TOOLS FROM THE FRENCH AND INDIAN WAR SLOOP BOSCAWEN

A Thesis

by

DAVID MITCHELL GRANT

Submitted to the Office of Graduate Studies of
Texas A&M University
in partial fulfillment of the requirements for the degree of

MASTER OF ARTS

December 1996

Major Subject: Anthropology
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December 1996

Major Subject: Anthropology
ABSTRACT

Tools from the French and Indian War Sloop Boscawen. (December 1996)

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Chair of Advisory Committee: Dr. Kevin J. Crisman

The 115-ton sloop Boscawen was built by the British to drive the French from Lake Champlain near the end of the French and Indian War. She helped to defeat the French fleet in 1759 and took part in amphibious operations the next year against the French fort of Ile-aux-Noix at the north end of Lake Champlain. Part of her duties included moving men and matériel for the British Army. The usefulness of the land-locked warship declined rapidly at the end of hostilities and, stripped of her armament and rigging, she sank at her moorings in the King’s Shipyard near Fort Ticonderoga. The remains of the Boscawen were discovered in 1983 during a survey sponsored by the Champlain Maritime Society. Archaeological excavation of the hull in 1984 and 1985 revealed a surprisingly large number of artifacts. Tools represented a small but diverse segment of the total artifact assemblage. Few tools from the Boscawen are comparable to the ship’s carpenter’s and shipwright’s tools commonly associated with shipwrecks. Instead, the tools represent types which were commonly used by eighteenth-century armies for fortification, siegework, and fatigue duties. Both the French and British armies used large numbers of these types of tools along the shores of Lake Champlain. The crew of the Boscawen may have used some of the tools but most were probably some form of cargo, either usable tools for the British Army or scrap iron collected at British and French sites.
For Mom and Dad

Marjorie Mitchell Grant

In Loving Memory

and

Richard Alan Grant
ACKNOWLEDGMENTS

Many individuals provided assistance during the research phase of this project. I would like to thank Nicholas Westbrook and Anthony Pell of the Fort Ticonderoga Association who arranged lodgings for me during my research at the Pell Research Center at Fort Ticonderoga in December 1993. I would also like to thank Bruce Moseley, former curator of the Fort Ticonderoga Museum, who made primary sources available to me from the museum’s archives, provided a work area, and suggested research directions. Curator Christopher Fox and the rest of the folks at Fort Ticonderoga have since offered critical support as the thesis progressed through the summer and fall of 1996. I am also indebted to Frank Kravic and George Neumann for their comments and advice. As I began to research colonial military tools Frank Kravic wrote me: “The deeper you get into this [research] the more you will find how little we know”. I would suggest, however, that real archaeology can go a lot farther towards rectifying this situation than can potting a site for collectibles. John Bratten, Jay Gaynor, Brendan McDermott, Ivor Noël Hume, and Rich Raymond, and David Starbuck also assisted me in my research into colonial tools.

I would also like to thank the members of my committee for the expeditious efforts that allowed the timely submission of this work. The final production of this thesis, not to mention my mental state, would have suffered badly had it not been for the input and moral support from Norine Carroll, Rob Combs, Tina Erwin, Tom Ginsburg, Jennifer Parker, Edward Rogers and my family. The ultimate accolades, however, go to Sean Parker and Rachel Stallings. Without their Herculean (Herclean) efforts this thesis would simply have not come together in time.
# TABLE OF CONTENTS (Continued)

<table>
<thead>
<tr>
<th>CHAPTER</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wood Engineering Structures in Fortification and Siegecraft</td>
<td>56</td>
</tr>
<tr>
<td>Fatigue Duty</td>
<td>57</td>
</tr>
<tr>
<td>The Need for Hand Tools</td>
<td>63</td>
</tr>
<tr>
<td>Contemporary References to Tool Use</td>
<td>73</td>
</tr>
<tr>
<td>V ORIGINS OF TOOLS FROM THE BOSCAWEN</td>
<td>78</td>
</tr>
<tr>
<td>Research Challenges Pertinent to Colonial Iron Tools</td>
<td>79</td>
</tr>
<tr>
<td>Origin Option 1: British Manufacture</td>
<td>80</td>
</tr>
<tr>
<td>Origin Option 2: French Manufacture</td>
<td>82</td>
</tr>
<tr>
<td>Origin Option 3: British Colonial Manufacture</td>
<td>83</td>
</tr>
<tr>
<td>Origin Option 4: French Colonial Manufacture</td>
<td>89</td>
</tr>
<tr>
<td>Colonial Ironware Distribution</td>
<td>90</td>
</tr>
<tr>
<td>British Broad Arrow Markings</td>
<td>93</td>
</tr>
<tr>
<td>French Army Sources</td>
<td>93</td>
</tr>
<tr>
<td>VI CATALOG</td>
<td>96</td>
</tr>
<tr>
<td>Digging Tools (Miner’s Tools)</td>
<td>96</td>
</tr>
<tr>
<td>Cutting Tools (Pioneer’s Tools)</td>
<td>114</td>
</tr>
<tr>
<td>Construction Tools</td>
<td>127</td>
</tr>
<tr>
<td>Possible Tools</td>
<td>136</td>
</tr>
<tr>
<td>Distribution of Tools in the Boscawen</td>
<td>139</td>
</tr>
<tr>
<td>VII CONCLUSIONS</td>
<td>144</td>
</tr>
<tr>
<td>REFERENCES</td>
<td>149</td>
</tr>
<tr>
<td>APPENDIX</td>
<td>159</td>
</tr>
<tr>
<td>PERMISSION LETTERS</td>
<td>159</td>
</tr>
<tr>
<td>VITA</td>
<td>163</td>
</tr>
</tbody>
</table>
# LIST OF FIGURES

<table>
<thead>
<tr>
<th>FIGURE</th>
<th>Description</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Political boundaries at the start of the French and Indian War</td>
<td>9</td>
</tr>
<tr>
<td>2</td>
<td>Major forts and cities in the French and Indian War</td>
<td>17</td>
</tr>
<tr>
<td>3</td>
<td>Forts along the Champlain Waterway</td>
<td>30</td>
</tr>
<tr>
<td>4</td>
<td>Cross section of low defenses</td>
<td>44</td>
</tr>
<tr>
<td>5</td>
<td>Star fort design</td>
<td>44</td>
</tr>
<tr>
<td>6</td>
<td>Vauban's sap-and-parallel siegeworks</td>
<td>46</td>
</tr>
<tr>
<td>7</td>
<td>Tools, gabions, fascines, and other materials used in siegework</td>
<td>51</td>
</tr>
<tr>
<td>8</td>
<td>Sappers and their equipment</td>
<td>55</td>
</tr>
<tr>
<td>9</td>
<td>Military tools and equipment from mid-18th-century print</td>
<td>58</td>
</tr>
<tr>
<td>10</td>
<td>Tools and materials used in siegework and fortification</td>
<td>64</td>
</tr>
<tr>
<td>11</td>
<td>Iron tools, wood tools, and separate helves</td>
<td>65</td>
</tr>
<tr>
<td>12</td>
<td>French toolmakers at work on an anvil</td>
<td>84</td>
</tr>
<tr>
<td>13</td>
<td>Pick-mattock head (03-546)</td>
<td>98</td>
</tr>
<tr>
<td>14</td>
<td>Pick-mattock helve and wedge (02-419)</td>
<td>99</td>
</tr>
<tr>
<td>15</td>
<td>Complete pick-mattock as found</td>
<td>100</td>
</tr>
<tr>
<td>16</td>
<td>Shovel blade (03-098)</td>
<td>104</td>
</tr>
<tr>
<td>17</td>
<td>Spade blade (03-111)</td>
<td>107</td>
</tr>
<tr>
<td>18</td>
<td>Broken socket from a shovel or spade (03-484)</td>
<td>109</td>
</tr>
<tr>
<td>19</td>
<td>Wooden T-handle crosspiece (02-368)</td>
<td>111</td>
</tr>
<tr>
<td>20</td>
<td>Wooden &quot;shod&quot; shovel fragment (02-215)</td>
<td>113</td>
</tr>
<tr>
<td>FIGURE</td>
<td>Description</td>
<td>Page</td>
</tr>
<tr>
<td>--------</td>
<td>------------------------------------------------------------------------------</td>
<td>------</td>
</tr>
<tr>
<td>1</td>
<td>Political boundaries at the start of the French and Indian War</td>
<td>9</td>
</tr>
<tr>
<td>2</td>
<td>Major forts and cities in the French and Indian War</td>
<td>17</td>
</tr>
<tr>
<td>3</td>
<td>Forts along the Champlain Waterway</td>
<td>30</td>
</tr>
<tr>
<td>4</td>
<td>Cross section of low defenses</td>
<td>44</td>
</tr>
<tr>
<td>5</td>
<td>Star fort design</td>
<td>44</td>
</tr>
<tr>
<td>6</td>
<td>Vauban's sap-and-parallel siegeworks</td>
<td>46</td>
</tr>
<tr>
<td>7</td>
<td>Tools, gabions, fascines, and other materials used in siegework</td>
<td>51</td>
</tr>
<tr>
<td>8</td>
<td>Sappers and their equipment</td>
<td>55</td>
</tr>
<tr>
<td>9</td>
<td>Military tools and equipment from mid-18th-century print</td>
<td>58</td>
</tr>
<tr>
<td>10</td>
<td>Tools and materials used in siegework and fortification</td>
<td>64</td>
</tr>
<tr>
<td>11</td>
<td>Iron tools, wood tools, and separate helve</td>
<td>65</td>
</tr>
<tr>
<td>12</td>
<td>French toolmakers at work on an anvil</td>
<td>84</td>
</tr>
<tr>
<td>13</td>
<td>Pick-mattock head (03-546)</td>
<td>98</td>
</tr>
<tr>
<td>14</td>
<td>Pick-mattock helve and wedge (02-419)</td>
<td>99</td>
</tr>
<tr>
<td>15</td>
<td>Complete pick-mattock as found</td>
<td>100</td>
</tr>
<tr>
<td>16</td>
<td>Shovel blade (03-098)</td>
<td>103</td>
</tr>
<tr>
<td>17</td>
<td>Spade blade (03-111)</td>
<td>105</td>
</tr>
<tr>
<td>18</td>
<td>Broken socket from a shovel or spade (03-484)</td>
<td>107</td>
</tr>
<tr>
<td>19</td>
<td>Wooden T-handle crosspiece (02-368)</td>
<td>108</td>
</tr>
<tr>
<td>20</td>
<td>Wooden “shod” shovel fragment (02-215)</td>
<td>110</td>
</tr>
<tr>
<td>FIGURE</td>
<td>Description</td>
<td>Page</td>
</tr>
<tr>
<td>--------</td>
<td>-----------------------------------------------------------------</td>
<td>------</td>
</tr>
<tr>
<td>21</td>
<td>Billhook (03-071)</td>
<td>116</td>
</tr>
<tr>
<td>22</td>
<td>Fascine knife (03-203)</td>
<td>119</td>
</tr>
<tr>
<td>23</td>
<td>Belt axe head (03-124)</td>
<td>122</td>
</tr>
<tr>
<td>24</td>
<td>Belt axe helve (02-130) and fit between the head and helve</td>
<td>123</td>
</tr>
<tr>
<td>25</td>
<td>Cross-peen hammer head (03-004)</td>
<td>129</td>
</tr>
<tr>
<td>26</td>
<td>Gimlet (02-120)</td>
<td>131</td>
</tr>
<tr>
<td>27</td>
<td>Mason’s pointing trowel (03-331)</td>
<td>134</td>
</tr>
<tr>
<td>28</td>
<td>Possible tools (03-051, 03-123, and 03-517)</td>
<td>137</td>
</tr>
<tr>
<td>29</td>
<td>Distribution of tools</td>
<td>140</td>
</tr>
</tbody>
</table>
### LIST OF TABLES

<table>
<thead>
<tr>
<th>TABLE</th>
<th>Description</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Stores Used by British Army in Campaign of 1757</td>
<td>66</td>
</tr>
<tr>
<td>2</td>
<td>Equipment Carried to the Siege of Turin</td>
<td>67</td>
</tr>
<tr>
<td>3</td>
<td>Artillery Tools</td>
<td>67</td>
</tr>
<tr>
<td>4</td>
<td>Tools Brought by Braddock’s Forces</td>
<td>68</td>
</tr>
<tr>
<td>5</td>
<td>Tools and Engineering Equipment Inventoried at Niagara</td>
<td>69</td>
</tr>
<tr>
<td>6</td>
<td>Tools and Blacksmithing Equipment Sent to Crown Point</td>
<td>70</td>
</tr>
<tr>
<td>7</td>
<td>Tools Sent from Fort George to Crown Point</td>
<td>72</td>
</tr>
<tr>
<td>8</td>
<td>British Axe Suppliers from the Mid-Eighteenth Century</td>
<td>125</td>
</tr>
<tr>
<td>9</td>
<td>Tools Recovered from the <em>Boscawen</em></td>
<td>139</td>
</tr>
</tbody>
</table>
CHAPTER I

INTRODUCTION

The *Boscawen*, a 115-ton sloop, was built by the British to drive the French from Lake Champlain during the French and Indian War. The remains of the *Boscawen* were discovered in the waters of Lake Champlain near Fort Ticonderoga in 1983. Archaeological excavation of the site in 1984 and 1985 produced a large number of artifacts and revealed the well-preserved lower elements of her hull. Dr. Kevin Crisman of Texas A&M University is presently completing a study of the vessel’s construction. The large artifact assemblage recovered from the ship has been subdivided into the following categories: (1) crew’s possessions, stores, and items from shipboard life; (2) weapons; (3) rigging elements; and (4) tools. Categories 1-3 have been studied by Tina Erwin, Brinnen Carter, and Alan Flanagan respectively. I have chosen to study the fourth category, tools and tool fragments, in order to complete this research effort. This thesis addresses the results of my study. The data generated by all of the researchers will eventually be published in a comprehensive examination of the *Boscawen*.

In 1983, the Champlain Maritime Society (CMS) began an archaeological survey of the bottom of Lake Champlain between Fort Ticonderoga and Mt. Independence. The CMS hoped to find remnants of a Revolutionary War-era bridge built by the American army between the fort and the east side of the lake. Additionally, the western end of the bridge near Fort Ticonderoga terminated near the “King’s Shipyard”, an area which had seen considerable activity during the last years of the French and Indian War as the British built a fleet to wrest final control of Lake Champlain from the French. Here the British quickly constructed the 155-ton brig *Duke of Cumberland* and the 115-ton sloop *Boscawen* at the shipyard in the late summer and early autumn of 1759. The King’s Shipyard was the last reported resting place of these two ships and others which composed the victorious British Lake Champlain fleet at the conclusion of the war.

This thesis conforms to the style and format of *Historical Archaeology*. 
The search for the bridge remains and vessels within the shipyard was to have begun with a side-scan sonar survey; when this sophisticated equipment did not arrive on time, the archaeologists proceeded with the diving portion of the survey. On 14 August 1983 the crew began searching the lake bottom between the shore and a line of buoys they had placed 100 yards off shore. The visual reconnaissance by divers of the weed-covered bottom proceeded despite poor visibility. The team was quickly rewarded with the discovery of several stone-and-log caissons from the Revolutionary War-era bridge and the remains of two hulls seen barely protruding from the sediment (Cohn 1985: 338). A third hull was located the next day and small test pits were excavated in the first two hulls. Artifacts observed within the test units, and the size of the frame members seen protruding from the bottom, led the crew to tentatively identify the hulls as belonging to eighteenth-century military vessels.

For several months the team worked out financial, legal, and logistical concerns and envisioned the excavation of one hull per season for the next three summers. They would begin with Hull # 2, the second and largest hull found in 1983. After consulting contemporary sources, regional historians, and verbal accounts the team decided the large hull remains, which measured 70 feet (21.35 m) in length, belonged to the Boscawen. Hull # 1 was smaller, at approximately 50 feet (15.25 m) in length, and most likely represented a French sloop captured by the British in 1759. The small Hull #3 remained unidentified.

Although the team had reservations about starting with the largest vessel, they recognized the advantages of beginning with an identified ship (Cohn 1985:342). Because the vessel was readily accessible from shore and was previously stripped of armaments and other valuable ship’s stores, it was assumed that relatively few artifacts would be encountered. Thus, the team hoped to have the Boscawen completely excavated and recorded by the end of the 1984 summer season.

The hull of the Boscawen rested in six feet (1.8 m) to eight feet (2.4 m) of water and lay perpendicular to the shoreline in a northwest/southeast alignment. The remains listed slightly to port and the stern was deeper than the bow, which was closest to shore. The orientation of the hull led archaeologists to surmise that the vessel had originally been tied up to a wharf or pier jutting out from the shore (Crisman 1985:357).
The Boscawen was originally constructed of green wood and began to deteriorate relatively quickly. The decay process accelerated when she sank at her moorings sometime around 1762 or 1763. While the upper portions of the hull rotted, the lower elements of the hull settled into the bottom and became covered by up to five feet (1.53 m) of sediment.

