four 2.7 m (9 ft) 12-pounders, twelve 2.1 m (7 ft) sakers, and four 1.5 m (5 ft) 3-pounders. *Essex* had a total of five decks including a lower deck, upper deck, forecastle, quarter deck, and poop deck. The demi-cannon were placed on the lower deck with the culverins at the stern. The 2.7 m (9 ft) 12-pounders, including the Mount Independence gun, were used on the upper deck, and the 3.2 m (10.5 ft) 12-pounders and 3.1 m (10 ft) sakers were placed in the forecastle at the vessel's bow. The 2.1 m (7 ft) sakers were used on the quarterdeck, and the remaining 3-pounders were located on the poop deck. Two guns were placed at each end of the vessel to be used as antipersonnel weapons in the event that the enemy overtook the waist of the ship (Browne 1703).

Following only five years of service, *Essex* was again placed on reserve in 1698 because of the vessel's failing condition. Along with the other surviving third-rates, Wells' Yard in Rotherhithe, England rebuilt *Essex* (Merriman 1961:366). However, these rebuilt versions, which contained only a few original timbers, had little in common with the parent vessels, except their names, gross dimensions, and armament (Fox 1980:158). This system of rebuilding ships was used by the Admiralty to avoid having to ask a reluctant British Parliament for the extraordinary amounts of money to build new ships, which it might not approve (Caruana 1994:xii).

After the "rebuilt" *Essex* sat in reserve for two years, Britain became embroiled in the War of Spanish Succession (1702-1713). *Essex* was involved in a number of important attacks on Spanish cities during the war, including attacks on Cadiz and Vigo, Spain in 1702; Gibraltar, Velez, and Malaga, Spain in 1704; and Barcelona, Cartagena, and Alicante, Spain in 1706. *Essex* was also involved in numerous naval engagements with the French fleet off Scotland, England, Ireland, Sardinia, Spain, and France. After fourteen years of remarkable service, *Essex* was once again "rebuilt" in 1713. Yet, its armament remained the same (Colledge 1969:195).

By order of King George Louis I (1660-1727), on 6 July 1716, the establishment of guns for *Essex* became twenty-six 24-pounders on the lower deck, twenty-six 12-pounders on the upper, fourteen 6-pounders on the quarterdeck, and four 6-pounder on the forecastle deck (Archibald 1968:134). This change in armament reduced the firepower of the vessel from



H.M.S. *ESSEX* GUNS FIRED IN BATTLE

	NINE YEARS WAR 1689-1697
1	April 25, 1694-Exchanged shots with a small French ship in the North Sea.
	WAR OF SPANISH SUCCESSION 1702-1713
2	August 21, 1702-Bombarded Caterena Fort, Cadiz, Spain, in support of ground troops.
3	October 12, 1702-Battle of Vigo Bay, Vigo, Spain.
4	July 22-23, 1704-Bombardment of Gibraltar, Spain.
5	August 13-14, 1704-Fight with French Fleet off Malaga, Spain.
6	June 11, 1709-Chased the French cruiser Phoenix off Oran, Algeria.
7	May 26, 1710-Fired three shots at a prize ship off the coast of Ireland.
8	May 11, 1711-Chased ships off the Iles of Scilly, England.
	ENFORCING THE PEACE OF UTRECHT
9	September 9, 1718-Engaged the citadel at Reggio, Italy.
10	October 18, 1718-Chased ships off Vulcano, Sicily.
11	July 1, 1719-Fired at Castle De Mer, Sicily.

KMK 1-00

Figure 9. *The battles fought by the Mount Independence cannon while aboard the H.M.S. Essex.*

532.5 kg (1,173 lb) to 474.0 kg (1,044 lb); however, this did not change the placement of the Mount Independence cannon aboard *Essex*.

Essex was involved in numerous naval battles with the Spanish Navy off the coasts of Sicily and Italy in 1718 and 1719. In 1722, only ten years after its reconstruction, *Essex* was placed into reserve at Blackstakes, England (Colledge 1969:195). It is unknown if the vessel sailed again before its reconstruction in 1736, although it is unlikely due to the ship's extreme age.

On 20 May 1736, *Essex* was dismantled at Woolwich and its armament underwent a dramatic change. It was at this time that the Mount Independence gun was removed from duty aboard *Essex*. The vessel's original guns were replaced with a new complement of guns to follow the Establishment of 1733. The vessel was reduced to sixty-four guns, with twenty-six 32-pounders on the lower deck, twenty-six 18-pounders on the upper deck, ten 9-pounders on the quarterdeck, and two 9-pounders for the forecastle deck. The 12-pounders were replaced with the heavier and longer range 18-pounders (Archibald 1968:136; Colledge 1969:195).

The Mount Independence cannon served with *Essex* from its construction in 1679 until 1736. The vessels that sailed under the name *Essex* were not as distinguished as other ships in the British fleet. However, the vessel served as flagship for the Blue Fleet and for various squadrons throughout its career and captured a number of vessels under different commands. *Essex* and its armament sailed throughout the western Mediterranean Sea, North Sea, Baltic Sea, North Atlantic Ocean, South Atlantic Ocean, Caribbean Sea, and Gulf of Mexico (Figures 10 and 11).

The Mount Independence cannon was released from *Essex*, stored at Woolwich, England, and likely made immediately available for land service. Artillery used for land service were almost always recycled naval artillery, which were displaced from sea service by more modern systems (Caruana 1994:xi). Thus, the army received most of its artillery as hand-me-downs from the navy. The Mount Independence cannon

was likely sent to America by the army to protect the British colonies before the French and Indian War. The guns sent to North America were older and usually inferior guns to those kept for the home army. New York, being one of the largest British military strongholds in America, was perhaps the destination of the Mount Independence cannon when it left England. Nothing is known about the cannon's career between the time it left *Essex* and when it arrived in the Champlain Valley.

A Rupertinoe Cannon on the Shores of Lake Champlain

When hostilities broke out in Massachusetts in 1775, American colonial forces immediately began to plan the seizure of the Champlain Valley's forts, outposts, and vessels. In the spring of 1775, the Champlain Valley was captured by a joint campaign led by Benedict Arnold (1741-1801), Ethan Allen (1738-1789), and John Brown (1744-1780). In June 1775, the newly formed Continental Congress appointed Philip John Schuyler the commander of the Northern Department, which included the Champlain Valley (Bellico 1992:120-121). Supplying the Champlain Valley with artillery proved to be exceedingly difficult due to the availability of ordnance, transportation needs, and organizational problems (Stephenson 1919:85-125) (Figure 12). Ordnance captured in the Champlain and Lake George valleys were an important source of artillery for the Northern Department in the early years of the American Revolutionary War (Table 2). However, no British 12-pounders appear in the surviving records of captured ordnance.

In the first few years of the Revolutionary War, the major source of American ordnance was the seizure of British artillery, as well as pieces owned by private American merchants or ship captains. The largest stores of British ordnance in North America were in and around the major seaports (e.g., Boston, New York City, Portsmouth, New London) and inland fortifications built during the French and Indian War (e.g., Fort Ticonderoga, Crown Point, Fort Stanwix) (Mulholland 1981:125, 131; Weller 1956).

American attacks in the Richelieu and St. Lawrence valleys in 1775 and 1776 led to the capture of ordnance, some of this material returned south to Fort Ticonderoga and Mount Independence when the Americans retreated from Canada in the spring of 1776. During the early years of the war, British transport ships off the eastern coast of North America were also captured on occasion, and their contents, including artillery, were incorporated into American stores (Stephenson 1919:211-212). Many of the British colonial fortifications in the West Indies were also sources of ordnance (Hopkins 1969 [1776]), some of which were forwarded to the Champlain Valley (Ward 1970 [1776]).

The capture of artillery only temporarily fulfilled the American army's needs. Due to the limited supply of artillery, the Continental Congress and states contracted with ironmasters to supply what they needed (Salary 1977:220).

Figure 10. *The extent of travel around Europe taken by H.M.S. Essex with the Mount Independence cannon aboard.*

Table 2. British Ordnance Captured by the Americans in the Champlain Valley, 1775.

Artillery Captured at Fort Ticonderoga

Quantity	Item
19	swivel guns
9	4-pounders
19	6-pounders
17	long 9-pounders
6	French 12-pounders
8	French double-fortified 12-pounders
3	long 18-pounders
2	French 18-pounders
1	8-inch howitzer
1	8-inch mortar
1	13-inch mortar

Ordnance Captured at Crown Point

Quantity	Item
1	brass 24-pounder
3	iron 24-pounder

Figure 11. *The voyages taken in the Atlantic Ocean by H.M.S. Essex with the Mount Independence cannon aboard.*

The states of New York, Massachusetts, Rhode Island, Connecticut, Pennsylvania, and Maryland began producing ordnance by the end of 1776. Between 1775 and 1777, the American ironworks produced over 650 iron cannon, varying in size from 3- to 18-pounder (Salary 1977:223). Between the summers of 1775 and 1777, only a few hundred cannon were captured, confiscated, or newly made to aid in the defense of the Champlain Valley. Most of them arrived during the winter and spring of 1776 and 1777 (Baldwin 1938 [1777]; Sewall 1963 [1777]).

The Mount Independence cannon was presumably captured by the Americans around New York City at the beginning of the American Revolution. The 12-pounders identified on Benedict Arnold's record of the captured ordnance at Fort Ticonderoga and Crown Point in 1775 list only French 12-pounders . The Mount Independence cannon was probably sent to the Champlain Valley during the late winter of 1776-1777, when vast quantities of artillery began to arrive at the American forts. Due to the cannon's caliber and barrel length, it was likely placed at one of the batteries along the northern end of Mount Independence.

In the summer of 1777, the British army planned a three-pronged assault that would cut the colonies into pieces. Lieutenant-General John Burgoyne (1722-1792) led the movement of troops south toward Albany through the Champlain Valley (Bellico 1992:167-168). Burgoyne received his army's artillery from the British Isles and Canada, the majority coming from the British Isles. Nearly all the supplies the British brought to Canada for the military campaign were new, from their artillery to their tents, so it is unlikely that the Mount Independence cannon was part of Burgoyne's collection of artillery (Stone 1886:66).

Disposal of the Cannon

At a council of the American general officers, held at Fort Ticonderoga on 20 June 1777, it was decided that cannon and stores not immediately necessary at Fort Ticonderoga would be moved to Mount Independence in preparation for the inevitable British assault on the American posts (Lancey et al. 1880 [1778]). All the guns larger than a 12-pounder and their equipment were supposed to be removed, except for two 18-pounders left along with about 100 rounds of ammunition at Fort Ticonderoga (Lancey et al. 1881 [1778]:18, 50-51, 95). The Mount Independence cannon found during the archaeological survey, if not previously on Mount Independence, was moved there at this time.