To provide provenience control and orient the excavators in the murky water, two 25-by-25 foot (7.63-by-7.63 m) square grids were constructed and placed over the bow and stern sections of the hull. The grid was subdivided into five-by-five foot excavation units which could themselves be broken down into 25 one-foot (30.5 cm) squares for recording purposes. The mud within and alongside the wreck was excavated in arbitrary four-inch (10 cm) levels through the use of a power dredge. Any small objects that escaped the careful hand excavation were collected in a bag at the outflow of the dredge discharge hose (Cohn 1985:350).

Artifacts and loose fragments of the hull were removed to shore where they were washed, tagged, catalogued, photographed, drawn, and placed in wet storage. As they removed overburden from the inside of the hull the crew encountered a surprising number of artifacts. The numerous small finds, especially in the lowest portion of the hull near the keelson, slowed the excavation process considerably. It soon became clear that a second season was needed to complete the Boscawen study. By the end of the next excavation season in 1985, the hull was fully exposed and recorded and over 5,000 small finds had been recovered. All artifacts were photographed, sketched, measured, and catalogued by material type. Artifacts not associated with the construction of the hull itself (e.g., wood fragments, iron spikes, and nails) fell into four categories: (1) crew’s possessions, stores, and items from shipboard life; (2) weapons; (3) rigging elements; and (4) tools.

Most of the wooden objects and small artifacts such as buckles, shoes, buttons, pipe stems, bottles, and ceramics were conserved by Heidi Miksch of the New York Bureau of Historic Sites in 1984 and 1985. However, some iron objects remained in wet storage for several years in Troy, New York. In the spring of 1993, Alan Flanagan and I conserved the remaining metal artifacts in the Conservation Research Laboratory at Texas A&M University. Iron objects were subjected to a two week electrolytic reduction process to change iron corrosion product to stable iron, to clean the objects, and to remove potentially
harmful chlorides. After the electrolytic reduction process the artifacts were rinsed in
deionized water, boiled in and coated with tannic acid, boiled again in microcrystalline wax
to drive out moisture, and finally, sealed with a coating of Acrylod B-72.

The long wait in wet storage, and unavoidable removal of corrosion products during
conservation, changed some of the iron tools slightly from their appearance at discovery.
These changes, coupled with the discovery of new surface features after cleaning and
conservation, necessitated that illustrations be made of the iron tools. In December of
1993, I visited Fort Ticonderoga to examine the wooden parts of tools which had
previously been conserved and to complete additional research. By comparing the
conserved wood objects with notes taken upon recovery it was clear that their dimensions
had not changed significantly. However, like the iron objects, new surface features were
apparent and the wood artifacts were redrawn as well.

Careful recovery, conservation, and illustration of cultural materials only partially
fulfill the obligations of archaeology. Comprehensive research is necessary to approach a
complete understanding of an artifact, its association, and context. Hence, the tools from
the Boscawen were examined through a combination of archival research and consultation
of knowledgeable individuals. Primary sources pertinent to this project were largely
available from the library and archive at the Pell Research Center at the Fort Ticonderoga
Museum. The museum curator at the time, Bruce Moseley, made many of these materials
available and suggested research directions. The Pell Research Center and libraries at Texas
A&M University, in Seattle, and at the University of Washington provided most of the
secondary references. The following individuals were consulted about the origin and
terrestrial use of colonial tools: Frank Kravic and George Neumann, collectors; Jay
Gaynor, in charge of collections at colonial Williamsburg; Rich Raymond, curator at
Colonial National Historical Park at Yorktown; Ivor Noël Hume, retired colonial
archaeologist; and Chris Fox, current curator at the Fort Ticonderoga Museum. Fellow
graduate students John Bratten, conservator of the Emanuel Point Shipwreck, and Brendan
McDermott, completing his master’s thesis on tools from the Defence, provided information
on tools found in a maritime context. The results of this research are addressed in the
following pages.
This thesis is divided into three sections: (1) an outline of the French and Indian War and the history of the Boscawen; (2) a historic framework for the tool assemblage; and (3) details of specific tools found on the ship.

Artifacts are most informative, and most interesting, when studied within their context. The first part of the thesis provides historic background for the complex artifact represented by the Boscawen itself. Accordingly, Chapter II outlines the contemporary political environment and events leading up to the French and Indian War in order to provide a context for the conflict. Chapter III covers the conduct of the war before the Boscawen was constructed and the role of the ship in the final two years of fighting.

The second part of the thesis provides a historic framework to better understand the tool assemblage found aboard the Boscawen. Chapter IV examines the military application of hand tools in the eighteenth century and their importance in the terrestrial operations of combatants in the French and Indian War, especially the British army. Chapter V briefly discusses iron industries and the manufacturing and trade of iron tools in Europe, North America, and in the colonial system. This chapter also suggests possible origins for the tools.

The final portion of the thesis departs from generalities and focuses on the specific tools found on board the Boscawen. Chapter VI includes a full catalog, provenience information, and description of the tools. The tool assemblage is not large but is quite diverse for its size and each artifact represents a separate type of tool. Accordingly, the definition of each tool type is included in the individual catalog descriptions and not presented separately. This chapter also examines some of the options for why specific tools were on the ship and addresses their distribution within the hull. Chapter VII concludes the discussion.

French and Indian War sites have been attracting increasing interest from the historic preservation community (e.g., David Starbuck's work on Roger's Island and the recent Pennsylvania SHPO inventory of French and Indian War sites). However, information gathered during 40 years of reconstruction-oriented archaeology at major sites, as well as work done by contract archaeologists, is dispersed and, in some instances, inaccessible (Bomberger 1993). Some of the material that is available does not meet what are now
agreed to be basic criteria for disseminating information about archaeological work. Unfortunately, some of the best-illustrated publications are oriented towards the private collector and include artifacts taken from French and Indian War and Revolutionary War sites without adherence to basic archaeological procedures. Hence, the objects lack provenience and, subsequently, they lack association and context. These are some reasons why a complete accounting and study of the tools and other artifacts from the Boscawen are important. This work will not only help complete the picture of one ship, but also provide useful information for archaeologists studying other civilian and military shipwrecks and terrestrial sites of the colonial period.
CHAPTER II

EIGHTEENTH-CENTURY INTERNATIONAL CONFLICT

Today, technology is forcing the development of a global economy. Independent nations realize that cooperation in the fast-paced and highly competitive international marketplace is often mutually beneficial and profitable. This was not so in the seventeenth and eighteenth centuries. These centuries were characterized by intense economic rivalry between European nations. An additional impetus to the normal competition between nations was the belief in an international form of zero-sum economics. It was accepted that any gain made by one nation must be balanced as a loss by another. This belief was the driving force behind the theory and practice of mercantilism in post-feudal Europe. Colonies played a crucial role in the mercantilist system and the end of the seventeenth century and the first half of the eighteenth century were marked by a series of wars for empire between European states. When European nations extended their empires to the New World, old rivalries followed. Three colonial wars for control of North America were fought between Britain and France before the French and Indian War finally decided the matter. These wars, and the system that spawned them, are the subject of Chapter II.

Mercantilism and Colonization

By the middle of the seventeenth century, mercantilism was universally accepted by the European states. Mercantilist doctrine held that a nation's power rested on the following: (1) its possession of colonies as markets for manufactured goods and as sources of raw materials; (2) a favorable balance of trade with those colonies and other nations; and (3) a healthy supply of gold and silver bullion to buy military protection for the whole structure. Colonies were a vital component of this system because overseas trade was crucial to the expanding economies of Europe. For the first time, a global economy was created in which the prosperity of European states hinged on access to the labor, products, and at times, the very members of populations all over the earth. According to mercantilist
theory, it was crucial for a nation to accumulate gold and silver bullion. Gold and silver from its New World empire had made Spain the envy of European nations. Until the defeat of the Spanish Armada in 1588, France, the Netherlands, and England had been major rivals of Spain in Europe. As Spain’s power began to weaken, they began to rival each other. All three hastened to follow Spain’s example and establish colonies in far-off lands in the belief that these would provide the wealth to make each more powerful than its rivals. With Central and South America under firm control by Spain and Portugal, other nations looked to the Caribbean and North America to set up ventures which would profit their royal coffers. The Caribbean colonies were initially more profitable but the colonies of the North American mainland eventually outpaced them. Although the Dutch enjoyed some initial success with their colony of New Amsterdam, the development of mainland colonies by Britain and France is of particular interest to this discussion (Figure 1).

**British Colonies in North America**

The English were eventually the most successful colonizers of North America. After initial failure to establish colonies in the sixteenth century, the first half of the seventeenth century witnessed the establishment of joint-stock and proprietary colonies in Virginia and Maryland, and of Puritan colonies in New England (Simmons 1976:46-48). Colonization continued until English colonies dominated the Eastern Seaboard from Maine to Spanish Florida. Though these colonies were established under a variety of circumstances, they all served the mercantilist policies of the mother country. The colonies provided a source of cheap foodstuffs and raw materials and presented a market for manufactured goods. Thus, Britain achieved a favorable balance of trade which, due to mercantilist theory, was coveted even more then than it is now. The colonies were required to make up any trade deficit by directly paying precious metal specie to the mother country (Perkins 1988:19). Gold and silver purchased anything the home government wished, including the administration and military needed to run and protect this vulnerable system.

Although the colonies were subordinates in an exploitive system designed to enrich Britain, most colonists believed in centralizing the wealth and power of the empire in the old country. Many prospered under a system which was often too busy at home and in Europe
FIGURE 1. Political boundaries at the start of the French and Indian War.
to strictly enforce the laws designed to monopolize the colonies' trans-Atlantic trade. This was especially true during the English Civil War in the middle of the seventeenth century. The haphazard circumstances in which the English seaboard colonies developed, and the turmoil at home, granted them a degree of independence not enjoyed by Spanish, Portuguese, French, or Dutch colonies. At the end of the English Civil War this situation came to the attention of parliament. Nevertheless, despite laws enacted to tighten economic control, her colonial subjects traded almost everything with Britain's economic rivals and the colonial economy continued to grow (Perkins 1988:20-25).

French Colonies in North America

France's colonization of North America began just one year after the founding of British Jamestown and proved less successful than Britain's. Samuel de Champlain established Quebec on the St. Lawrence River in 1608 to secure French interests in the area, namely the conversion of the indigenous peoples to Catholicism and protection of the lucrative trade in beaver pelts. Although the St. Lawrence Valley was explored to the Great Lakes, Champlain's sponsors were more interested in trade than settlement. Most French émigrés were instead going to the West Indies. After Champlain's death in 1635, New France was ruled by the Company of the Hundred Associates. This company attempted to set up royal land grants, or seigneuries, to encourage agricultural settlement along the banks of the St. Lawrence (Lunn and Moore 1992:57). However, this attempt proved only mildly successful. The short growing season hindered production and the profitable and exciting fur trade proved to be too much of an attraction for many a would-be farmer. Hence, the quasi-feudal system of seigneuries, and subsequently agriculture, did not grow rapidly. With the reign of Louis XIV came a new direction. The Company regime was abolished in 1663 and New France became a Crown colony under the direct scrutiny of the king. Though explorers, traders, and missionaries claimed vast areas of land between the Great Lakes and the Gulf of Mexico for their king, settlers were not forthcoming. French aristocrats acquired huge grants from the government, thus denying land to many of the lower classes (Cooke 1993: 427). Also, because it was closed to non-Catholics, New France did not attract the same types of religiously disaffected immigrants that were
swelling the ranks of the English colonies (Eccles 1987:43). As a result, New France spread thinly into the interior as British colonists grew in number and consolidated their hold on the relatively compact strip of land between the ocean and eastern mountain ranges.

Colonial Wars

The mercantilist doctrine enforced a global trade network that revolved around the European economy. The protection of one's share was crucial. It was not sufficient to simply cultivate and exploit a colony, it was also necessary to hamper or destroy the colonial trade of your rivals. War was too often the only means employed to resolve disputes in the anarchic atmosphere of international relations. Heaven help the state unable to defend its interests. Although England, France, the Netherlands, and Spain were major players in the colonization of North America, their foreign policies were often inseparable from the European political arena. European states such as Prussia, Russia, Austria, Sweden, Poland, and the Ottoman Empire vied for control of European commerce and the territories of weaker states. With their long standing rivalries freshened by colonial concerns, the nations with interests in the New World were participants in dynastic and colonial wars linked to complex and shifting rivalries and allegiances in Europe.

The conflicts that arose from the differing agendas of these nations dominated Europe for decades. The three wars preceding the French and Indian War are of interest to this discussion because all began in the Old World and spread to the New World. The first of these conflicts ran from 1689 to 1697 and was known in Europe as the War of Austrian Succession or the War of the League of Augsburg. In the New World it was known as King William's War. The war was fought between an Anglo-Dutch alliance, under William of Orange, and France, whose burgeoning power under Louis XIV threatened the Protestant countries of northern Europe. The second conflict, known as the War of Spanish Succession, pitted England, the Netherlands, Brandenburg-Prussia, and Austria against France and Spain between 1702 and 1713. In North America, this conflict was known as Queen Anne's War. Finally, England and her allies fought France, Spain, and Prussia between 1739 and 1748 in the War of Austrian Succession, known as King George's War in the New World (Cooke 1993:279). Mercantilist doctrine decreed that empire building
would play a major role in these wars and that each of these conflicts had a North American component.

The French and English colonies were concerned with consolidating their fragile beginnings on the North American continent and had managed to avoid direct conflict through most of the seventeenth century. Yet, before fighting in Europe spread across the Atlantic, friction steadily increased between each nation's expanding territories. Territories, later to become Canada and the Mississippi Valley, were claimed by the French. Not completely satisfied, the French cast a covetous gaze on the fish, agricultural products, and timber of New England (Millet and Maslowski 1984:27). Limited to the area of the Atlantic Seaboard colonies, the British looked to the north and west. Here, enticements included fishing grounds off New France's coast, control of the fur trade, settlement opportunities in the Ohio Valley, and a chance to break through the French encirclement.

**King William’s War (1689-1697)**

King William's War set the form and style of subsequent colonial wars. The war began with a winter offensive by the French and their Indian allies against English frontier settlements in New England and New York. The French wiped out Schenectady, New York, in February 1690 and other raids followed against New England (Parkman 1983:157-159). On the high seas, French privateers preyed on British colonial merchantmen and fishing vessels. In retaliation, New England captured Port Royal in Acadia and sent an unsuccessful expedition against Quebec. Although fighting continued until 1699 in New England, the indecisive war officially ended when the Treaty of Ryswick was signed in 1697 (Cooke 1993:280-281; Leckie 1981:15). The treaty reestablished the borders in existence before the war and reaffirmed the rivalry, leading to continued conflict five years later.

**Queen Anne’s War (1702-1713)**

In 1700, Charles II of Spain died without a successor. Louis XIV's attempt to place his grandson on the throne was opposed by the Grand Alliance of England, Prussia, Austria, and the Netherlands. Fearing a possible powerful partnership between Spain and France, the Grand Alliance supported a rival claimant. Thus, the War of Spanish Succession began
in 1703 (Leckie 1981:25). In the English colonies of North America, the war over the Spanish throne was known as Queen Anne's War and involved both extremities of the Atlantic seaboard. In the south, the Spanish and French colonies of Florida and Louisiana allied against English South Carolina. On the northern frontier, the war repeated the raid and counter-raid pattern of King William's War. Border raids by the French and their Indian allies included the destruction of Deerfield, Massachusetts. Overcoming initial failures, the New Englanders retaliated by recapturing Port Royal, Nova Scotia (Cooke 1993:282). This war ended with the Treaty of Utrecht in 1713 which affirmed England's sovereignty over Acadia (Nova Scotia) and recognized its claims to Hudson Bay and Newfoundland. The British received territorial and commercial concessions elsewhere. These gains effectively mark the beginning of England's ascendancy in world affairs.

The signing of the treaty began a 27 year truce between England and France while each nation continued to strengthen its overseas position. Though France lost possession of Acadia, they continued to hold Cape Breton Island. In an attempt to protect the St. Lawrence Seaway from British sea power, the French built the strong fort of Louisbourg on the island to act as a New World "Gibraltar" (Cooke 1993:283). In addition, the French built and garrisoned a series of forts west of the Appalachians designed to link New France with Louisiana and to confine the English colonies to the Atlantic seaboard. The balance of power supposedly created at Utrecht began to tip in England's favor as she profited from commercial assault against Spanish trade. The New World colonies continued to strengthen with the influx of thousands of immigrants (Simmons 1976:182).

**King George's War (1739-1748)**

In 1739 England and Spain fought each other over trade grievances in the "War of Jenkin's Ear"; in 1744 the conflict expanded to include France and became what was known in America as King George's War. The first years of the conflict in Europe were mirrored on the border between Spanish Florida and England's newest colony, Georgia. General James Oglethorpe led two unsuccessful expeditions against St. Augustine in 1740 and 1743 (Chitwood 1961:383). In turn, Spaniards from Florida and Cuba attacked the coast of Georgia but were repulsed. The Anglo-Spanish rivalry was soon engulfed by a larger
European conflict known as the War of Austrian Succession. Prussian aggression against Austrian territory quickly polarized Europe as England joined the Netherlands and Austria against Prussia, France, and Spain (Cooke 1993:283-284; Leckie 1981:29-30). The declaration of war between France and England in 1744 sparked the renewal of fighting between New England and New France. As in the previous wars, the Franco-Indian alliance carried out terrifying but militarily ineffective raids against English frontier settlements (Leach 1973:241). The most noteworthy occurrence of the war was the capture of mighty Louisbourg in 1745 by New Englanders inexperienced in the art of formal siege warfare. Much to the chagrin of the New Englanders, Louisbourg was returned to the French at the end of the conflict under terms in the Treaty of Aix-la-Chapelle in 1748.