On 1 July 1777, the British army reached Fort Ticonderoga and Mount Independence. The 8,000 British and Hessian troops under the command of Lieutenant-General John Burgoyne vastly outnumbered the 3,000 American troops within the forts. After realizing that they were nearly surrounded by the British army, the American officers unanimously decided in the early afternoon of 5 July to evacuate the forts (Wickman 1993:110-111). The resolve to evacuate was reached about 3 PM. However, the Americans could not begin to carry it out until nightfall, for the British on Mount Defiance would be able to see at once any troop movements indicative of a retreat (Nickerson 1928:145). Every light, even from fires and candles, was to be extinguished before striking the tents and collecting their belongings. There was also to be no destruction of the structures, especially by fire, for it would betray the American movements to the British. At dusk, two 18-pounders at the Jersey Redoubt at Fort Ticonderoga were to be fired continuously every thirty minutes towards the enemy's battery being constructed at the

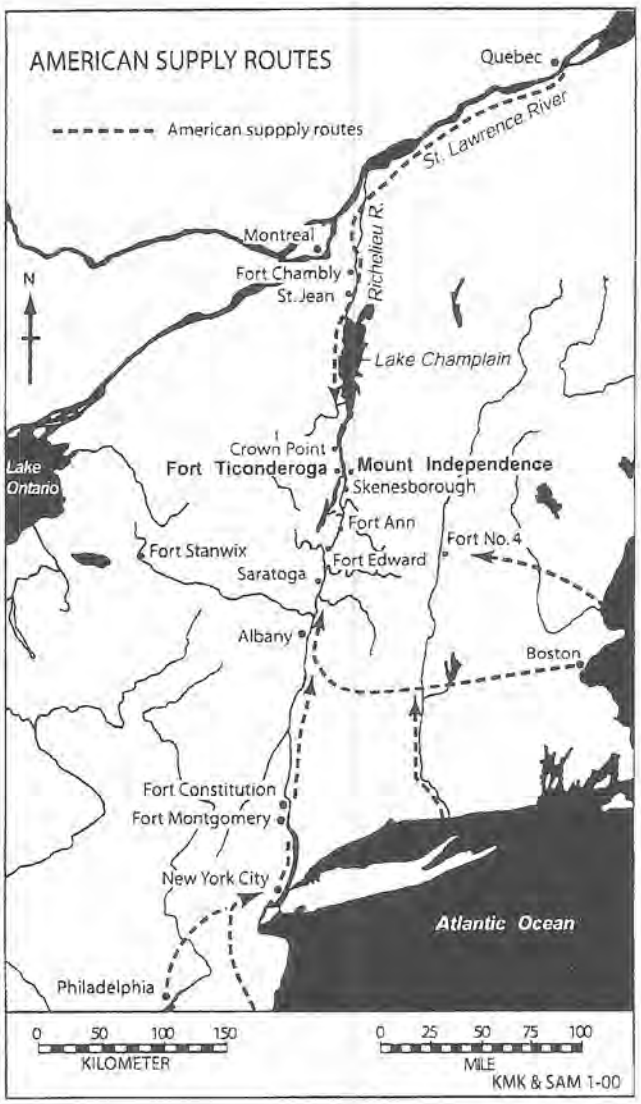


Figure 12. *American supply routes to the Champlain Valley during the American Revolutionary War* (after Ketchum 1997:25).

mouth of East Creek. The cannon fire was to continue until the American retreat from Mount Independence was completed. At 10 PM, all the officers and troops were given the order to prepare to retreat. Bateaux were used for transporting the stores, artillery, tools, clothing, and provisions during the retreat (Lancey et al. 1881 [1778]:67, 80, 81, 94).

All the cannons not removed from the forts were to be spiked, which involved driving a specially designed spike into the fuse hole, making it impossible to fire the cannon. St. Clair advised the officers not to knock the trunnions off any of the guns, being fearful it would make too much noise and alarm the enemy. About 7 PM, St. Clair notified Lieutenant Colonel Ebenezer Stevens of the evacuation and gave him 500 men to assist in the loading of ordnance aboard the vessels. All artillery pieces smaller than 18-pounders were removed from Mount Independence and brought to the north landing (Lancey et al. 1881 [1778]:93-94). The Rupertinoe cannon found during the archaeological survey alternatively may have been moved at this time if its gun placement was on top of Mount Independence.

At about 9 PM, St. Clair sent Major Isaac B. Dunn, Aide-de-Camp, to inform Brigadier General Matthias Alexis Roche de Fermoy (b. 1737), the commander at Mount Independence, that he should direct all the stores, ammunition, cannon, and baggage to the south landing of Mount Independence. The material was then put on board bateaux for Skenesborough. (Lancey et al. 1881 [1778]:88, 111, 149). Everything of any consequence on the northern end of Mount Independence was carried down to the north landing, but due to the lack of boats not all of it was loaded, including the Rupertinoe cannon. Brigadier General Enoch Poor (1736-1780) took many of the boats that were intended to carry away the artillery from Mount Independence. Some of the material left at the northern landing consisted of provisions, about eight old tents, some cannon, various supplies, and a howitzer that was run into Lake Champlain, along with some gun carriages and St. Clair's wagon (Lancey et al. 1881 [1778]:89, 93, 94).