Another war had passed without a final decision in the competition for North America.

The Treaty of Aix-la-Chapelle ended one bloody but indecisive war; the possession of continental North America was to be decided by another. England, France, and Spain had all carved territories out of the new land. Spain's position as a world power had been badly weakened, and that country already had its hands full in Florida, the Southwest, the West Indies, and most of South America. The fight would be between France and England.
CHAPTER III

THE FRENCH AND INDIAN WAR

Following the end of King George's War, a fragile peace existed between the French and English colonies in North America. Previous colonial wars were precipitated by hostilities elsewhere, not by direct conflict between the two colonies. This would change, for in the six years of armed truce after King George's War the two colonies were set on a confrontational course which would have global results.

Each side believed it possessed strategic superiority and saw no reason to avoid armed conflict. New areas of conflict increased the level of tension and led to contentious policies and actions by both sides. The French possessed different strategic assets than their British enemy. They controlled a string of forest fortresses that were placed east of the Mississippi to link Louisiana and New France and act as a barrier against English westward expansion. They had a strong army under superb leadership and large numbers of Native American allies who preferred the fur-trading French to the land-hungry British colonists. Finally, the French system was controlled by an absolute and centralized government which could take decisive action during war time (Leckie 1981:40). On the other hand, the British colonists outnumbered the population of New France nearly 15 to one (Simmons 1976:172). Unlike the French, they occupied a compact position on the Atlantic seaboard which could be readily supplied under the protection of the Royal Navy. Lastly, the British were in possession of more prime agricultural land which could support citizen and soldier alike in time of war.

The nebulous boundaries between rival North American colonies provided many areas of contention which could provide the spark for war. In the South, disputed territory still lay between British Georgia and Spanish Florida. Areas to the north of British America such as Acadia and the Champlain Valley were highly contested and increasingly militarized. On Lake Champlain, the French controlled the Richelieu River to the north and their claim to the region was strengthened by the presence of Fort St. Frédéric, built at Crown Point in 1731. The British controlled the Hudson River to the south, however, and were far from
ceding the strategically vital waterway to the enemy. The old Northwest represented a third area of contention. The French, anxious to control the fur trade of the Great Lakes region, built forts at Detroit, Frontenac, and Niagara (Figure 2). Meanwhile, with the help of their new Iroquois allies, and a small fortified trading post at Oswego, the English began to make inroads into the French monopoly. Although hostilities could have flared to the south, north, or northwest, the war originated instead in the west, in the Ohio River Valley.

For more than a century, the Ohio River Valley had been spared exploitation by the European colonists. Initially, the English colonists in Pennsylvania and Virginia were content to slowly expand toward the eastern boundaries of the Appalachians and found no reason to push into, let alone beyond, the mountains. The far ranging French trappers and traders, *coureurs de bois* and *voyageurs*, passed through this land. They established temporary posts but no permanent establishments.

At the end of King George's War, the Ohio Valley began to attract more attention as both sides were intent to claim it for their respective kings. In 1757, a powerful group of Virginian merchants formed the Ohio Company and petitioned the king for a grant of 500,000 acres in the Ohio Valley (Cooke 1993:284; Jennings 1988:10-13). The king granted a charter of 200,000 acres in 1749 and surveyors and scouts were sent to the Ohio country (Leach 1973:321). Alarmed by this threat, the French asserted their claim to the region via expeditions backed by the governor of Canada and by establishing and garrisoning forts south of Lake Erie. The French wanted the Ohio region to protect their fur trade and to stem the westward expansion of British America. The rich Virginians of the Ohio Company wanted to encroach on the French fur trade and to position themselves to profit from land speculation upon settlement of the upper Ohio Valley. The British government saw a chance to break through the perceived French encirclement which, if allowed to continue, would eventually leave the English holding a small strip of coastal land surrounded by an entire continent of hostile French territory.

Both sides scouted the region for the best locations to build major fortifications and both built small defensive posts along the banks of the Ohio, Monongahela, and Allegheny rivers. On 13 October 1753, following British instructions, Virginia's Lieutenant-Governor Robert Dinwiddie sent young George Washington to meet with the commander of the
French forts. He was to convey the British displeasure at French occupation of lands claimed by the English Crown (Peckham 1964:130). The French politely, but firmly, asserted their claim to the territory. Both sides continued to build, and as fortification intensified so too did the risk of warfare.

The Fighting Begins

Both sides recognized the strategic importance of the confluence of the Ohio, Allegheny, and Monongahela Rivers, the site of today's Pittsburgh. The Ohio Company sent out a group of Virginians in March 1754 to build a fort and claim the location (Jennings 1988:65). Their attempt was cut short by the arrival of a thousand-man French force that drove off the would-be occupiers (Leckie 1981:42). Meanwhile, Lieutenant-Governor Dinwiddie dispatched a small body of Virginian troops under Washington to aid in the endeavor. The French finished the fortifications and named them Fort Duquesne (Figure 2). In retreat, the frustrated British fort builders met Washington's force and joined them. On the morning of 28 May 1754, the Virginians fired on a French party and killed several, including its commander (Jennings 1988:67; Leach 1973:335). Washington feared an angry backlash by the French and their Indian allies. However, instead of retreating altogether he withdrew a few miles to Great Meadows Run where he built a crude stockade which he christened Fort Necessity. A French and Indian force arrived and forced Washington to capitulate on 4 July 1754 (Leach 1973:341; Leckie 1981:43). These events precipitated the French and Indian War, the final struggle for the North American continent between France and England.

For the rest of 1754, the two sides prepared themselves for a conflict which threatened, but was not yet inevitable (Jennings 1988:5). France, New France, England, and British America were buzzing with news of Washington's ill-fated expedition. The British realized the colonies could not defend themselves and needed help to repel French encroachments. In September 1754, Parliament decided to send an expeditionary force to regain the Ohio Valley for the king. The force, made up of one thousand men, was commanded by General Edward Braddock (Bradley 1900:79). General Braddock's relatively small force was to be augmented by two colonial regiments from New England.
Throughout the winter, France and England focused their attention on North America while maintaining a wary eye on the activities of their rival in Europe. Both sides were anxious to confine hostilities to the New World.

1755

In February 1755, Braddock and his two regiments arrived in Virginia and he became commander-in-chief of both the regulars and the provincial troops from New England. Braddock met with colonial governors in Alexandria, Virginia, to coordinate the colonies and to organize military expeditions against French forts. The targeted forts were Fort Duquesne, the focal point of the present hostilities; Fort Niagara, on Lake Ontario; and Fort St. Frédéric, on Lake Champlain (Figure 2).

A force of roughly 2,500 provincial troops and British regulars left Fort Cumberland on 7 June 1755 under General Braddock. As they plodded their way west to drive the French from Fort Duquesne their progress was monitored by enemy scouts (Hamilton 1962:153). Braddock soon realized the need to move faster. Two weeks after starting, he decided to push a leaner force of 1,200 regulars and 200 Virginians ahead of the slower elements of the force to reach Fort Duquesne before enemy reinforcements arrived there. Instead, the head of the column was ambushed eight miles from Fort Duquesne by a lesser, but well-concealed force of Indians and French sent out to retard the British advance. The troops, unable to see the enemy in the forest, and witnessing their fellow soldiers and officers falling on every side, began to panic. Braddock ordered a retreat but was mortally wounded. The French and their native allies had turned a delaying action into a near slaughter. Braddock was buried in the road as his retreating army, now at half their original strength, trampled over his grave to protect it from defilement. The defeat was a blow to colonial and British morale and strengthened the Franco-Indian alliance. It also left the western boundaries of Maryland, Pennsylvania, and Virginia vulnerable to attack. Recoiling from brutal attacks, English settlers and the frontier they represented withdrew to the east side of the Allegheny Mountains.

The British attempt to take Fort Niagara near the west end of Lake Ontario was another disappointment. The small British trading post at Oswego, on the opposite end of
the lake from Niagara, had always been a thorn in the side of French interests in the Northwest. Oswego was at the end of a very long supply line up the Mohawk Valley from Albany (Figure 2). Nevertheless, the conference of colonial governors instructed William Shirley, the governor of Massachusetts, to reinforce and strengthen the outpost. British hoped to use it, ultimately, as a base from which to launch an attack on Fort Niagara. By the time Shirley reached Oswego, built up the defenses, and built vessels for the advance on Niagara, the campaigning season was over and the attempt was postponed.

Driving the French out of Fort St. Frédéric on Lake Champlain was another overly optimistic goal formulated at the Alexandria conference. The governors appointed William Johnson as Major-General, and gave him the task of taking Fort St. Frédéric. Approximately 3,500 untested colonial troops and a strong array of artillery started up the Hudson River in July 1755 (Hamilton 1962:162; Peckham 1964:148-149). Johnson began construction of a fortification, eventually named Fort Edward, about 50 miles upstream from Albany (Figure 2). While there, he received word that the French were gathering at Fort St. Frédéric with plans to move south and fortify the outlet of Lake George at Ticonderoga. Johnson left 500 men behind to complete the fort and moved his remaining force toward Lake George to head off the French (Hamilton 1962:165). Soon after, 1,500 French regulars, Canadians, and native allies under Baron von Dieskau moved to attack uncompleted Fort Edward but instead turned toward Johnson’s camp on Lake George (Peckham 1964:149). The French advanced a short distance and set an ambush to catch a small force that Johnson had sent to reinforce the vulnerable new fort. Premature firing warned the British and most of the provincials escaped back to their camp on Lake George.

At the camp the colonials loaded their muskets and cannon and hurriedly arranged themselves behind a crude barricade of fallen trees, overturned bateaux, and wagons as the enemy came on. The first few volleys of cannon fire scattered the Canadian militia and Indians, leaving the French regulars to press the attack. Eventually the French were beaten back with heavy losses, including Baron von Dieskau who was wounded and taken prisoner. The French returned to Ticonderoga to begin constructing Fort Carillon. The British and provincial forces stayed on at the south end of Lake George and began to build Ft. William Henry.
1756

In December 1755, Governor William Shirley was given the late Braddock’s position as commander-in-chief. Shirley called together another meeting of colonial leaders to organize expeditions against Fort Duquesne, in the Ohio Valley; Fort Niagara, Fort Frontenac, and Fort Detroit, on the Great Lakes; and Fort St. Frédéric and the developing fortifications of Fort Carillon on Lake Champlain (Figure 2). With their Indian allies dropping away and refugees streaming in from their vulnerable western frontiers, the British colonials could not be accused of lacking ambition or optimism. At the same time, the French were planning to remove the British presence on Lake Ontario by destroying their outpost at Oswego.

Soldiers and newly appointed leaders were dispatched across the Atlantic from both Great Britain and France. John Campbell, 4th Earl of Loudoun, was selected to take command of British forces in North America. Assisting him would be General James Abercromby and Brigadier Daniel Webb. The French crown sent Louis Joseph, Marquis de Montcalm de Saint-Véran, to replace the captured Baron von Dieskau. Accompanying him were his subordinates Brigadier Gaston François Lévis, Colonel François de Bourlamaque, and his aide-de-camp, Louis Antoine de Bougainville. As Governor General of New France, Pierre Vaudreuil felt that he should be in charge of the military forces and he resented Montcalm’s appointment. Montcalm, on the other hand, viewed the Canadian-born Vaudreuil as an untrained provincial, unfit to direct military affairs. The fate of New France was held by two men who hated each other.

Meanwhile, the grand schemes of the British were not materializing. The central colonies failed to mount an expedition against Fort Duquesne and a strike against Fort Niagara became increasingly unlikely as its primary backer, Governor William Shirley, fell from political favor. With their other plans fading, the British focused on Lake Champlain, for it was there that the French had penetrated the farthest into what was perceived to be British territory. Accordingly, in June of 1756, more than 10,000 British regulars and provincials massed in the Hudson River Valley for a strike north against the new Fort Carillon at Ticonderoga and Fort St. Frédéric at Crown Point. The French, however, were determined to keep them there (Frégault 1969:125). Accordingly, Vaudreuil sent
Montcalm, Lévis, and 2,300 men to Fort Carillon. He hoped to keep the British busy on their defenses at Fort William Henry by making them think an attack from Carillon was imminent (Frégault 1969:126).

Montcalm arrived back in Montreal after implementing the ruse and found preparations for an attack on Oswego well underway. With 3,000 men and ample artillery, some of which had been captured from Braddock the previous year, Montcalm moved up the St. Lawrence River and arrived at Fort Frontenac on 5 August 1756 (Hamilton 1962:180). On 12 August 1756, they began to lay siege to the British fortifications at Oswego, and the defenders capitulated on 14 August 1756 (Figure 2). The victors razed the forts and sent roughly 1,600 British soldiers to Quebec's prison camps (Frégault 1969:131).

Severed from its lakeside attachment, the British frontier recoiled back towards Albany. Due to political bickering among its leaders, the huge force of British regulars and colonials stagnated on the shores of the Hudson River and Lake George. After weeks of inactivity, Loudoun released the provincial troops and ordered the regulars to winter quarters in the homes of incensed colonists. News of the latest French victory spread quickly and the British lost more native allies. Attacks on the frontiers increased. The only British actions of the year would consist of reprisals against hostile Indian villages and the strengthening of the naval blockade of the St. Lawrence Seaway. Another year had passed and New France was stronger than ever.

1757

Back in London, William Pitt consolidated his power in the British Government and began to provide the leadership that would eventually lead the British empire to victory in the Seven Year's War. Pitt felt it unwise to attack Quebec without first neutralizing Louisbourg, so he earmarked the new forces and most of the standing army in the northern colonies for this purpose. The scant forces left to defend the rest of the frontier would be free from threat only if Loudoun succeeded in striking up the St. Lawrence Seaway and forcing a serious engagement (Hamilton 1962:193). It was a gamble.
Keenly aware of Britain's plans, France sent its own reinforcements to Canada. These fresh troops were to guard against an attack by land and a considerable naval force was to be held at Louisbourg for its defense (Millet and Maslowski 1984:38).

As the year progressed, Lord Loudoun held his forces at New York and anxiously waited for a naval force from Britain to arrive at Halifax (Figure 2). Loudoun tired of waiting for the convoy, which was plagued by bad weather and a slow crossing, and decided to send his troop transports to Halifax without adequate naval protection. Before the two British fleets met in Halifax, three French convoys arrived in Louisbourg's port and Loudoun was forced to wait once again (Hamilton 1962:193). With British forces poised to strike Louisbourg, the stakes of Pitt's gamble increased with each passing week.

The arrival of the French fleet pleased Governor Vaudreuil. He had correctly predicted that the British would continue to loiter at Halifax and Louisbourg, thus reprieving Quebec from attack for another year (Cooke 1993:286). Vaudreuil, however, feared attacks on Forts Carillon and St. Frédéric and prepared to send Montcalm on an expedition up the Champlain and Hudson Valleys (Leach 1973:397-398). The two men decided to send a force against Fort William Henry (Figure 2). The force would carry with it a substantial train of artillery to take the fort through a European-style siege.

Montcalm's force of some 8,000 French provincials, Frenchmen, and Indians assembled at Fort Carillon in late July 1757 (Hamilton 1962:199; Peckham 1964:199). Because boats were scarce, Montcalm sent Lévis and one-third of the men ahead through the rugged Iroquois country on the west side of Lake George. Montcalm loaded the rest of the force into those canoes, bateaux, and whaleboats he did possess and proceeded up the lake. The two parts of his force met and began a formal siege of Fort William Henry on 1 August 1757. General Daniel Webb feared just such an attack and had previously sent British reinforcements to Fort William Henry, although he held 1,600 men at Fort Edward to guard the final approach to Albany. The British forces at Fort William Henry were under Lieutenant Colonel George Monro. They consisted of less than 500 soldiers and civilians inside the fort itself and over 2,000 men holding rudimentary defenses on high ground a half mile to the southeast (Hamilton 1962:197). Montcalm completed his batteries and began shelling the weaker western defenses of the wooden fort. He also sent Lévis' forces and
Indian skirmishers out to pen up the entrenched troops on the high ground and to cut off the road to Fort Edward. The screen of Indians intercepted a message from Webb that informed Monro that no reinforcements would be dispatched and that Monro should make terms for surrender. Montcalm apprised Monro of the message. With half of his guns burst, most of his ammunition gone, and colonial militia threatening to leave, Monro reluctantly surrendered on 9 August 1757. Under the terms, the English would be allowed to march to Fort Edward with their equipment and arms, sans ammunition, if they agreed not to serve against the French again for eighteen months.