At about 3 AM, the commander of Mount Independence set fire to his cabin, contrary to orders, which lighted up a great portion of the Mount. This action gave the British an opportunity to see every movement the Americans were making. At 4 AM on 6 July 1777, the last of the American troops departed through the southern gate of Mount Independence (Lancey et al. 1881 [1778]:88, 112; Nickerson 1928:146; Weeden 1899:117-118).

With orders to sail to Skenesborough, the American flotilla of approximately 225 watercraft left Mount Independence at 4 AM, carrying between 400 and 600 troops and civilians and great quantities of artillery and stores. The rest of the American troops took to the road southeastward from Mount Independence to Castleton (Nickerson 1928:146).

Later that day, the American fleet was overtaken at Skenesborough by the British flotilla, capturing ordnance, provisions, and supplies (Bellico 1992:170-177). At the newly captured forts of Fort Ticonderoga and Mount Independence, the British began to take inventory and organize what they had captured. General orders were given by British Major General William Phillips (1731-1781) to the Artillery Company at Mount Independence to gather all the captured artillery and ammunition along the shoreline battery on the north side of Mount Independence near the Great Bridge. Only serviceable pieces of artillery necessary for the batteries were to remain in place (Epping 1911:173-175).

On the afternoon of 6 July 1777, Major Griffith Williams in command of the British Artillery, with a party of two conductors, a sergeant, and twelve privates, began taking an account of the guns and ordnance captured at Fort Ticonderoga and Mount Independence (Table 3). Meanwhile, all the British artillery pieces brought from Canada and a select number of captured artillery were then taken to the landing along Ticonderoga Creek to be portaged to Lake George (G. Williams 1777a:6 and 7 July 1777).

Table 3.
American Ordnance
Captured by the British at Fort Ticonderoga
and Mount Independence, 1777 (G. Williams 1777b).

American Artillery Captured at Fort Ticonderoga

General Article	Description	Quantity	Condition
iron ordnance	18-pounder	2	all spiked
	12-pounder	5	all spiked
	9-pounder	6	all spiked
	6-pounder	13	all spiked
	2-pounder on a field carriage	1	not spiked

American Artillery Captured at Mount Independence

General Article	Description	Quantity	Condition
iron ordnance	32-pounder	2	1spiked
	24-pounder	2	1 spiked
	18-pounder	8	4 spiked
	12-pounder	5	3 spiked
	9-pounder	12	not spiked
	6-pounder	21	3 spiked
	4-pounder	9	1 spiked
	1-pounder on traveling carriage	2	not spiked

After the inventory was taken, the British discovered additional pieces of abandoned artillery, which may have included more 12-pounders. The first inventory lists two undamaged 12-pounders found at Mount Independence, one of which may be the cannon discovered during the archaeological survey. Altogether, approximately 131 cannon had been discovered in the entrenchments at Mount Independence and Fort Ticonderoga, but only seventy-four of them were mounted on carriages. The exact number of guns captured by the British is unclear as is the number of spiked guns, which may have been as many as thirty-eight pieces (Specht 1995 [1777]; G. Williams 1777a).

The British also captured a vast quantity of baggage, military stores, and provisions, including twenty-eight pieces of artillery and a large quantity of shot and shells, when they overtook the American fleet at Skenesborough. However, most of the materials at Skenesborough, along with the vessels, were burned or blown up by the Americans.

As Burgoyne pursued the American troops, he decided to use the road between Skenesborough and the Hudson River to move his troops south and the route to the Hudson Valley via Lake George to carry provisions, ammunition, and other military supplies to his advancing army (Bellico 1992:170-177). Immediately after its capture, Fort Ticonderoga served as a large supply depot, forwarding necessary goods to the British army. Burgoyne had the guns removed from most of the British vessels on Lake Champlain so that the vessels could be used to carry supplies from Canada to Skenesborough and Fort Ticonderoga (Wickman 1997).

The British had no wish to fall prey to the same dilemma that led to the American evacuation. The Americans had too few men to guard the extensive works of both forts. Learning from this mistake, the British chose to primarily garrison Mount Independence (Epping 1911:173). On 12 August 1777, Brigadier General Henry Watson Powell (1733-1814) returned with the British 53rd Regiment from the British front to assume command of the former American posts along Lake Champlain. By the middle of September, the Americans cut off British communication between Burgoyne and the Champlain Valley. After recognizing the weak nature of the British garrisons along Lake Champlain, Americans struck at Skenesborough, Fort Ticonderoga, and Mount Independence with moderate success, but they failed to take the posts. With Burgoyne now trapped in the Hudson Valley, Brigadier General Henry Watson Powell vowed to avoid the same inevitable position. Powell realized, with victory over Burgoyne a near certainty, that it was only a matter of time before a superior American force armed with artillery would lay siege to Mount Independence and Fort Ticonderoga. Powell turned to Sir Guy Carleton for recommendations and hinted that the most favorable option was to abandon the forts (Powell 1777).

On 11 October 1777, Powell received word that Burgoyne was retreating and 9,000 Americans would attack Fort Ticonderoga and Mount Independence. Five days later, Powell called his British and German field officers to a conference to evaluate their current situation and determine their plan of action. They decided to abandon the outposts in the Lake George region and retreat with all their stores to Fort Ticonderoga and Mount Independence (Powell 1976 [1777]). Beaten back, Burgoyne retreated north to Saratoga, where the Americans surrounded the British army and forced the surrender of the British on 17 October 1777 (Bellico 1992:185-186).