The siege had run its course according to the rules of European-style warfare. What occurred after the surrender did not. Some Indians fell on the stragglers at the tail end of the retreating British column and stripped them of their possessions and clothing. The violence escalated to killing and many in the column fled into the surrounding woods where hundreds were taken prisoner. Some of the victims included women and children. As the survivors staggered into Fort Edward, exaggerated news of a general massacre spread panic throughout the Hudson Valley. Although the massacre was not as severe as the rumors originally suggested (the estimated number of victims varies between 100 and 150) this perceived treachery would continue to haunt the French for the rest of the war (Jennings 1988:320; Leckie 1981:54). The incident left a legacy of betrayal between all parties involved; Monro by Webb, the British by the French, the French by the Indians, and the Indians by the French.

Public opinion against the French would not bring back the smoldering ruins of Fort William Henry or the lost security of the approach to Albany and New York. Luckily for General Webb, and much to the chagrin of the eager Governor Vaudreuil, Montcalm stayed further attack on the Hudson River Valley. At Halifax, Loudoun finally abandoned his plans for an attack on Louisbourg in 1757 and pulled most of his force back to New York.

The end of 1757 witnessed the height of French power throughout the world. Loudoun was sent home in defeat from North America as was Pitt's rival, the Duke of Cumberland, from the battlefields of Europe. Yet, William Pitt had fully consolidated his power and began to impose taxes to pay for the coming year. Pitt drew up plans and shuffled his North American military staff. James Abercromby replaced Loudoun as the
new commander-in-chief of the American operations. Other new names appearing on the North American roster included Brigadier-Generals John Forbes, Lord George Howe, John Stanwix, James Wolfe, and Major-General Jeffrey Amherst. Placing the conquest of North America as his war effort's first priority, Pitt prepared for a triple offensive against New France. He would attack Louisbourg, on the way to Quebec; Fort Carillon, on the way to Montreal; and once more, at Fort Duquesne. He asked the colonial governors to raise 20,000 troop to join the regulars already in country and those arriving from England (Peckham 1964:165). He asked parliament to reimburse the colonies as an incentive for recruitment, thus adding to the rapidly accumulating war debt brought on by Pitt's ambitious policies. Most of the regular troops were slated for the Louisbourg campaign, but the remaining units and provincials were to attack Fort Carillon under Abercromby and Howe.

1758

While the French-Canadians were successful on the field of battle, many of their farm fields lay neglected due to the shortage of labor. This, coupled with the successful naval blockade imposed by the British navy, would lead to the beginning of shortages in New France and to the end of French dominance in North America. In 1758, New France began to experience shortages of food. Before stepping down, Loudoun had wisely predicted that if the British campaigns started early in spring, full advantage could be wrought from the enemy's shortage of provisions. Indeed, Vaudreuil was forced to send more regulars to Fort Carillon than he wished simply because the fort contained provisions which would sustain the troops until more food arrived from France. This redeployment also removed hundreds of hungry mouths from the already overtaxed interior of the colony and from Quebec itself, where the daily ration of bread was a meager two ounces (Frégault 1969:211).

Throughout the late spring and early summer of 1758, James Abercromby assembled a force of over 15,000 men at the south end of Lake George. This was the largest non-native force yet assembled in the Americas (Millet and Maslowski 1984:36). Abercromby loaded his army into bateaux and whaleboats on 5 July 1758 and set out for Carillon via Lake George (Hamilton 1962:216). The army disembarked at the north end of Lake
George and Abercromby sent an advance party under Lord Howe forward through the woods on the morning of 6 July 1758. A small enemy force clashed with the British and Lord Howe was killed. The death of the beloved Howe was a severe blow to British morale. Meanwhile, approximately 3,500 enemy troops waited behind a breastwork reinforced with tree trunks and an abatis of sharpened and tangled branches placed across the approach to Fort Carillon. This barricade was a substantial distance from the actual fort.

Abercromby believed that reinforcements were already on the way to fortify the enemy, which he already overestimated, and he pushed the attack ahead without using his cannon against the barricade. Successive waves of redcoats rushed ahead in a frontal assault against the French line. Many were cut down as they tried to hack their way through the abatis. Ten percent of the British force of 15,000 were dead, wounded, or missing by the end 8 July 1757. In spite of their victory, the French feared that the artillery and superior numbers of the enemy would prevail the next day. Instead, they awoke to the sight of the British army rowing away in retreat. Abercromby added his name to the growing list of losing British generals.

For the move on Louisbourg, Pitt combined proven officers from European campaigns (Jeffrey Amherst and James Wolfe) with local knowledge provided by Charles Lawrence, the Governor of Nova Scotia. Cooperating closely with the army in the enormous undertaking were Admiral Boscawen and Sir Charles Hardy of the Royal Navy. Nearly 160 vessels left Halifax at the end of May 1758. They carried 1,900 guns and more than 28,000 soldiers and sailors (Frégault 1969:217-218). The ships were joined en route by Amherst and arrived at Louisbourg on 2 June 1758. Although Governor Augustin de Drucourt had only 3,000 French troops to defended the town, they occupied impressive defenses. Large batteries ringed the harbor and lesser earthworks commanded all possible landing places.

The British amphibious assault struck on the morning of 8 June 1758. The British longboats and barges approached under heavy fire, but a handful of men managed to gain a precarious foothold on a rocky promontory. Thousands of redcoats swarmed ashore and invested the town. The siege was delayed by poor weather but once underway it took less
than a week to destroy the French shore batteries and open the harbor to British warships and transports. The French fleet was bottled up in the harbor and it ships were set ablaze or captured. The town was isolated and it was just a matter of time until the defenses gave way. The French knew that if they held out long enough the British could not launch an assault against Quebec that season. They held long enough. Drucourt finally agreed to unconditional surrender on 26 July 1758 and, although Louisbourg was lost, Quebec would go unmolested for another season.

The British scored two more victories in 1758, one at Fort Frontenac, at the head of the St. Lawrence River, and the other at Fort Duquesne. Abercromby sent 3,600 colonials from his defeated forces to General Stanwix and ordered him to build Fort Stanwix at the Oneida Lake portage. General Stanwix sent John Bradstreet and nearly 3,000 soldiers and bateau men to attack Fort Frontenac at the head of the St. Lawrence River (Peckham 1964:173). The attack began on 26 August 1758 and the undergarrisoned fort fell quickly as close-range fire readily breached the stone walls. Frontenac’s stores and fleet of small vessels on Lake Ontario were captured or put to the torch.

The third victory for the British in 1758 was at Fort Duquesne. General John Forbes strived to complete Braddock's doomed attempt to drive the French from the forks of the Ohio. Forbes began his campaign in Carlisle, Pennsylvania, where horses, wagons, and other provisions were readily available. Throughout the summer of 1758, Forbes' army hacked its way through the forest, periodically stopping to consolidate their lines and establishing fortified supply posts at Laystown (Fort Bedford) and Loyalhanna Creek (Fort Ligonier) (Figure 2). Located only forty miles from Fort Duquesne, Fort Ligonier became the base for the final operations. On 2 November 1758, Forbes finally reached Fort Ligonier with his main force and decided to prepare for winter. However, Providence smiled on the general. A prisoner informed the British that most of the Indian allies and Canadians had left Fort Duquesne due to shortages. Forbes decided to press on the remaining 40 miles to the fort with Washington's provincials blazing the trail. On the night of 24 November 1758, while camped near the site of Braddock's defeat, the army heard a thundering explosion. The French had abandoned and destroyed Fort Duquesne. With
Duquesne gone, the French lost their grip on the Ohio Valley and raids on the British western frontier decreased. The tide had turned against New France.

1759 and 1760: The Final Campaigns and the Boscawen's Service

As the Seven Years War raged across the globe, New France became increasingly isolated as vital resources of the mother country were distributed elsewhere. Poor harvests and a successful blockade of French shipping by the British Navy caused acute food shortages in Quebec and Montreal. Vaudreuil and Montcalm could see New France weakening. Although Vaudreuil did not agree, Montcalm wanted to enact a fighting retreat to the defensible heart of New France (Lee 1969:96). If they could avoid a decisive defeat, the French might retrieve their North American colony through negotiations at a peace conference.

In England, William Pitt tightened his grip on the reins of the British war machine and orchestrated plans for far-flung theaters of war. In light of his exceptional performance at Louisbourg, Jeffrey Amherst replaced Abercromby as commander-in-chief of His Majesty's forces in North America. With the loss of Louisbourg, a major route into the heart of Canada from the sea was now open. Two other water routes, one from the Great Lakes region down the St. Lawrence River and the other, up the Champlain/Richelieu Valley, were still closed to the British at the beginning of 1759. Pitt's 1759 campaign would involve a three-pronged strike at the enemy's heartland utilizing each of these three routes. Amherst would lead a strike up the Champlain Valley against Forts Carillon and St. Frédéric and, hopefully, on towards Montreal. General James Wolfe would assault Quebec via the St. Lawrence Seaway. General John Prideaux, with Sir William Johnson as second, would head an expedition against Fort Niagara.

In May 1759, General John Prideaux's force of 3,000 headed for the shores of Lake Ontario, ostensibly to rebuild Fort Oswego. They were joined in late June by 1,000 Iroquois under Sir William Johnson. Leaving 1,000 men behind to rebuild Oswego, Prideaux landed his force a few miles east of Fort Niagara on 4 July 1759 (Figure 2). The sudden appearance of so large a force stunned the French commander, prompting him to
send an urgent request for aid. The official siege of Fort Niagara began on 10 July 1759. Starting nearly 1,000 yards from the fort, the British began to shell the French position and to advance their siege trenches (Dunnigan 1986:48). As new British batteries increased the onslaught, the French fire slackened and their defenses crumbled. General Prideaux was killed by a mortar carelessly fired from his own lines. Johnson took over and pressed the siege until news of approaching French reinforcements reached the British camp. Hasty defenses were thrown together one mile from the British rear. The French confidently attacked these defenses on 24 July 1759, but were repulsed. Their last hope shattered, the French surrendered the fort on 25 July 1759 (Dunnigan 1986:101).

Amherst sent Brigadier General Thomas Gage to assume General Prideaux’s command. Ordered to press the attack on the French west via the St. Lawrence, Gage was thwarted by logistical problems and settled instead for reconstructing the fortifications at Oswego and Niagara. Although unable to take full advantage of their victory, the British succeeded in opening the western gate to New France.

The French were also pushed back along the major southern route into the heart of their territory represented by Lake George, Lake Champlain, and the Richelieu River (Figure 3). William Pitt picked Jeffrey Amherst to lead the British and provincial forces against Fort Carillon and Fort St. Frédéric on Lake Champlain. Pitt gave Amherst specific instructions to begin his drive towards Canada by May. Instead, the methodical General did not get his army onto the offensive until late July 1759, having spent a month laying out a new fort on Lake George to replace Fort William Henry. On 21 July 1759, Amherst loaded his army into whaleboats, batteaux, and artillery rafts and set out for Fort Carillon. He also brought his artillery with the intent to use it on the French defensive works. With Montcalm in Québec, Brigadier François-Charles de Bourlamaque commanded the French forts of Lake Champlain. According to Montcalm's policy of delay and retreat, Bourlamaque had orders to give token resistance to the British advance and retire if his 3,000-man army was in danger of encirclement. He was to pull back the French line of defense at Ile-aux-Noix, a small island located in the middle of the Richelieu River below the outlet of Lake Champlain. Accordingly, upon arrival of the British, Bourlamaque took 2,500 men to Fort St. Frédéric and left a mere 400 men to keep up a lively fire upon the
FIGURE 3. Forts along the Champlain Waterway.
advancing British siege works (Peckham 1964:185). When the British heavy siege artillery was finally in place, the small French garrison slipped away after having lit a fuse leading to Carillon's powder magazines. The resulting explosion did not damage the fort significantly. The French destroyed Fort St. Frédéric in the same way then abandoned the southern shores of Lake Champlain and fell back to their inner defenses at Ile-aux-Noix. French control recoiled in the west and south but the most severe blow to New France came at the capital city, Quebec.

The citizens of Quebec mistakenly believed that the complex tidal currents and mud flats of the lower St. Lawrence would spare them the sight of an enemy fleet at their doorstep. They were wrong. Vice Admiral Charles Saunders skillfully led a British squadron of 22 warships and 119 transport and supply ships to the French capital city in June 1759. The ships carried Major General James Wolfe and his army. Wolfe spent the next two-and-one-half months tormenting the countryside, probing the enemy's defenses, and bombarding the civilian sections of the Quebec (Jennings 1988:419-420; Hamilton 1962:280). Finally, Wolfe ordered a landing near a small path ascending the high bluffs just upriver of the city. During the dark early hours of 13 September 1759, the British, by deceit and force, overwhelmed the feeble defenses and poured nearly 4,000 men up the path to the Plains of Abraham west of the city. Montcalm was waiting elsewhere for the landing and was forced to rush to the rapidly growing British positions. He hoped to drive the British back before they had a chance to entrench and did not wait for reinforcements, instead sending his troops into a frontal assault against the British lines. The loose French formations fired too soon and were raked by a disciplined volley at 40 yards (Hamilton 1962:288). Wolfe's redcoats fixed bayonets, charged, and broke the French ranks. Wolfe lay dead on the field and Montcalm was mortally wounded. The British commanded the field by the time French reinforcements finally arrived. Quebec surrendered five days later.

Meanwhile, the decisive stab into the heart of New France was stalled along the shores of Lake Champlain. Not one to repeat Abercromby's rash advances of the previous year, Jeffrey Amherst chose to consolidate his holdings by repairing Carillon (Ticonderoga) and ordering the construction of a new fort at Crown Point near Fort St. Frédéric. A plague of supply and logistical problems delayed the 1759 campaign from its inception.
Although Amherst was criticized for not speeding his advance to the north once the forts were secured, he faced a major problem; he lacked control of the surface of Lake Champlain.

Months before, Governor de Vaudreuil ordered the construction of a French fleet at the north end of Lake Champlain. The fleet was to be under the command of Monsieur de Laubaras. As a privateer captain, de Laubaras had daringly brought supplies to Quebec in the winter months of 1758. For his reward he was given the task of building a fleet with which to control Lake Champlain if Forts Carillon and St. Frédéric were bypassed or lost to the British (Bird 1965:245). That time had come.

Before de Laubaras arrived in the spring of 1759, construction of the French fleet was underway at Saint Jean. The ten-gun topsail schooner *Vigilante* was already on the Lake Champlain, having covered French movements and transported supplies since its construction in the autumn of 1757 (Lewis 1983:203). A year later its builder, Nicolas-René Levasseur, began laying the keels for four sloop-rigged galleys to compliment the *Vigilante*. Three of the eight-gun vessels were completed by the summer of 1759 and, together, the *Vigilante, La Musquelongy, La Brochette*, and *L'Esturgeon* threatened any movement of Amherst's army by batteaux or whaleboat (Amherst 1931:156-157).

The British realized the need for a naval presence to compete with the French on Lake Champlain and they needed to build a fleet quickly. Amherst gave this responsibility to Captain Joshua Loring. Like his rival, Loring earned a commission in the king's navy through daring successes as a privateer. Loring was born in Massachusetts and had few colonial peers in the Royal Navy (Lewis 1983:204). As superintendent of British vessels on Lake George, Loring had accompanied Abercromby's failed campaign against Carillon in 1758. He had been prepared, though somewhat prematurely, to build a British fleet on Lake Champlain at that time (Bird 1965:129).

Earlier in the spring, upon hearing of the construction of sloop-rigged galleys at Saint Jean, Amherst had ordered Loring to New York. Here, Loring found the naval equipment he would need to build a fleet on Lake Champlain. Amherst envisioned vessels carrying 24-pounders and Loring prepared to build a brig and gunboats to do just that (Amherst 1931:147).
Loring saw to it that shipwrights, spikes, sails, rope, blocks and tackle, and assorted ship's chandlery were at hand. Any hardware he lacked could be forged by the army blacksmiths. What he needed most urgently was wood. Masts, spars, and compass timber to frame the brig could be extracted from the surrounding woods, but planks for her sides and decks needed to be milled. The retreating French failed to completely destroy a saw mill at the lower falls of the river between Lakes George and Champlain. This structure was one of the first to be secured as the British enveloped Fort Carillon. Loring carried out his initial inspection even as the French continued to fire into British positions on the heights above. He optimistically estimated that it would take eight days to carry out repairs. In fact, it would take nearly a month before the mill was in full operation, but Loring had plenty to do in the meantime. His tasks included portaging gun boats from Lake George, refloating sunken French batteaux, constructing dockyard facilities, and building a wharf over the shallow waters below the newly-British Fort Ticonderoga. Leaving Loring to his task, Amherst continued northward to begin constructing a new British fort at Crown Point near Fort St. Frédéric.

Loring planned to start construction on the brig by 10 August 1759. The mill was not yet operational but the men could lay down her keel with hand-cut timbers. Prompt construction of the brig received additional importance when a French deserter brought news of the enemy fleet into the British camp. Amherst, now at Crown Point, summoned Loring to confer upon the new information; which he recorded in his journal:

...the four Vessels are La Vigilante of 10 Pieces of Cannon 6 & 4 pounders, a Schooner, a Sloop called Musquelongy. A Captain of a Man of War commands, Monsieur De le Bras, has 2 brass 12-pounders and 6 Iron six-pounders, la Brochette of 8 Guns 6 & 4 pounders commanded by Mons. Regal, an Officer of a Man of War, L'Eturgeon of 8 Guns of 6 & 4 pounders. All of them have swivels, Three were built this year; one is an old one, and there is another repairing (Amherst 1931:156-157).

Amherst and Loring decided that the brig and a handful of gun boats could not guarantee victory over this French force. Artillery Major Thomas Ord was ordered to build a radeau
as he had done previously on Lake George and he was given ten days to do it. The radeaux on Lake George, *Land Tortoise* and *Invincible*, were flat-bottomed barges with inward sloping sides to protect the gunners. A poor sailing design, these craft were essentially floating gun batteries. The new radeau would have the same angular construction, however, getting the planks to build her would prove more complicated than her design. Both Loring and Ord now needed planks for their projects and, when the mill finally began operating three weeks into August, its services were sorely needed (Lewis 1983:6-8). Inter-service rivalry flared between Loring and army personnel, including Ord, and Amherst had to remind them that they were all working towards a common goal. As the 84-foot radeau *Ligonier* was taking shape at Crown Point, the incomplete hull of the 18-gun, 155-ton brig *Duke of Cumberland* was launched at Ticonderoga; it would take more than a month to complete her deck and rigging (Crisman 1988:142).

As the British fleet grew, so to did the French threat. News arrived at the British camp that Nicolas-René Levasseur's fourth sloop, *Waggon*, had finally arrived at Isle-aux-Noix (Lewis 1983:215). Amherst sent a party to burn the solitary *Waggon*. When this daring attempt failed, Amherst again summoned Loring to discuss the building of a new sloop. Throughout the unusually wet month of September, Loring's men scrambled to finish the new ships before the campaigning season was lost. As finishing work continued on *Duke of Cumberland*, the new sloop took form. Designed to be of 115 tons burden, the sloop, named *Boscawen*, would carry 16 guns (Crisman 1988:142).

As guns, shot, and provisions streamed into the busy shipyard, the British still lacked skilled sailors to man the new vessels. Amherst and Loring scoured the ranks of the regulars for experienced men to crew the ships and relied heavily on provincial regiments to fill out the ranks of the *Boscawen*. provincials on the *Boscawen* included men from Colonel Timothy Ruggles' Massachusetts Regiment, Colonel Peter Schuyler's "Jersey Blues", Colonel Eleazer Fitch's 4th Connecticut, and the Rhode Island regiment under Colonel Henry Babcock (Munsell 1857:179). With his flagship complete, Loring sailed *Duke of Cumberland* from Ticonderoga on 9 October 1759, and arrived at Crown Point the next day. Lieutenant Alexander Grant commanded *Boscawen*. Grant had come to America from Scotland in 1757 and had served exceptionally during Forbes' campaign against Fort
Duquesne in 1758. While serving in Montgomery's 77th Regiment, primarily composed of his fellow highlanders, he was chosen to captain *Boscawen*.

The British army at Crown Point awoke to a light southerly breeze on the morning of 11 October 1759, and with the breeze came the *Boscawen* from Ticonderoga. She carried four 6-pounders, twelve 4-pounders, and 22 swivel guns. Her compliment included 60 sailors and 50 soldiers acting as marines. Ammunition and stores to feed both her guns and crew were quickly loaded aboard under Amherst's orders. He was anxious to move.

The army departed Crown Point in the early afternoon of 11 October 1759. Relying on colored semaphores for communication, Amherst gave detailed orders for the procession down the lake. The army's whaleboats and bateau were arranged in four columns and led by Amherst on the *Ligonier*. With the vulnerable flotilla protected by the *Ligonier* and surrounded by a picket of gunboats, the brig and sloop were free to roam. Loring and Grant had orders to sail *Duke of Cumberland* and *Boscawen* north and deny the French vessels access to Isle-aux-Noix. The army rowed all night while the brig and sloop unintentionally sailed past the three French sloops under Monsieur de Laubaras.

As dawn broke, Amherst heard cannon fire across the water. Several bateau had inadvertently separated from the main body of the army during the night and the three French sloops, anchored for the night near the Iles-au-Quatre-Vents, recognized the enemy boats and fired upon them (Knox 1916:65). The British lost one bateau but the rest escaped into the southerly wind (Bird 1965:306).

Meanwhile, *Duke of Cumberland* and the *Boscawen* were having marginally better luck. Miles to the north of the French sloops, Loring and Lieutenant Grant spotted *La Vigilante*. The enemy schooner ducked behind two islands and into Missisquoi Bay. Charging ahead, both British ships ran aground in the shallows between the two islands (Lewis 1983:211). By the time the British vessels were free, so was *La Vigilante*. Their quarry gone, the British ships sailed into the main lake in search of the French sloops. The wind now came hard from the northeast and the British were heartened to see, to the south, the French fighting against it in an attempt to make Isle-aux-Noix (Knox 1916:65). Loring made all possible sail to engage the enemy and the French did likewise to flee. As the wind dropped off at dusk, de Laubaras brought his exhausted crews into the protection of
Cumberland Bay while the British anchored in waiting at the mouth (Lewis 1983:212). With their escape route by water cut off, de Laubaras summoned the captains of *Brochette* and *Esturgeon* to the *Musquelongy*.

The following morning *Duke of Cumberland* and *Boscawen* crept into the bay to finish off the three sloops. They found *Musquelongy* beached with her masts cut and guns spiked. The two other sloops lay scuttled in 30 feet of water (Knox 1916:65). Although *Vigilante* escaped and joined *Waggon* under the protective guns of Isle-aux-Noix, the British suddenly controlled Lake Champlain.

The French captains had failed to resist Amherst's advance up the lake, much to the dismay of Bourlamaque at Isle-aux-Noix, but the weather refused to cooperate so amicably. Strong northeastern winds forced Amherst's columns of small boats into a sheltered bay on the west shore of Lake Champlain. On 14 October 1759, Amherst received word of the French defeat, but strong contrary winds prevented him from advancing north to Loring's position for four more days. As the temperature dipped below freezing, and with the prospect of French troops from Quebec reinforcing Montreal and Isle-aux-Noix, Amherst called off the northward advance. He ordered his army back to winter quarters at Crown Point. On 27 October 1759, Amherst ordered Lieutenant Grant to take the *Boscawen* and 200 men to raise *Brochette* and *Esturgeon*. Meanwhile, Loring prepared the proper winter facilities at Fort Ticonderoga to receive the king's land-locked navy (Knox 1916:69). New France had held for one more year.

As Amherst and his senior officers traveled to more comfortable winter quarters in New York, the troops at Crown Point, under Colonel William Haviland, had one consolation; they were considerably better off than their comrades holding Quebec. The British garrison there faced the full onslaught of a Canadian winter in the badly mauled city. All of the soldiers, from the lowliest private to Brigadier James Murray, knew full well that the French would attempt to retake their former capital. The French and their native allies began to harass work parties and, as this threat increased, the one-time besiegers of Quebec became the besieged. The British repelled several small incursions against the outskirts of the city but on 28 April 1760, the British marched out of Quebec to meet an army of 8,000 French, Canadians, and Indians under their new commander-in-chief, the Chevalier de Lévis
(Bird 1965:320). After achieving some initial success in what would become the bloodiest battle of the whole war, the outnumbered British were forced back to the defenses of Quebec. They now faced a formal siege. Lévis advanced his siegeworks for two weeks and built a battery to contain his few inadequate cannon. It was too late. The first ships to appear were not the French resupply fleet, with its train of large siege guns, but rather His Majesty's Ships Lowestoft, Vanguard, and Diana (Bird 1965:326). Lévis called off the siege and retreated to Montreal.

Montcalm's plan of retreat and delay was happening much too fast. Montreal faced the same three-pronged assault as it had at the beginning of the previous year's campaign season, but this time the enemy was closer and stronger. Murray would strike to the southwest up the St. Lawrence, Colonel William Haviland would strike north from Lake Champlain, and Amherst would strike from the southwest down the St. Lawrence after getting his army to Lake Ontario via the Mohawk River. This encirclement would ensure that France's army would not escape to fight again. Amherst planned for all three armies to converge on Montreal and meet in the first week of September 1760.

As in previous years, the British got their campaign season off to a slow start. Amherst and Haviland spent the spring grappling with the logistics of mounting their campaigns and getting their armies in position. Murray nursed his battered garrison in Quebec. The delays heartened the French in their enclave around Montreal.

Murray was the first on the offensive. On 14 July 1760, Murray left Quebec with 2,500 men and a flotilla of forty of His Majesty's vessels, including four warships (Hamilton 1962:299). Avoiding confrontation with the armies of Dumas, Lévis, and Bourlamaque, Murray advanced 100 miles up river to Sorel, at the confluence of the Richelieu and St. Lawrence. All along the route the British burned the homes with no men present, under the assumption that they were fighting with the French forces, and forced the inhabitants to give up their arms and swear an oath of submission. Murray rolled back the eastern boundaries of New France and by the middle of August threatened the rear of French forces along the Richelieu River.

It required most of the spring and early summer of 1760 to move Amherst's 10,000-man army up the Mohawk River from Albany to Lake Ontario. As Murray reached Sorel,
Amherst began his drive down the St. Lawrence to the rendezvous at Montreal. The French still had the brig *Outaouise* and schooner *Iroquoise* on Lake Ontario and these threatened Amherst's army. Captain Joshua Loring had been ordered to Oswego to build ships to wrest control of the lake from the French as he had done on Lake Champlain a year earlier. Loring's brigs, *Mohawk* and *Onondaga*, were busy patrolling the wide lake to destroy the French ships when their work was done for them. The *Iroquoise* hit a shoal in the St. Lawrence and had to retire down river to Fort Lévis for repairs. The other enemy ship, *Outaouise*, was attacked and captured in the upper St. Lawrence by several gunboats attached to Amherst's army (Crisman 1988:148). Only the small garrison at Fort Lévis now stood between Amherst and Montreal. In his conservative style, Amherst spent two weeks besieging the 300 men in the fort with his army of 10,000. Fort Lévis fell on 25 August 1760. Amherst lost 21 men in the siege and four times that many to rapids below the fort but, by 6 September 1760, he had brought his army a total of 420 miles to within sight of Montreal (Bird 1965:345).

Acting as Brigadier of the army at Crown Point, Colonel William Haviland was a veteran of two campaigns against the French on Lake Champlain. Throughout the winter and spring of 1760, he advanced the impressive works at Crown Point and prepared his army for the push north. With Loring gone to Lake Ontario, command of the fleet on Lake Champlain passed to Captain Alexander Grant. Grant's first major task of the 1760 campaign was to escort a contingent of rangers down the lake. Amherst had ordered Robert Rogers to take 200 rangers north past Ile-aux-Noix to attack Fort St. Jean and destroy enemy shipping and war matériel (Amherst 1931:204). On 5 June 1760, Grant had *Duke of Cumberland* and *Boscawen* oversee the rangers' amphibious landing 12 miles south of the island and then sailed his ships to Ile-aux-Noix to draw enemy attention away from Rogers' force. Rogers skirmished with a party of French, regrouped, and landed again four days later on the west shore of the lake near Isle La Motte. The rangers skirted past Isle-aux-Noix and reached St. Jean on 15 June 1760. Finding the fort too strong, they continued on to St. Thérèse and razed the fort and village there. Rogers escaped to the east side of the Richelieu River in stolen batteaux and was hotly pursued to a rendezvous with Grant at Missisquoi Bay (Lee 1969:103).
Colonel Louis Antoine de Bougainville took over the works at Ile-aux-Noix when Bourlamaque had been recalled to the defense of Montreal. Governor Vaudreuil had repeatedly warned him to be vigilant for such an attack. Bougainville had been feverishly working on the defenses of Isle-aux-Noix since his arrival in April 1760, and had been short of material, supplies, pay, men, and, possibly most importantly, morale. The policy of retreat and delay had prevented both the provincial militia and French regulars from fighting in their preferred styles. Many of the Indians assisting the French could see the growing power of the British and abandoned their former allies. Additionally, Murray's policy of destroying homes of absent militiamen along the St. Lawrence led to a high degree of desertions (Lee 1969:103). Regardless, Bougainville still hoped to fight more than a delaying action at Ile-aux-Noix.

Colonel Haviland's army of 3,000 completed preparations at Crown Point and by 10 August 1760, was ready to embark. The army loaded onto a flotilla consisting of 1 brig (Duke of Cumberland), 4 sloops (Boscawen, Brochette, Esturgeon, and Musquelonge[also called Amherst]); 3 radeaux, including Ligonier; 3 prows (rowed gunboats with one cannon each); 2 long boats; 263 batteaux; 41 whaleboats; and 12 canoes (Moody 1976[1760]:24). The army began its journey north against contrary winds at 10:30 the following morning (Moody 1976[1760]:24). After slow but steady progress the flotilla landed on the east shore of the Richelieu on 16 August 1760, about a mile south of Ile-aux-Noix. Ile-aux-Noix bisected the river into two channels; the west channel was too shallow to be navigable in late summer and the east channel was blocked to shipping by floating batteries and chain booms (Lee 1969:103). Because the French occupied the island and the marshy west shore, the British quickly set up breastworks along the east side of the river. British ships covered the work on land by exchanging fire with the island. The French fired on the enemy works to no avail. On 23 August 1760, the British batteries opened up on the fort with cannon and mortar fire. The British attempted to cut the French booms from the east shore and six companies of rangers and regulars dragged guns below the fort and commenced firing. This new battery effectively separated the Vigilante and the rest of the French flotilla from the fort. British gunners severed a cable mooring the French radeau Grand Diable and it drifted to the eastern shore where it was captured. The remaining vessels came under fire
and were themselves captured by rangers before they could escape to deeper water
downstream (Moody 1976[1760]:30). The British surrounded three sides of the fort and
now threatened to cut off the French garrison's retreat. Bougainville quit the island on the
night of the 27 August 1760 (leaving a small force to provide covering fire and to care for
the wounded), marched to St. Jean and fired the town, then retired to Montreal.

By the first week in September 1760, three British armies encamped near Montreal.
With the Canadian militia gone, Vaudreuil, Lévis, Bourlamaque, Bougainville, and 2,400
regulars faced an enemy force of 17,000 (Crisman 1988:148). Against the wishes of his
proud generals, Governor Vaudreuil signed 55 articles of surrender on 8 September 1760.
Although sporadic fighting continued in North America and the Seven Years War would
continue to rage across the globe, the French and Indian War was effectively over.

The British had won a great victory in North America, but peace between France
and England would not be formalized until 1763. Although provincial troops were free to
return to their homes, thousands of British regulars stayed on to consolidate their new
holdings, inventory equipment, and complete the works at Crown Point. The British fleet
was moored at the King's Shipyard below Fort Ticonderoga.

In 1767, in a trip through Canada from New York, Francis Grant provides the last
account of the fleet available in the historic record. Passing Fort Ticonderoga on 18 July
1767, Grant wrote, "At the Point there is a strong redoubt for the defence of the shipping,
which are laid up here, consisting of a large Brigantine [Duke of Cumberland] which
mounted 20 guns, two Schooners, two Sloops, and some small craft; also a Sloop
constantly employed in the summer season between this place and St. John's" (Grant
1932[1767]:319-320). The sloop still employed in 1767 was probably the Musquelongy;
Boscawen was reported sunk at its mooring in 1762 (Gage 1767). After Grant's
description, the fleet dropped out of sight for two centuries. Two more wars raged up and
down Lake Champlain and the surrounding population grew to the point where it would be
scarcely imaginable by those who had participated in the French and Indian War. The
ultimate fate of some of the British fleet is still a mystery. However, in 1909 a substantial
portion of the Duke of Cumberland was dragged from the waters below Fort Ticonderoga
and placed on display below the fort; the brig's rotted timbers were still evident in 1983. In
the same year divers would find the sunken remains of *Boscawen*, a French sloop, and one other vessel near the old "King's Shipyards".
CHAPTER IV

MILITARY USE OF TOOLS

For millennia, the high stone walls of castles and fortified cities provided the principal means to defend a stronghold. The occupants of a besieged city or castle had to contend with starvation, siege engines, mining operations, biological warfare, and even subterfuge yet the defenders of strongholds throughout history shared one overriding concern: how to stop escalade (i.e., enemy infantry scaling the walls with ladders). The best way to do this was to make the walls high. With increased height came increased thickness and increased resistance to breaching. When such walls were themselves protected by moats and ditches the defenders generally enjoyed an advantage over the besiegers. This all changed with the advent of cannon.

By the first quarter of the fourteenth century, cannon began to literally and figuratively knock down castle walls. Directed against a conventional castle or walled city, cannon could punch a hole in the base of the high stone wall or corner tower like a long-distance battering ram. Gravity would do the rest. Collapsing under their own weight, the tumbling stones often opened a large breach and occasionally filled defensive moats and ditches in the process (Keegan 1993:322). Once a large breach was made, it was customary to surrender the works to avoid nasty reprisals allotted to strongholds which put up a lengthy defense. Castles which had once survived long sieges fell quickly to armies carrying siege artillery. The art of the cannoneer advanced steadily throughout the fifteenth century and by the beginning of the 1500s it was obvious that a new type of fortification was needed.