After learning about Burgoyne's surrender, the decision for Powell was as clear as the one American Major General Arthur St. Clair had faced four months earlier. Orders were sent to the garrison and the naval vessels to prepare for an immediate evacuation (Powell 1777).

By 8 November 1777, the British evacuation of Fort Ticonderoga and Mount Independence was nearly completed. The British then proceeded to destroy the captured forts (Powell 1976 [1777]). "The old fort at Ticonderoga have [sic] been blown up, the outworks destroyed, every house and everything of wood within five miles [8 km] have been burned; the trunnions have been knocked off a hundred pieces of iron cannon, their carriages consumed, and the ironwork brought off with as much shot and as many shells as our vessels could carry. Whatever we could not stow away was thrown into the lake" (Finlay 1976 [1777]). The Mount Independence cannon may have been thrown into the lake at this time. A German spectator of the destruction wrote, "No theater director could present the Moors in Jabar so alert at lighting the spreading fires as the Eng. [English] artillery were in setting everything afire [at Fort Ticonderoga and Mount Independence]. Rebuilt Carthage had probably not been reduced to ashes as quickly as this circuit of a few

leagues...Not even a later Amandus could have painted the destructive burning of Sodom and Gomorrah as realistically but also as magnificently as this fire developed in a few minutes" (Lynn 1993:86). After fifty barrels of gunpowder erupted beneath Fort Ticonderoga and blew it up high into the air, the British troops loaded themselves into bateaux and proceeded northwards. New York Loyalist John McAlpine and about sixty men were appointed to complete the destruction of the forts and walk back to Canada through the woods with the last of the British horses (Rae 1985 [1780]).

Shortly following the British evacuation of Fort Ticonderoga and Mount Independence, the Americans began scavenging the sites for anything of value. At least sixty-six cannon of different calibers were recovered from the posts for the defense of passes along the Hudson River (Ford 1908:221). Whether abandoned on land or dumped into the lake by the British, the Mount Independence cannon escaped being recovered by the American salvers. Although the British destroyed most of the works at Mount Independence and Fort Ticonderoga during their evacuation in November 1777, the Continental Congress feared that the British would be able to reconstruct the strongholds. Consequently on 27 March 1778, the Continental Congress resolved that the fortifications and works at Fort Ticonderoga and Mount Independence were to be further demolished and that the Board of War give the necessary orders for carrying this resolution into execution (Ford 1908:287).

Despite the American attempt to destroy the forts, the British continued to demonstrate their naval presence on Lake Champlain and to utilize the former American posts as staging areas for attacks and spying missions into New England and New York until the end of the war (Bellico 1992:186-188). In October 1780, Captain William Chambers (1748-1829), the commander of the British fleet on Lake Champlain, was sent to Mount Independence and Fort Ticonderoga at the request of General Frederick Haldimand (1718-1791), the Governor and Commander-in-Chief of Quebec. Chambers and his men were to pick up or destroy any remaining serviceable stores and ordnance left by the British troops in November 1777 (Haldimand 1780). On 12 October 1780, Chambers dragged and searched the waters around Mount Independence for guns that had been thrown from the site when evacuated by the British. With a number of boats, they searched all around Mount Independence for guns but had no luck in locating any underwater. A number of guns were lying on the shore; however, they were rendered useless during the British evacuation. Chambers then landed a number of marines on Mount Independence to search the site for anything of value (Chambers 1781c:281-282).

In late July 1781, just prior to an exchange of prisoners at Mount Independence, Chambers was informed by one of their prisoners that the Rebels had raised one gun from the lake bottom and that they knew where there was a brass gun, which they intended to raise. Unfortunately for Chambers, he had given his word to Major Jonas Fay (1736-1818), the American commander during the negotiations, that no hostilities would take place prior to the exchange, and he would allow the Americans three days after the prisoners' exchange to return home. Chambers proceeded down the lake in *Maria* (1776), leaving all the soldiers on board to avoid alarming the Americans of his knowledge of their attempt to recover abandoned artillery from the waters around Mount Independence (Chambers 1781c:94-95).

As the British grew closer to Mount Independence, Chambers sent the gunner of *Maria*, Robert Deed, to spy upon the Americans. On 28 July, Deed returned from Mount Independence and told Chambers that American troops had recovered an 8-inch brass howitzer and an iron 12-pounder from the lake. The Americans had dragged them up near the Mount Independence landing of the Great Bridge. Deed surmised that the guns had been either sunk or hidden by the British or American troops during the evacuation of the site (Chambers 1781c:92).

On 6 August 1781, Chambers, curious about the Americans' activity, sent four Loyalists to watch Mount Independence. He ordered Lieutenant Blackett and Lieutenant Graham of the 34th Regiment with all their troops to proceed up to Fort Ticonderoga where Loyalists would join them. The men were to carry off the serviceable artillery that lay on shore and capture any of the Americans remaining at Mount Independence following the truce (Chambers 1781a, b).

When Graham and Blackett arrived at Fort Ticonderoga, they discovered the Americans were gone. The officers learned from the released British prisoners that the Rebels brought away the howitzer, a swivel gun, and some old muskets. For lack of a boat, the Americans had left the iron 12-pounder. The British also learned of the location of a bateau with a brass gun in its hold sunk near the bridge. But, for want of a proper boat, Lieutenant Blackett could not weigh the bateau, and at that time it was also deemed not safe to attempt to recover the vessel and gun. British troops did, however, recover the 12-pounder and return to their fleet (Chambers 1781a, b).