Star-shaped Forts

Fortress designers faced a dilemma. They needed to build a low-wall fort which would resist cannon fire without being vulnerable to escalade. They accomplished this during the sixteenth and seventeenth centuries by lowering the walls and making them thicker. The high, brittle stone castle walls were replaced by low earthworks which could
better absorb the energy of the cannon balls. The increased depth also provided a platform for the fort's own artillery pieces which protruded through embrasures in parapets at the top of the outer wall. The ditch or moat, originally protecting the base of castle walls, was retained, but the new fortifications did not stop there. To keep the enemy infantry at a distance, the fortress designers placed a protected ledge, called the covered way, on the outside of the ditch. Here, the defenders were protected by a short wall from which they could keep the besiegers at bay under the protection of the fort's guns behind and above them. A gentle slope, or glacis, projected outward from the covered way and surrounded the entire works. The glacis provided another protective layer and offered a clear field for defensive fire ([Desandrouins] 1972[1759]:200). Thus, the profile of the fort was carefully conceived to provide maximum fields of fire for the defenders while keeping the exposed wall surface to a minimum (Figure 4).

The corner towers, or bastions, which protected the castle walls also were redesigned. These too were brought down in height and constructed to resist iron shot. The round, or square, castle tower form was replaced by a diamond shape to eliminate areas previously protected from defensive fire (Figure 5). The two outer walls of the diamond commanded the countryside in front of them and the two walls connecting the bastion to the fort provided flanking protection for the main walls while sweeping attackers off the slopes of neighboring bastions with enfilading fire. The ditch, covered way, and glacis paralleled the sides of the bastion as they did the walls. Built with three, four, five, six, and eight sides with corresponding bastions, the fortresses began to resemble stars. The numbers of points on the stars seemed to increase exponentially with the addition of ravelins, demi-lunes, tenailles, lunettes, bonnettes, hornworks, and crownworks in attempts to add extra layers and angles of defensive fire to the fortifications (Hogg 1988:123). The distinction between art and science blurred as these impressive structures grew in complexity during the sixteenth and seventeenth centuries.

As the fortresses increasingly employed “scientific” principles, so too did siegcraft. The incessant wars of Louis XIV in the latter half of the seventeenth century provided ample opportunities to perfect the art of fortification and siege warfare. Although he is best remembered for his fortified towns, Louis XIV’s master engineer, Sébastien le Prestre de

FIGURE 5. Star fort design.
Vauban (1633-1707), became Europe’s foremost siege engineer during the classical period of fortification. Vauban perfected the technique of sap-and-parallel trenches (Figure 6). In this system the besieging army opened a trench roughly parallel to the enemy fortress just outside the range of the defensive cannon. Under cover of night, the siege engineers advanced a sap, or zig-zagging trench, toward the enemy works from the first parallel. The saps moved toward the enemy in a zig-zag or herringbone fashion so one side of the ditch faced the defenders at an oblique angle and to break the trench into short sections. In this way, the side facing the enemy was built up to protect the workmen, or sappers, and the entire length of the trench was not exposed to enfilading defensive fire from the fort.

The excavation work was exhausting and dangerous. The fort’s gunners targeted the head of the sap and the sappers constantly worried about a sally of defending infantry from the fort’s covered way. Sappers and miners were generally not protected by civilized laws of warfare and could expect no quarter from the enemy (Martin 1993:136). As the sappers pushed forward to establish a second parallel trench, approximately 300 yards from the fortress, the fortress itself came under attack from gun batteries constructed in front of the first parallel. Besiegers usually opened fire after they had enough batteries completed to outgun the enemy. If they did otherwise, the defenders could concentrate their fire on each new battery in turn. Twenty-four pounders and 13-inch mortars were the workhorses of siege warfare. Batteries were constructed in front of the second parallel to weaken the fortifications and cover the sappers who were well on their way to the third, and closest, parallel. This third parallel was often dug directly into the slope of the glacis and from here the breaching batteries could hammer a hole in the ramparts even as miners might be digging beneath the ramparts to detonate kegs of powder. Meanwhile, the defenders did everything they could to delay the construction of the breaching batteries. The intersecting fields of defensive fire did much towards this goal, as did sallies from the fort and countermining activities. Once a breach in the ramparts had been opened by artillery and/or mines, the fortress was open to direct assault from the third parallel. Once all efforts at defense were exhausted, it was customary and honorable for the town’s governor to surrender. In doing so, he avoided aggravated destruction and plunder of his town and his army. Indeed, the head engineers from opposing sides often met to discuss the outcome of the affair, as if
it were a giant chess game. In this way, Vauban met his chief rival, the great Dutch
ingineer Menno, Baron van Coehoorn, after he conducted a successful siege against a town
Coehoorn was defending in 1692 (Hogg 1988:129).

**New World Forts**

The mastery of Vauban dominated the technical aspects of fortification and siege
warfare for over one hundred years after his death in 1707. It was no surprise that his
countrymen carried his style to the New World as they looked to fence in the British
colonies with a string of wilderness forts. The Marquis de Montcalm survived at least 16
formal European sieges and was well acquainted with the principles of attack and defense
(Duffy 1985:270). New France’s chief engineer, Jean Nicolas Desandrouins, studied the
works of the European masters as part of his training. Upon his arrival in North America,
he complained that even Vauban would have been hard pressed to find anything
commendable about the kind of small log forts he encountered here (Duffy 1985:271). The
log forts thrown up by the frontiersmen of both sides in the first half of the eighteenth
century were small and perhaps crude by European standards, yet they were perfectly suited
for defense against a lightly armed enemy. However, as the final contest for possession of
North America approached, the intensity of fort building increased and the forts themselves
became larger and stronger.

Thinly populated, New France relied heavily on forts to protect its lines of
communication. More prolific in the construction of forts than their enemy, the French built
nearly 20 new forts and improved captured enemy strongholds throughout the years
preceding the French and Indian War and during the war itself. The impressive fortress of
Louisbourg protected the approach to the St. Lawrence valley with its own fortified cities
of Quebec and Montreal. Forts Detroit, Venango, Le Boeuf, Presque Isle, Michilimackinac,
Niagara and Frontenac commanded strategic positions in the Great Lakes region. Forts at
St. Jean, Chambly, St. Frédéric (Crown Point), Carillon (Ticonderoga), and finally Ile-aux-
Noix protected the vital route represented by Lakes George and Champlain and the
Richelieu River. The forks of the Ohio were protected by the provocative Fort Dusquene.
The British tried to defend their western frontier with small forts east of the Alleghenies. They defended their toehold on Lake Ontario by fortifying Oswego and building Fort Stanwix to protect its supply line to Albany. Finally, in an attempt to curb what was perceived as the deepest penetration into their territory, the British built Fort Edward and Fort William Henry to protect the upper end of the Hudson Valley against French expeditions up Lake Champlain. Except for Louisbourg and the large cities of Quebec and Montreal, most forts in the North American theater rarely reached the size and complexity of their European counterparts. Though smaller, these forts were conceived according to contemporary military doctrine from the age of Vauban; so were the attempts to take them.

Unlike the previous hit-and-run colonial wars and the American Revolution to follow, the French and Indian War was, by and large, a war of sieges, or at least, attempted sieges. According to Fred Anderson, “With a few exceptions (most notably the celebrated encounter on the Plains of Abraham) combat took the form not of open-field pitched battles, but of fights for fortified positions along the main avenues of approach to Canada. These sieges were seldom extended; Louisbourg withstood the British for seven weeks, but most forts were abandoned after a few days” (Anderson 1984:142). Edward Hamilton continues in this vein:

The capture of a colonial fort in the final analysis depended almost entirely upon logistics, the operation of getting a reasonable amount of fairly heavy artillery, and, if at all possible, a 13-inch mortar, within effective range of the fort concerned. It was almost axiomatic that once this was accomplished the fort would sooner or later have to surrender. An analysis of all the various French and British expeditions against frontier forts during the colonial period shows that this rule held, without exception, and in the cases where artillery did not arrive or was not employed the fort was successfully defended (Hamilton 1962:197).

The early weeks and months many campaign seasons during the French and Indian War were expended on the logistics of compiling, organizing, and moving an army and its
necessary equipment to the enemy's position. If he were not ambushed (e.g., Braddock), or
failed to use his artillery (e.g., Abercromby), a British commander stood a good chance of
besting the enemy in his stronghold. Once a siege began it proceeded much as it had in
Europe, though on a smaller scale.

The Art of Fortification in Europe and North America

Back in Europe, the work of fortifying a position fell to paid or coerced local
laborers and/or the troops. No local peasantry lived near the forest fortresses of the French
and Indian War, so the regular and provincial soldiers of both armies built the forts
themselves. Under the direction of engineering officers, these men used tools of iron to
build fortifications of earth, sod, stone, and wood; all of these materials had to be dug, cut,
hauling, and placed by hand.

The engineering officer laid out the plan of the fort and its outer defenses with
stakes and string. Most colonial forts were a four-sided bastion pattern, or trace, designed
according to European principles. The engineers directed the work parties to remove the
sod layer from the area which would become the ditch and cut the sod into manageable
blocks to be used later. The ditch formed a defensive obstacle for enemy assaults and
provided the earth to make the ramparts. Not surprisingly, ramparts were usually as high
and thick as ditches were deep and wide. Earth was readily available and it harmlessly
absorbed the energy delivered by iron cannon balls better than stone or wood. Some dirt
was directed toward the outside of the ditch to form the glacis. The gentle slope of the
glacis required no support to keep the dirt in place, but the more vertical walls of the
ramparts and their protective parapets necessitated the use of support materials.

Sandbags, round logs, and, if available, milled timber were occasionally used to give
form and support to the earthworks. If the workmen used logs or timbers, they laid them
down to form two sides of the ramparts, with interlocking cross members, and packed the
space between with dirt. Occasionally, the timbers were left uncovered to form the finished
surface of the walls or were covered with dirt, sod, brick, or stone. For example, in 1757
the French began replacing the timber revetments used in Fort Carillon (Ticonderoga) with
blocks of local limestone (Duffy 1985:268). This improvement to the historic fort was
continued under both its French and the British owners. More often, support for the loose dirt in both fortifications and siegeworks came from items specially designed for military engineering, namely fascines and gabions.

When an army in the eighteenth century stopped to fortify a strategic position, it had to clear land for the defensive works, the approaches to the fort, and its camp. This was especially true in the heavily-forested theater of the French and Indian War. Tree trunks provided large timber for ramparts and building, and tree branches and underbrush provided materials to make fascines and gabions (Figure 7). These standardized and prefabricated items were in turn used for a variety of purposes. Captain George Smith defined fascines in his Universal Military Dictionary:

Fascines, in fortification, are a kind of faggots, made of small branches of trees or brush-wood, tied in 3, 4, 5, or 6 places, and are of various dimensions, according to the purposes intended. Those that are to be pitched, over, for burning lodgments, galleries, or any other works of the enemy, should be 1½ or 2 feet long. Those that are for making eapaulments or chandeliers, or to raise works, or fill up ditches, are 10 feet long, and 1 or 1¼ feet in diameter. They are made as follows: six small pickets are struck into the ground, 2 and 2, forming little crosses, well fastened in the middle with willow bindings. On these trestles the branches are laid, and are bound round with withes at the distance of every 2 feet. Six men are employed in making a fascine: 2 cut the boughs, 2 gather them, and the remaining 2 bind them. These 6 men can make 12 fascines every hour. Each fascine requires five pickets to fasten it (Smith 1969[1779]:87-88).

This chapter contains numerous quotations from contemporary sources. In order to keep the original flavor intact, I have not altered spelling, capitalization, or grammar, and I have not used [sic]s because there would be so many in some passages as to detract from their legibility. The use of [sic] also implies a mistake has been made and it is inappropriate to use modern standards to judge writing, especially personal journals, from an age before strict standardized spelling and grammar.
Although this definition was written after the French and Indian War it is one of the most complete. Similar dictionaries and treatises on fortification and siege warfare from the age of Vauban, whether English, French, Dutch, or Spanish invariably contain references to fascines. Though made with minor variations in dimensions and construction, fascines were used in great numbers by both sides during the French and Indian War. Fascines were also soaked in tar for use as "fireworks" against enemy works or attacking infantry (Le Blond 1970[1746]:98). Saucissons, or double fascines, were extra-long fascines which reached up to 19 feet in length (Smith 1969[1779]:230). The French may have made more use of saucissons than did the British (Muller 1977[1757, 1780]:167).

A gabion was another prefabricated engineering structure utilized extensively in military engineering. These wicker-work cylinders were used in fortification and siege work for centuries. They were even used as late as World War II when the French used gabions as expedient infantry positions to protect their much vaunted Maginot Line (Brice 1990:157). Smith's military dictionary of 1779 also defines these items:

Gabions, in fortification, are a kind of baskets made of ozier-twigs, of a cylindrical form, having different dimensions, according to what purpose they are used. Some are 5 or 6 feet high, and 3 feet in diameter: These serve in sieges to carry on the approaches under cover, when they come pretty near the fortification. Those used in field-works are 3 or 4 feet high, and 2½ or 3 feet diameter. There is also a kind of gabions, about 1 foot high, 12 inches diameter at top, and from 8 to 10 at bottom, which are placed along the top of the parapet, to cover the troops firing over it.

In order to make them, some pickets, 3 or 4 feet long, are struck into the ground, in form of a circle and of a proper diameter, wattled together with small branches, in the manner of common fences. Batteries are often made of gabions. Stuff-Gabions, in fortification, are made in the same manner as the former: they are only filled with all sorts of branches and small wood, and are 4 or 6 feet long: they serve to roll before the workman in the trenches, to cover them in front against musket-shot (Smith 1969[1779]:94).
As the fort took shape, the men threw dirt from the ditches into staggered lines of gabions. The gabions kept the dirt from slumping and produced a stable foundation for subsequent levels of dirt and gabions. Once the gabions were filled and covered, the dirt faces of the work were held in place by fascines anchored to the surface with long wood stakes, or pickets. The whole structure might then be covered with the sod squares which had been set aside earlier. Gabions and fascines, and occasionally sandbags, were often used to construct the parapets which protected the defensive cannon on top of the ramparts. The fort’s cannon fired through embrasures, which were themselves sided with gabions or fascines, or over the top of the parapets ([Desandrouins] 1972[1759]:199). The defenders used gabions and fascines in stone forts to strengthen weak areas and rebuild damage after the siege began.

The Art of Siegecraft in Europe and North America

Pre-made and readily available construction materials such as fascines and gabions were especially useful during offensive operations against a fort because, as the besieging army strived to advance its saps and establish parallels and breaching batteries, the defenders kept up a lively fire to retard this process. Portable and abundant, gabions and fascines protected the sappers as they advanced their trenches and the attackers used fascines to fill defensive ditches during a siege or assault. Quickly-placed prefabricated structures saved lives. These materials also allowed batteries to be thrown up with dispatch.

The siege engineer usually set up his first parallel just outside the range of the fort’s guns. He might also begin his first approach trench, or sap, behind a hill or some other defensive cover. The engineer marked the layout of the parallels and saps on the ground with stakes and string. This design work and the process of advancing the trenches was usually carried out under the protective cover of night. The daytime was usually reserved for improving and consolidating the protected trenches from the previous night’s work. The saps were advanced in a zig-zag manner to avoid a situation where the whole trench might be swept by enfilading fire. In this manner, the side of the trench nearest the enemy could be fortified with an earthwork wall against oblique fire from the fort. Dirt, gabions, fascines, and sandbags were the primary ingredients of this wall.
Not surprisingly, the soldiers who dug the trenches were called sappers. A party of sappers might consist of eight men divided into two groups of four. One group dug while the other provided them with gabions, fascines, tools, and other equipment. The two groups alternatively relieved each other from the dangerous and back-breaking task of excavation (Smith 1969[1779]:230). Vauban preferred a six-man work party including four diggers, one man to add finishing touches to the wall and trench, and one man to keep tools and materials moving to the front of the trench. The last man was always prepared to replace the first digger if he were wounded or killed. Each man in the party took his turn at the vulnerable front of the trench and after a time the whole party would be replaced by another (Dunnigan 1986:41). In addition to defensive fire, the sappers were also vulnerable to a sally of defenders from the fort. Groups of soldiers, or pickets, were usually stationed to protect the unarmed work parties from such sorties. Sappers, and other skilled workers needed during the siege, usually received higher pay than the rest of the soldiers but often merited no quarter if captured. In an age when it was considered honorable to stand and face volleys of musketry and cannon fire in neat ranks, the mole-like activities of sappers were considered to be disgraceful by many.

The first sapper had the unenviable job of establishing the head of the trench according to the engineer’s marker line. With no effective cover from cannon fire, the lead sapper might find some protection from musket shot behind a mantlet, a thick wooden shield mounted on wheels (Figure 8), or a gabion stuffed tightly with fascines and loose sticks and rolled on its side. This latter method was most likely used during the French and Indian War (Dunnigan 1986:41). Behind his stuffed-gabion or mantlet, the lead sapper placed hollow gabions along the side of the intended trench on the fort side. Working on his knees or crouched over, the sapper dug a small trench behind the gabions and tossed his excavated dirt into them (Figure 8). This anchored the gabions and increased their protective properties. The second sapper continued digging and topped off the gabions. Once the gabions were filled with earth, the second sapper laid one or two layers of fascines on top of them. This increased the height of the protective wall and consolidated it by tying the gabions together. The men also placed sandbags or fascines vertically between the gabions to strengthen this weak area. The third and fourth sappers deepened and widened
the trench and threw the dirt they generated over the top of the fascines to thicken the wall. The depth of the trench and the height of the wall combined to form a well protected passageway for the besiegers (Figure 8).

Vast amounts of excavation were also required when it came time to establish siege and breaching batteries. The parapets set up to protect the gun and mortar batteries were, like sap walls, constructed with dirt, sod, gabions, fascines, and sandbags. Gabions were especially useful where the dirt was loose or sandy, as the interior wall needed to be vertical to provide working space for the guns and their crews. Guns were usually placed on timber platforms which inclined slightly towards the parapet to facilitate a return to firing position after recoil. Mortar batteries were mounted flat on a sturdy foundatoin. The men built embrasures in the battery parapet to allow the siege guns to fire while minimizing exposure to defensive fire. The sides of these openings flared outward towards the enemy fort to increase the angle of fire, and were consolidated with gabions, fascines, and/or sandbags. Throughout the Age of Vauban, fortification and siege warfare consumed vast quantities of fascines and gabions and the forest resources they represented. The numerous sieges of the French and Indian war were not exempted from this consumption. To amass the necessary materials for the British siege of Niagara in 1759, for instance, orders were issued for the troops to construct 6,000 fascines and 1,500 gabions. It is unlikely, however, that these numbers were reached before the siege was completed (Dunnigan 1986:35).

**Wood Engineering Structures in Fortification and Siegecraft**

Gabions and fascines were not the only wooden accouterments associated with sieges and fortification. Pickets, or sharpened wooden stakes of differing length, were used for sundry purposes. Engineers used them in conjunction with string to stake off the design of fortifications or siege works. Cut to decreasing lengths and pounded into the ground, they acted as a height guide for producing the gentle slope of glacis. Pickets were also used to pin fascines and gabions to the earthworks. Occasionally, pickets, or fraises, were driven into the face of the ramparts and into the ditch. Once sharpened, these early versions of punji sticks acted as one more deterrent against a charge by enemy infantry.
Defenders also fashioned other forms of sharp and entangling devices out of wood. Sharpened logs, or large pickets, formed a palisade when placed close together (Figure 9). Additional spikes were occasionally driven into these poles to increase their effectiveness. Poles spiked with wood or iron, called turning bars or turn pikes, could be chained across an area that needed frequent opening such as a gate or passageway. Chavaux-de-frise were similar devices with longer spikes placed to impede an attacker or be rolled down on top of him as he stormed into the ditch (Figure 9). Wooden and iron spikes mounted in boards and placed on the ground acted as expedient anti-personnel devices (Figure 9). An abatis, a antecedent of barbed wire, consisted of trees laid out horizontally with their tops toward the enemy. The defenders sharpened and intertwined the branches to impede an enemy assault. This technique was particularly successful against Abercromby’s assault on the outer defenses of Fort Carillon (Ticonderoga) in 1758.

Special troops called pioneers were occasionally sent ahead to clear a path for the main force through natural obstructions and an enemy’s defensive obstacles (Peterson 1968:183-184). Axes, billhooks, and fascine knives were the primary tools of those who made these obstacles and those sent to disable them.

Wood was also used for less martial purposes. Branches, saplings, withes, and other small wood were incorporated into various wickerwork and wattle construction materials. The men occasionally revetted trenches and other excavated positions with small sticks held against the earth wall by vertical stakes. Earth was also held in place by flat rectangular wickerwork mats called hurdles (Figure 9). The men used fascines and hurdles to level low or wet spots in the works or to pass over muddy areas in camp. Hurdles were also used to raise barrels of gunpowder and other sensitive materials off the wet ground.

Fatigue Duty

Contemporary accounts from the French and Indian War, such as orderly books, lists of stores, and journals kept by officers and men (from both regular and provincial regiments), are filled with references to fatigue duty. Fatigue duty refers to all types of manual and menial labor performed by soldiers which is not directly related to fighting. Labor on fortifications and entrenching fell under this category as did most of the rest of the work performed by soldiers of both sides. The soldiers were kept constantly busy building
FIGURE 9. Military tools and equipment from mid-18th-century print. (From Military Architecture. Courtesy of the Fort Ticonderoga Museum, Ticonderoga, New York.)
roads and bridges, clearing land, cutting and hauling wood, digging trenches, hauling supplies, harvesting, herding, boat building, etc. Manual labor kept the troops out of trouble. Along with guard duty, heavy fatigue duty schedules provided regimentation and kept the men busy and/or worn out (Anderson 1984:80). Poor food, unsanitary conditions, and unending work made the men susceptible to disease; there were compensations, however. Hard labor was often rewarded with extra pay, as were skilled and semi-skilled jobs, and occasionally, an extra ration of rum awaited a man who completed a hard day’s work (Amherst 1931:91). Regardless of monetary and liquid benefits, the provincial officers and men felt that they were doing more than their share when it came to fatigue duty, according to Fred Anderson, they were. He writes, “Immense amounts of labor were required to keep an army functioning in the wilderness, and provincials, far more than the highly trained and hard-to-replace regulars, supplied the muscle that built roads, dug trenches, cut wood, constructed vessels, and hauled supplies” (Anderson 1984:81).

Provincial and regular troops performed a variety of tasks and occasionally they were paid for piecework such as gabions and fascines. As the building blocks of fortifications and siege works, gabions and fascines were produced and used in great numbers. Contemporary treatises on artillery contain lengthy discussions about the number of men, tools, and materials needed for batteries of varying sizes (Muller 1977[1757, 1780]:175). The production rate of fascines was carefully calculated in Muller’s treatise:

A soldier may make 12 fascines a day with the pickets required, when proper wood is to be had conveniently: a horseman may make 20 bavins [short fascines] a day, bound in two places only, because they require very little care to make them neat; for it is the cavalry that generally make these kind of fascines.

Twelve soldiers will make a sufficient quantity of fascines in a day for a battery of two pieces, and three horsemen a sufficient quantity of bavins at the same time. (Muller 1977[1757, 1780]:169)

Soldiers were often paid for each gabion or fascine produced as an incentive to boost production. One of the first orders given after the British forces landed near Niagara
in 1759 was for 500 troops to “make fasheens & gabions for which the men will be paid according to the usual custom” (Dunnigan 1986:35). Contemporary accounts from the 1759 and 1760 campaigns against the French on Lake Champlain contain numerous references to the production of fascines and gabions. Moneypenny’s orderly book states, “A return to be forth with given in of all the Serjts, Corplls & private soldiers in each regiment, who have serv’d at sieges, & of all such as have been accustom’d to make Gabions, Baskets or Hurdles & also of the Gardners, Carpenters & Masons” (Moneypenny 1969[1758]:356). Robert Webster writes in his journal on 9 July 1759, “I went after Bark for fascines” and, two weeks later, alluding to the intensity of work involved with mounting a siege, he writes “there was five or six hundred men cutting fascines and entrenching as fast as they could” (Webster 1931[1759]:131, 133). Thomas Moody’s journal entry for 18 August 1760 illustrates the production of fascines, 3,500 total, during the expedition against Ile-aux-Noix. He writes, “Orders out last night for 3000 500 Fachines to be Compleated by 10 o’Clock this Day” (Moody 1976:27). Three days later, his fellow soldier, Lemuel Wood, writes, “Thirs Day ye 21, Last Nite there was a Party of our men sent to Carring fashens for ye Battree” (Wood 1882:292). Orders for 24 July 1759 include the following: “Sergt Murray of the R. Highland Regt is appointed to Oversee the People employ’d making Fascines & to keep an account of the numbers made” (Moneypenny 1932[1759]:237). Also, Wilson’s orderly book contains the following passage:

This day the Serjeants and Men of Lymans, Worcesters and Fitches Regiments employed in Making Fasceins at Ticonderoga will receive what is Due them by the Quartermaster of Said Regiments Applying to Lieut. Gray for Payment. The men of the Royall Highland Regiment, Montgomerys and the Light Infantry who have been employed making Basketts [gabions] will be paid for the Same by the Quartermasters Applying to Mr. Gray this Afternoon after the work is over. (Munsell 1857:150).

Producing fascines and gabions for fortifications and entrenching fell into the more martial aspects of fatigue duty, but much more work was needed to keep an army in the field. The logistics of keeping masses of men in fighting readiness were daunting. Lines of
communication in the form of roads, bridges, and portages needed to be built and
maintained simply so supplies and equipment could reach the army. The men cleared and
built their own camps and the officers compelled them, sometimes successfully, to keep the
camp sanitary. Finally, the nutritional needs of the army had to be met. All of these things
required digging, cutting, and hauling, and all work required hand tools.

Whenever the army stopped at a spot, making camp was its first priority. A stay for
any length of time meant work for the troops. After suitable ground was located, it needed
to be cleared and prepared. Pick and shovel work leveled spots for tents, dug latrines, and,
for winter camp, excavated hillsides for semi-subterranean cabins. Axes, hatchets, and
billhooks cut trees, cleared brush, whittled tent pegs, and split firewood and kindling. The
men also gathered brushwood and grasses for bedding materials. Stationed at Crown Point
on 3 September 1779, Moneypenny recorded in his orderly book: "The Commanding
Officers are desired to have [the hospitals] compleated immediately; and that particular Care
may be taken that the men lye properly defended from the Damps by dry'd Grass and Brush
Wood" (Moneypenny 1759).

Grasses provided fodder for animals as well. Journals kept by generals and privates
alike mention mowing hay for cattle (Amherst 1931:152; Anderson 1984:82; Munsell
1857:133). Both the French and British used "marsh" hay found near Ticonderoga to feed
their stock through the winter. Harvesting grain to make enough bread and biscuits to feed
the men through the winter preoccupied the government of New France. Unlike European
armies, the combatants in the New World rarely campaigned in agricultural areas that could
provided productive foraging opportunities, but the British enjoyed a better agricultural
base in their colonies, and more labor to exploit it, than did the French. The manpower
shortage was so acute in New France near the end of the war that, immediately before the
British attacked Île-aux-Noix, militia had to be sent home to harvest (Lee 1969:104).
Scythes, sickles, and billhooks were all employed to collect food and fodder (Frank Kravic
1994, pers. comm.). Gardening was another means of drawing sustenance from the land for
men and officers; undoubtedly the king’s tools were used here as well (Munsell 1857:78).
Both sides consumed great quantities of spruce beer during the seventeenth- and eighteenth-century colonial conflicts. Crucial for combating scurvy, spruce beer contained vitamin C and was consumed as a potable beverage and medicine. The Europeans learned of the scurvy-fighting attributes of several species of New World evergreens, including spruce, from initial contact with the local tribes. During the French and Indian War, the recipe for spruce beer was simple. One of the most complete recipes comes from Jeffrey Amherst's journal:

Take 7 Pounds of good Spruce & boil it well till the bark peels off, then take the Spruce out & put three Gallons of Molasses to the Liquor & boil it again, scum it well as it boils, then take it out the Kettle & put it into a cooler, boil the remainder of the Water sufficient for a Barrel of thirty Gallons, if the kettle is not large enough to boil it together, when milkwarm in the Cooler put a Pint of Yest into it and mix well. Then put in the Barrel and let it work for two or three days, keep filling it up as it works out. When done working, bung it up with a Tent Peg in the Barrel to give it vent every now and then. It may be used in two or three days after. If wanted to be bottled it should stand a fortnight in the Cask. It will keep a great while. (Amherst 1931:152).

Honey or maple syrup occasionally substituted for molasses. The men sometimes mixed the spruce beer with rum and extra molasses to produce a powerful drink called calibogus. The army purchased spruce beer from the sutlers or produced it itself. Once again, contemporary private journals and orderly books contain numerous references related to the vital substance. Cutting and gathering the spruce boughs was part of many a soldier's fatigue duty (Anderson 1984:82; Munsell 1857:72, 125, 126). Billhooks and fascine knives were undoubtedly used to cut spruce boughs. Orders for Monday, 6 August 1759, specified that spruce beer and the brewing utensils necessary for its production be brought to the camp before the newly captured French fort at Ticonderoga (Moneypenny 1759). These orders also included the following command:
An officer & fifty Rangers to Assemble at Gage’s light Infantry at five o’clock tomorrow morning. They will take six Batteaus, & proceed two miles down the Lake, where they will cut spruce. The Officer will take the French Deserter who is on the General’s Guard, who will show him where the Spruce is; And a man who can talk German, to be the Interpreter. A Party of Gage’s Light Infantry will go in the English Boat, to guard the Batteaus. The Officer will deliver the Spruce under the Care of the Sergeants Guard, by the Fort (Moneypenny 1759).

The army paid a half-penny per quart to whoever produced the root beer-like beverage (Munsell 1857:137).

The Need for Hand Tools

"Many tools were used to erect fortified positions; the most common were picks, shovels, spades, axes and billhooks. Picks, shovels and spades were needed to dig ditches and form earthworks. Axes and billhooks were used to clear trails to cut wood and brush for revetting the earthworks” (Hanson and Hsu 1975:98). This quotation illustrates the necessity of tools for fortification and siege work. Yet, these same ubiquitous tools were used for almost every other form of fatigue duty the officers could think up. Tools have always been an indispensable part of field equipment for any army, but perhaps at no other time was the quantity of tools needed as great as during the age of siege warfare in Europe and America (Figure 10, Figure 11).

Contemporary European treatises on fortifications, siege warfare, and artillery stress the importance of hand tools for a successful campaign. John Muller (1777[1757, 1780]:166) stressed the necessity of careful logistical planning in his Treatise of Artillery. He writes, “To proceed with order, the quality and quantity of the materials, as well as the number of workmen and their tools, must be determined as exactly as the nature of the subject will admit.” Muller continues: “In the construction of a battery of two pieces, it requires 10 mallets to drive the pickets, 15 spades, shovels, and pick-axes for digging, according to the nature of the ground. It has been found that 50 men are sufficient to make
FIGURE 10. Tools and materials used in siegework and fortification. (Plate III, Print from Guillaume Le Blond’s *A Treatise of Artillery* used to illustrate Vauban’s *A Manual of Siegecraft and Fortification*. Courtesy of The University of Michigan Press, Ann Arbor, Michigan.)
a battery of two pieces in one night, 70, 90 for one of 4 or 6 pieces” (Muller 1977[1757, 1780]:169). A guide to the requisite numbers of men, materials, and tools needed for the construction of various sizes of batteries was also included in table form (Muller 1977[1757,1780]:175). Lastly, Muller reinforced his point by including the following list of the stores used by the British army in its campaign of 1747 during the War of Austrian Succession. Muller’s list is provided here as Table 1:

<table>
<thead>
<tr>
<th>Tools</th>
<th>Type</th>
<th>Quantity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Axes</td>
<td>felling</td>
<td>150</td>
</tr>
<tr>
<td></td>
<td>pick</td>
<td>1,495</td>
</tr>
<tr>
<td>Bills, hand</td>
<td>claw</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td>small</td>
<td>4</td>
</tr>
<tr>
<td>Hammers</td>
<td></td>
<td>148</td>
</tr>
<tr>
<td>Hand spikes</td>
<td></td>
<td>1,030</td>
</tr>
<tr>
<td>Hatchets, hand</td>
<td></td>
<td>100</td>
</tr>
<tr>
<td>Helves, spare, for pickaxes</td>
<td></td>
<td>1,934</td>
</tr>
</tbody>
</table>

Source: Muller (1977[1757, 1780]:183).