In early October, 1781, the British army appointed Lieutenant Colonel Barry St. Leger to the command of Fort Ticonderoga to reestablish its fortifications. By October 26, he had already rebuilt the largest barracks at the site and had about 200 troops employed in drawing materials for the repairs of the rest of the fort (Johnson 1999). It is assumed the British troops continued their search in the waters along Mount Independence for additional ordnance and supplies. However, enough iron articles remained scattered around Mount Independence that in October 1785, the Vermont General Assembly assigned to Colonel John Strong (1733-1816) of Addison, Vermont, the responsibility of selling to the highest bidder the iron cannon, mortars, mortar beds, shells, and cast iron carriage wheels that lay on, and in the waters around, Mount Independence. This ordnance was deemed unfit for service but recyclable for making bar iron. Strong was directed to advertise the sale of the ordnance for two weeks in the Bennington, Vermont, newspapers. Anyone willing to recover ordnance in the shallow water above Lake Champlain's low water line was to be compensated for his service from the sale of the ordnance. Those pieces that lay below the low water mark were deemed property of the salver (J. A. Williams

1966:32-33). Following the sale of the ordnance in 1788, Matthew Lyon (1746-1822) established a blast furnace (VT-AD-300) in Orwell utilizing the old scrap iron salvaged from the abandoned ordnance and stores at Mount Independence (Rolando 1992:111).

Conclusion

The Mount Independence cannon remained in service for such a long time because the gun was overbuilt for its purpose and strong enough to withstand the improvements in corned black powder during the eighteenth century. *Essex* had relatively few naval engagements during its career and subsequently the Mount Independence cannon saw little use, except for shots fired in commemoration, practice, salute, and to signal. Even after fifty-eight years of service aboard *Essex*, the Mount Independence cannon was still in its first quarter of its predicted life span as distinguished by its single fuse hole. A cast iron gun had a predicted life span of 10,000 fired rounds and after each quarter-life (2,500 rounds), a new fuse hole was drilled and the old one plugged. The gun also must have been well cared for throughout its career to survive one hundred years before even arriving in the Champlain Valley. Although the maintenance for iron guns was quite simple, periodic scaling and cleaning the inside of the gun was necessary for the preservation of the piece. Scaling involved loading a ladle of powder in the gun without a wad or projectile and firing it off, and then thoroughly sponging and worming the bore clean (Binning 1676:109). Scaling generally occurred after every refitting and in extraordinary occasions by order of the captain (Lavery 1998:32).

While the Mount Independence cannon itself does not give any indication whether British or American forces discarded it into the lake, we know that those who disposed of it intended for the cannon to be useless even if recovered. The left trunnion was knocked off, making it nearly impossible to mount the gun and aim it effectively. The cannon also exhibits dents on its muzzle, cascabel, and right trunnion, which are likely the result of unsuccessful attempts to further damage the artillery piece. No doubt a sledgehammer was used to knock off the left trunnion of the Mount Independence cannon. This technique was the most effective method of rendering artillery useless. The cannon could only be placed back into its carriage with extreme difficulty and once mounted it could not be aimed or moved (Peterson 1969:68). In an effort to conceal the cannon, the artillery piece was tossed into the lake along with its detached trunnion. The Mount Independence gun is likely one of the artillery pieces that the British soldiers are recorded as having destroyed and tossed into the lake during their retreat of the Champlain Valley in November 1777 (Finlay 1976 [1777]).

References Cited

Archibald, E.H.H.
1968 *The Wooden Fighting Ship in the Royal Navy, AD 867-1860*. Arco Publishing, New York.

Baldwin, J.
1938 [1777] Baldwin's Diary. *Bulletin of the Fort Ticonderoga Museum* 4(6):10-40.

Banning, J.
1676 *List of Ordnance Delivered to the Stores at Woolwich, England from John Browne, Jr.* W051/18, pp. 228-229. Public Record Office, London.

Beer, C. de (editor)
1991 *The Art of Gunfounding: The Casting of Bronze Cannon in the Late 18th Century*. Jean Boudriot Publications, Rotherfield, England.

Bellico, R.P.
1992 *Sails and Steam in the Mountains: A Maritime and Military History of Lake George and Lake Champlain*. Purple Mountain Press, Fleischmanns, New York.

Binning, T.
1676 *A Light to the Art of Gunnery*. John Darby, London, England.

Blackmore, H.L.
1976 *The Armouries of the Tower of London I: Ordnance*. Her Majesty's Stationery Office, London.

Brown, R.R.
1989 Identifying 18th-Century Trunnion Marks on British Iron Guns: A Discussion. *International Journal of Nautical Archaeology and Underwater Exploration* 18(4):321-329.

Browne, G.
1703 *1696 Survey*. Manuscript. W055/1736. Public Records Office, London.

Caruana, A.B.
1994 *The History of English Sea Ordnance 1523-1875 1: The Age of Evolution, 1523-1715*, 2 vols. Jean Boudriot Publications, Rotherfield, England.

Chambers, W.
1781a *Captain William Chambers to Captain Mathews*. Letter. MG21, vol. ADD MSS 21802, File B-142, Reel H-1455, pp.79-80. Public Archives of Canada, Ottawa.

1781b *Captain William Chambers to General Frederick Haldimand*. Letter. MG21, vol. ADD MSS 21802, File B-142, Reel H-1455, pp. 86-88. Public Archives of Canada, Ottawa.

1781c *Journal of Captain William Chambers*. Journal. MG21, vol. ADD MSS 21802, File B-142, Reel H-1455. Public Archives of Canada, Ottawa.

Clowes, W. L.
1966 [1903] *The Royal Navy: A History from the Earliest Times to the Present*. 7 vols. AMS Press, New York.

Colledge, J.J.
1969 *Ships of the Royal Navy: An Historical Index 1: Major Ships (Excluding Trawlers, Drifters, Tugs, Etc.)*. 2 vols. Augustus M. Kelley, New York.

Committee of the Royal Artillery Institution
1906 *Official Catalogue of the Museum of Artillery in the Rotunda, Woolwich*. His Majesty's Stationery Office, London, England.

Davies, J.D.
1992 *Gentlemen and Tarpaulins: The Officers and Men of the Restoration Navy*. Oxford University Press, Oxford, England.

Elliott, R.
1988 *Cast Iron Technology*. Butterworths, Boston.

Elvin, J.G.D.
1984 *British Gunfounders, 1700-1855*. J. G. D. Elvin, England.

Epping, C.S.J. (editor)
1911 *Journal of Du Roi the Elder: Lieutenant and Adjutant, in the Service of the Duke of Brunswick, 1776-1778*. University of Pennsylvania Press, Pennsylvania.

Finlay, H.
1976 [1777] Hugh Finlay to Anthony Todd (Duplicate). In *Documents of the American Revolution, 1770-1783 (Colonial Office Series)*, edited by K. G. Davies, vol. 14, pp. 261-262. Irish Academic Press, Dublin.

Ford, W.C. (editor)
1908 *Journals of the Continental Congress, 1774-1789, 10: 1778:January 1-May 1*. US Government Printing Office, Washington, DC.

Fortune, T.
1992 [1778] *The Artillerist's Companion 1778*. Museum Restoration Service, Alexandria Bay, New York.

Fox, F.L.
1980 *Great Ships: The Battlefleet of King Charles II*. Conway Maritime Press, London.

Gooding, S.J.
1988 *An Introduction to British Artillery in North America*. Historical Arms Series 4. Museum Restoration Service, Alexandria Bay, New York.

Haldimand, F.
1780 *General Frederick Haldimand to Captain William Chambers*. Letter. MG21, vol. ADD MSS 21803, File B-143, Reel H-1455, p. 99. Public Archives of Canada, Ottawa.

Harding, R.
1995 *The Evolution of the Sailing Navy, 1509-1815*. St. Martin's Press, New York.

Hopkins, E.
1969 [1776] Commodore Esek Hopkins to Governor Jonathan Trumbull. In *Naval Documents of the American Revolution*, edited by W. B. Clark, vol. 4, pp. 711-712. Naval History Division, Department of the Navy, Washington, DC.

Hoyt, S D.
1986 *An Empirical System for the Identification of Smooth Bore, Cast Iron Cannon*. Unpublished M.A. thesis, Department of Anthropology, Texas A&M University, College Station, Texas.

Jackson, M.H. and C. de Beer
1974 *Eighteenth Century Gunfounding: The Verbruggens at the Royal Brass Foundry, A Chapter in the History of Technology*. Smithsonian Institution Press, Washington, DC.

Johnson, S.A.
1999 A New Chapter in the History of Fort Ticonderoga. *Haversack* 8(2):8.

Kennard, A.N.
1986 *Gunfounding and Gunfounders: A Directory of Cannon Founders From Earliest Times to 1850*. Arms and Armour Press, New York.

Ketchum, R M.
1997 *Saratoga: Turning Point of America's Revolutionary War*. Henry Holt and Company, New York.

Lancey, E.F. de, R.L. Kennedy, and G.H. Moore
1880 [1778] The Trial of Major General Schuyler, October, 1778. In *Collections of the New-York Historical Society for the Year 1879*, pp. 1-211. Publication Fund Series, vol. 12. New-York Historical Society, New York.

1881 [1778] The Trial of Major General St. Clair, August, 1778. In *Collections of the New-York Historical Society for the Year 1880*, edited by E. F. de Lancey, R. L. Kennedy and G. H. Moore, pp. 1-172. Publication Fund Series, vol. 13. New-York Historical Society, New York.

Lavery, B. (editor)
1998 *Shipboard Life and Organization, 1731-1815*. Publications of the Navy Records Society, vol. 138. M. A. Simpson, general editor. Ashgate Publishing Company, Brookfield, Vermont.

Lynn, M.C. (editor)
1993 *The American Revolution, Garrison Life in French Canada and New York: Journal of an Officer in the Prinz Friedrich Regiment, 1776-1783*. Greenwood Press, Westport, Connecticut.

Merriman, R.D. (editor)
1961 Queen Anne's Navy: Documents Concerning the Administration of the Navy of Queen Anne 1702-1714.. vol. 103. Navy Records Society, London.

Mulholland, J.A.
1981 *A History of Metal in Colonial America*. University of Alabama, University, Alabama.

Nickerson, H.
1928 *The Turning Point of the Revolution or Burgoyne in America*. Houghton Mifflin, Boston.

Peterson, H.L.
1969 *Round Shot and Rammers*. Stackpole Books, Harrisburg, Pennsylvania.

Pool, B.
1966 *Navy Board Contracts, 1660-1832: Contract Administration Under the Navy Board*. Archon Books, Hamden, Connecticut.

Powell, H.W.
1777 Henry Watson Powell to Guy Carleton. Letter, MG11, Folio 239, Microfilm Roll G-34. Public Archives of Canada, Ottawa.

1976 [1777] Brig.-General Henry Watson Powell to Lord George Germain. In *Documents of the American Revolution, 1770-1783 (Colonial Office Series)*, edited by K. G. Davies, pp. 253-254. vol. 14. Irish Academic Press, Dublin.

Rae, T. (editor)
1985 [1780] *Adventures of John McAlpine*. The Black Pennell Press, Greenock, Scotland.

Rolando, V.R.
1992 *200 Years of Soot and Sweat: The History and Archeology of Vermont's Iron, Charcoal, and Lime Industries*. Vermont Archaeological Society, Burlington, Vermont.

Roth, R.
1989 A Proposed Standard in the Reporting of Historic Artillery. *International Journal of Nautical Archaeology and Underwater Exploration* 18(3):191-202.

Salary, D.L.
1977 *Arming for War: The Production of War Material in Pennsylvania for the American Armies During the Revolution*. Unpublished Ph.D. dissertation. Department of History, University of Delaware, Newark, Delaware.

Seller, J.
1994 [1691] *The Sea-Gunner*. Jean Boudriot Publications, Rotherfield, England.

Sewall, H.
1963 [1777] The Diary of Henry Sewall. *Bulletin of the Fort Ticonderoga Museum* 11(2):75-91.

Smith, C.S. and M.T. Gnudi (editors)
1959 [1540] *The Pirotechnia of Vannoccio Biringuccio*. Basic Books, New York.

Specht, J.F.
1995 [1777] *The Specht Journal: A Military Journal of the Burgoyne Campaign*. Contributions to Military Studies, 158. Greenwood, Westport, Connecticut.

Stephenson, O.W.
1919 *The Supplies for the American Revolutionary Army*. M.A. thesis, Department of History, University of Michigan, Ann Arbor.

Stone, W.L. (editor)
1886 *Journal of Captain Pausch, Chief of the Hanau Artillery During the Burgoyne Campaign*. Joel Munsell's Sons, Albany, New York.

Tanner, J.R. (editor)
1903 *A Descriptive Catalogue of the Naval Manuscripts in the Pepysian Library at Magdalene College, Cambridge*. vol. 26. Navy Records Society, London.

Ward, A.
1970 [1776] Major General Artemas Ward to George Washington. In *Naval Documents of the American Revolution*, edited by W. J. Morgan, vol. 5, pp. 394. Naval History Division. Department of the Navy, Washington, DC.

Weeden, W.B.
1899 Diary of Enos Hitchcock, D. D., A Chaplin in the Revolutionary Army. With a Memoir. *Publications of the Rhode Island Historical Society* 7(1):87-119.

Weller, J.
1956 The Artillery of the American Revolution. *Military Collector and Historian* 8 (issue of volume):61-65, 97-101.

Wickman, D.H.
1993 *Built with Spirit, Deserted in Darkness: The American Occupation of Mount Independence 1776-1777*. M.A. thesis, Department of History, University of Vermont, Burlington, Vermont.

1997 The British Occupation of Mount Independence; 6 July-8 November 1777. In *Proceedings, Second Annual Conference of Heritage Tourism in the Adirondack Region*, edited by D. R. Starbuck. Adirondack Regional Chamber of Commerce Heritage Tourism Subcommittee, Glens Falls, New York.

Williams, G.
1777a *Major Griffith Williams Journal.* Journal. MG11, CO42, vol. 36, Reel B-33, Folio 752, pp. 368-375. Public Archives of Canada, Ottawa.

1777b *Return of All the Ordnance & Ordnance Store Found in the Garrisons of Ticonderoga & Mount Independence.* Manuscript. MG11, CO42, vol. 36, Reel B-33, Folio 356-357. Public Archives of Canada, Ottawa.

Williams, J.A. (editor)
1966 *Laws of Vermont.*, vol. 14. Secretary of State, Montpelier, Vermont.

Wright, W.
1695 *A Journal Commencing from 8br ye 5th 93 on Board Their Majts' Ship* Essex *by me Wm Wright Commander.* Captain's Log. ADM 51/137 Part 1. Public Record Office, London.

Scott A. McLaughlin is a Ph.D. candidate in the department of Anthropology at Binghamton University, Binghamton, New York, and is nearing completion of his dissertation on Lake Champlain's canalers. Scott's career in Vermont archaeology began in 1986 as a high school volunteer with the Consulting Archaeology Program (CAP) as the University of Vermont (UVM). In 1991, while employed by CAP, Scott obtained a bachelor's degree from UVM in anthropology, geography, and history. In 1987, Scott became a certified scuba diver and shortly thereafter began volunteering for the Lake Champlain Maritime Museum at Basin harbor. Scott's interest in Lake Champlain's maritime history led him to pursue a master's degree from the Nautical Archaeology Program at Texas A&M University. His master's thesis, completed in 2000, was entitled "History Told from the Depths of Lake Champlain: 1992-1993 Fort Ticonderoga-Mount Independence Submerged Cultural Resource Survey."