Guillaume Le Blond’s treatise of artillery, dating to 1746, includes a similar list provided here as Table 2:

<table>
<thead>
<tr>
<th>Tool Type</th>
<th>Brought</th>
<th>Consumed</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pioneers tools</td>
<td>56,374</td>
<td>54,742</td>
</tr>
<tr>
<td>Helves or handles for tools</td>
<td>24,580</td>
<td>24,580</td>
</tr>
<tr>
<td>Hatchets</td>
<td>2,685</td>
<td>1,892</td>
</tr>
<tr>
<td>Hedging bills, or pruning knives</td>
<td>unknown</td>
<td>unknown</td>
</tr>
<tr>
<td>Miners tools</td>
<td>unknown</td>
<td>unknown</td>
</tr>
</tbody>
</table>
TABLE 2 (Continued)

<table>
<thead>
<tr>
<th>Tool Type</th>
<th>Brought</th>
<th>Consumed</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pick axes</td>
<td>1,000</td>
<td>800</td>
</tr>
<tr>
<td>Sledges</td>
<td>150</td>
<td>100</td>
</tr>
<tr>
<td>Trowels, or short spades</td>
<td>6</td>
<td>6</td>
</tr>
</tbody>
</table>


The types of artillery needed by an army of 50,000 were detailed by Le Blond, as were the number and disbursement of horses and carts needed to carry the necessary tools. The following table (Table 3) was derived from "A Table of Things Necessary for a Train of Artillery Consisting of 50 Pieces of Cannon" (Le Blond 1970[1746]:112):

TABLE 3
ARTILLERY TOOLS

<table>
<thead>
<tr>
<th>Horses</th>
<th>Carts</th>
<th>Cart Loading Instructions</th>
</tr>
</thead>
<tbody>
<tr>
<td>96</td>
<td>24</td>
<td>Each loaded with 250 tools for removing earth, as spades, mattocks, pickaxes, wooden shovels bound with iron, &amp;c.</td>
</tr>
<tr>
<td>16</td>
<td>4</td>
<td>For 2000 hedging-bills packed up in barrels</td>
</tr>
<tr>
<td>15</td>
<td>3</td>
<td>To carry 1000 hatchets with halves</td>
</tr>
<tr>
<td>5</td>
<td>1</td>
<td>To carry smaller tools</td>
</tr>
<tr>
<td>5</td>
<td>1</td>
<td>To carry 2000 miners tools</td>
</tr>
</tbody>
</table>


Le Blond’s treatise continued with further tables breaking down what was necessary for each brigade. Generally, he stipulated that the commanding officer should plan one wagon of mixed tools per brigade. An addendum to his extensive list of things needed by an army included three more wagons of tools, one caisson loaded with 300 hatchets, one caisson loaded with 600 bills (billhooks), and 2 caissons of miner’s tools (e.g., picks, shovels, and spades) (Le Blond 1970[1746]:119).
Although the largest armies fielded in the French and Indian War fell far short of the numbers seen in Europe, they needed the same kinds of supplies. While General Edward Braddock readied his two 500-man regiments for their fateful trip to North America in 1754, the quartermasters busily compiled the ordnance, equipment, and sundry stores they would need and inventoried every last item. Stanley Pargellis (1969) published such a list in Military Affairs in North America: 1748-1765. The original list of artillery stores was compiled by Charles Frederick, Surveyor General, and was titled "A Proportion of Brass Ordnance, Howitzers, and Stores for the Intended Expedition to North America By Order of the Board, Dated the 12th October, 1754" (Pargellis 1969:482-485). References to tools are scattered throughout the list and are compiled below as Table 4.

<table>
<thead>
<tr>
<th>Type</th>
<th>Count</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intrenching Tools</td>
<td></td>
</tr>
<tr>
<td>Pickaxes helved</td>
<td>300</td>
</tr>
<tr>
<td>Spare helves for d° [ditto]</td>
<td>50</td>
</tr>
<tr>
<td>Spades</td>
<td>400</td>
</tr>
<tr>
<td>Shovels</td>
<td>200</td>
</tr>
<tr>
<td>Felling Axes</td>
<td>100</td>
</tr>
<tr>
<td>Hand hatchets</td>
<td>300</td>
</tr>
<tr>
<td>Hand Bills</td>
<td>250</td>
</tr>
<tr>
<td>Cross cut Saws</td>
<td>6</td>
</tr>
<tr>
<td>Gimblets of Sorts</td>
<td></td>
</tr>
<tr>
<td>Dozens</td>
<td>8</td>
</tr>
<tr>
<td>Setts of Tools &amp; Materials</td>
<td></td>
</tr>
<tr>
<td>Carpenters</td>
<td>3</td>
</tr>
<tr>
<td>Wheelers</td>
<td>2</td>
</tr>
<tr>
<td>Smiths</td>
<td>3</td>
</tr>
<tr>
<td>Cooper</td>
<td>1</td>
</tr>
<tr>
<td>Collar Maker</td>
<td>1</td>
</tr>
<tr>
<td>Armourers</td>
<td>2</td>
</tr>
</tbody>
</table>

It makes one wonder how many of these tools were captured from Braddock at the Monongehela, only to be recaptured by the British later in the war. Engineering and artillery officers generated similar lists on this side of the Atlantic. Similar inventories were undoubtedly produced for expeditions against the French on Lake Champlain and, conversely, against the British as well. It seems likely that they included the same tools which represent the bulk of the inventories above (e.g., axes, picks, shovels, spades, and billhooks), the same tools present on the Boscawen.

Following their successful campaign against Niagara in the summer of 1759, British army engineers compiled an inventory of tools and other engineering equipment returned after the siege. Titled “Return of Intrenching Tools &c Deliver’d to the Engineer Williams By Order of General Prideaux, For the Expedition Against Niagara, August 21, 1759”, in his book Siege-1759: The Campaign Against Niagara the list, provided here as Table 5, is as follows:

<table>
<thead>
<tr>
<th>Type</th>
<th>Count</th>
<th>Type</th>
<th>Count</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hand Hatchets</td>
<td>200</td>
<td>Drawing knives</td>
<td>4</td>
</tr>
<tr>
<td>Felling axes</td>
<td>400</td>
<td>Adzes</td>
<td>10</td>
</tr>
<tr>
<td>Pick d&quot;[ditto]</td>
<td>300</td>
<td>Iron Square</td>
<td>1</td>
</tr>
<tr>
<td>Broad d&quot;</td>
<td>40</td>
<td>Chalk Lines, Dozen</td>
<td>½</td>
</tr>
<tr>
<td>Hand Saws</td>
<td>10</td>
<td>Chalk</td>
<td>40lb</td>
</tr>
<tr>
<td>Cross cut Saws</td>
<td>10</td>
<td>Hambro Lines, Fathoms</td>
<td>36</td>
</tr>
<tr>
<td>Whipe [whip] Saws</td>
<td>5</td>
<td>Nails of Sorts, Casks</td>
<td>2</td>
</tr>
<tr>
<td>Wheel Barrows</td>
<td>30</td>
<td>Hand Hammers</td>
<td>2</td>
</tr>
<tr>
<td>Hand d&quot;</td>
<td>6</td>
<td>Hand Files for Saws</td>
<td>10</td>
</tr>
<tr>
<td>Two Inches Ropes, Coils</td>
<td>2</td>
<td>Crosscut d&quot;</td>
<td>5</td>
</tr>
<tr>
<td>One &amp; a half d&quot; d&quot;</td>
<td>1</td>
<td>Whipe d&quot;</td>
<td>5</td>
</tr>
<tr>
<td>2 Inches Augers</td>
<td>1</td>
<td>Iron Wedges</td>
<td>0</td>
</tr>
<tr>
<td>One and one Quart d&quot;</td>
<td>2</td>
<td>Iron Dogs</td>
<td>0</td>
</tr>
<tr>
<td>One Inch Auger</td>
<td>6</td>
<td>Saw, Sets of Sorts</td>
<td>3</td>
</tr>
<tr>
<td>Spades</td>
<td>500</td>
<td>Stone Hammers</td>
<td>6</td>
</tr>
<tr>
<td>Shand [sand?] Shovels</td>
<td>200</td>
<td>Trowells</td>
<td>7</td>
</tr>
<tr>
<td>Shod d&quot;</td>
<td>35</td>
<td>Padlock and key</td>
<td>2</td>
</tr>
<tr>
<td>Mattocks</td>
<td>60</td>
<td>Spikes Gimblets</td>
<td>2</td>
</tr>
</tbody>
</table>
TABLE 5 (Continued)

<table>
<thead>
<tr>
<th>Type</th>
<th>Count</th>
<th>Type</th>
<th>Count</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hand Bills</td>
<td>200</td>
<td>Compasses, pair</td>
<td>1</td>
</tr>
<tr>
<td>Iron Crows</td>
<td>5</td>
<td>Two Foot Rule</td>
<td>1</td>
</tr>
<tr>
<td>Iron Sledges</td>
<td>8</td>
<td>Carpenters</td>
<td>15</td>
</tr>
<tr>
<td>Spikes of 7 Inches</td>
<td>400</td>
<td>Master Carpenter</td>
<td>1</td>
</tr>
<tr>
<td>Grind Stones</td>
<td>6</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>


During the summer of 1759, as Amherst waited for his warships to be built, he kept the army busy on land by repairing Fort Ticonderoga and building a new fort at Crown Point. All of this construction demanded tools and construction materials. On 16 August 1759, Jeffrey Amherst sent a copy of a list of tools and stores to Colonel James Montresor at Fort George. The list inventories materials such as nails, tacks, brads, rope, glass and putty, locks, chalk and chalk lines, hinges, and hooks but primarily covered tools. The original title of the list, "A Proportion of Tools & Stores for the Use of Crown Point, Ticonderoga, Replacing those Sent from Fort George to the Several Posts since July 27th, 1759", implies that the tools and materials were consumed at a high rate (PRO 34/77/145-146). The following table, Table 6, includes the tools listed in this inventory:

TABLE 6
TOOLS AND BLACKSMITHING EQUIPMENT SENT TO CROWN POINT

<table>
<thead>
<tr>
<th>Item</th>
<th>Type/Description</th>
<th>Count</th>
</tr>
</thead>
<tbody>
<tr>
<td>To be made</td>
<td>Drag Chain for hauling Timber</td>
<td>20</td>
</tr>
<tr>
<td>To be made</td>
<td>Drawing Knives for Shingles</td>
<td>48</td>
</tr>
<tr>
<td>To be made</td>
<td>Froes for D⁰ [ditto]</td>
<td>18</td>
</tr>
<tr>
<td>To be made</td>
<td>Mason's Hammers two pound heavier</td>
<td>40</td>
</tr>
<tr>
<td>To be made</td>
<td>Trowels for D⁰</td>
<td>50</td>
</tr>
<tr>
<td>Hammers</td>
<td>Carpenter's Claw Hammers, Middle Size</td>
<td>72</td>
</tr>
<tr>
<td></td>
<td>Large for flooring D⁰</td>
<td>50</td>
</tr>
<tr>
<td>Files</td>
<td>Mill Saw Bastard Cutt</td>
<td>24</td>
</tr>
<tr>
<td></td>
<td>Whip Saw D⁰</td>
<td>48</td>
</tr>
<tr>
<td></td>
<td>Cros Cutt D⁰</td>
<td>108</td>
</tr>
<tr>
<td>Item</td>
<td>Type/Description</td>
<td>Count</td>
</tr>
<tr>
<td>-------------------</td>
<td>---------------------------</td>
<td>-------</td>
</tr>
<tr>
<td>Crosscut Saws</td>
<td>Hand Saw D°</td>
<td>108</td>
</tr>
<tr>
<td></td>
<td>6 feet Peck tooth</td>
<td>24</td>
</tr>
<tr>
<td></td>
<td>7 feet D°</td>
<td>12</td>
</tr>
<tr>
<td>Hand Saws</td>
<td>Common but Large</td>
<td>48</td>
</tr>
<tr>
<td>Saw Setts</td>
<td>for Whips Saws</td>
<td>8</td>
</tr>
<tr>
<td></td>
<td>for Cross cutt D°</td>
<td>8</td>
</tr>
<tr>
<td></td>
<td>for Hand Saws</td>
<td>24</td>
</tr>
<tr>
<td>Iron Squares</td>
<td>2 feet</td>
<td>36</td>
</tr>
<tr>
<td>Carpenter’s Rules</td>
<td>2 feet</td>
<td>36</td>
</tr>
<tr>
<td>Gimblets</td>
<td>Spike...IV</td>
<td>24</td>
</tr>
<tr>
<td></td>
<td>for half Crown Nails...IV D°</td>
<td>36</td>
</tr>
<tr>
<td>Framing Chizzles</td>
<td>Sorted Gimblets...IV D°</td>
<td>144</td>
</tr>
<tr>
<td>2 Inch</td>
<td></td>
<td>36</td>
</tr>
<tr>
<td>1 1/2 D°</td>
<td></td>
<td>36</td>
</tr>
<tr>
<td>1 1/4 D°</td>
<td></td>
<td>36</td>
</tr>
<tr>
<td>1 Inch</td>
<td></td>
<td>48</td>
</tr>
<tr>
<td>Pecking Gouges</td>
<td></td>
<td>48</td>
</tr>
<tr>
<td>Augers</td>
<td>2 Inch</td>
<td>36</td>
</tr>
<tr>
<td></td>
<td>1 1/2 D°</td>
<td>48</td>
</tr>
<tr>
<td></td>
<td>1 1/4 D°</td>
<td>24</td>
</tr>
<tr>
<td></td>
<td>1 D°</td>
<td>36</td>
</tr>
<tr>
<td></td>
<td>3/4 D°</td>
<td>12</td>
</tr>
<tr>
<td>Plains</td>
<td>Inch</td>
<td>24</td>
</tr>
<tr>
<td></td>
<td>Long</td>
<td>24</td>
</tr>
<tr>
<td></td>
<td>Smoothing</td>
<td>12</td>
</tr>
<tr>
<td></td>
<td>Jointers</td>
<td>6</td>
</tr>
<tr>
<td></td>
<td>1 1/2 Inch Grooving</td>
<td>3</td>
</tr>
<tr>
<td>Steel</td>
<td>English Figure. 3 Fagots</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td>German D°</td>
<td>1</td>
</tr>
<tr>
<td>Compasses</td>
<td>Iron</td>
<td>48</td>
</tr>
<tr>
<td>Coopers Tools</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Compleat Setts</td>
<td>6</td>
<td></td>
</tr>
<tr>
<td>Axes</td>
<td>Broad</td>
<td>6</td>
</tr>
<tr>
<td>Adzes</td>
<td></td>
<td>6</td>
</tr>
<tr>
<td>Howels</td>
<td></td>
<td>6</td>
</tr>
<tr>
<td>Round</td>
<td>Sheath</td>
<td>6</td>
</tr>
<tr>
<td>Wimble</td>
<td>With 2 Iron Pins</td>
<td>6</td>
</tr>
<tr>
<td>Sheafs</td>
<td>Hollow</td>
<td>6</td>
</tr>
<tr>
<td>Compass</td>
<td>Iron</td>
<td>6</td>
</tr>
<tr>
<td>Knives</td>
<td>Drawing</td>
<td>6</td>
</tr>
<tr>
<td></td>
<td>Sheath</td>
<td>6</td>
</tr>
</tbody>
</table>
### TABLE 6 (Continued)

<table>
<thead>
<tr>
<th>Item</th>
<th>Type/Description</th>
<th>Count</th>
</tr>
</thead>
<tbody>
<tr>
<td>Knives</td>
<td>Hollow</td>
<td>6</td>
</tr>
<tr>
<td></td>
<td>Plain Wooden &amp; Iron Dº</td>
<td>6</td>
</tr>
<tr>
<td></td>
<td>Crow Wooden Dº</td>
<td>6</td>
</tr>
</tbody>
</table>

Source: PRO 34/77/145-146.

Another inventory of tools sent to Crown Point survives in Amherst’s records. Originally titled, "Proportion of Stores sent by Mendes for the Works Carrying on at Crown Point viz Issued out from Fort George August 30th, 1759", the list includes new tools purchased at Albany, tools and materials collected from Fort George (Figure 3), and tools gathered from the British Army’s camp near the fort after it had moved on to Ticonderoga and Crown Point. This list is provided here as Table 7:

### TABLE 7

TOOLS SENT FROM FORT GEORGE TO CROWN POINT

<table>
<thead>
<tr>
<th>Item</th>
<th>Type/Description</th>
<th>Count</th>
</tr>
</thead>
<tbody>
<tr>
<td>Purchas’d in Albany by Mr. Russel</td>
<td>Masons 18 &amp; 12</td>
<td>30</td>
</tr>
<tr>
<td>Trowels</td>
<td>Iron</td>
<td>6</td>
</tr>
<tr>
<td>Squares</td>
<td>Smith</td>
<td>4</td>
</tr>
<tr>
<td>Rubbers</td>
<td>Large, flat, Smith</td>
<td>4</td>
</tr>
<tr>
<td>Files</td>
<td>Smaller</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>Three Square, Large Dº [ditto]</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td>Smaller Dº</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>Large, half Round</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td>Smaller Dº</td>
<td>2</td>
</tr>
<tr>
<td>Axes</td>
<td>Broad</td>
<td>12</td>
</tr>
<tr>
<td>Hammers</td>
<td>Masson’s 25 &amp; 5</td>
<td>30</td>
</tr>
<tr>
<td>Compasses</td>
<td>Carpenters</td>
<td>12</td>
</tr>
<tr>
<td>Anvil</td>
<td>Smith</td>
<td>1</td>
</tr>
<tr>
<td>Bellows</td>
<td>Standing, Large</td>
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</tr>
<tr>
<td>Vice</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Item</td>
<td>Type/Description</td>
<td>Count</td>
</tr>
<tr>
<td>-------------------------------</td>
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</tr>
<tr>
<td>Sent From Fort George</td>
<td></td>
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<tr>
<td>Adzes</td>
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</tr>
<tr>
<td>Oakum</td>
<td>Casks</td>
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</tr>
<tr>
<td>Grinde Stones</td>
<td>Rough &amp; Smooth</td>
<td>10</td>
</tr>
<tr>
<td>Crows</td>
<td>Iron</td>
<td>6</td>
</tr>
<tr>
<td>Hammers</td>
<td>Sledge</td>
<td>1</td>
</tr>
<tr>
<td>Pick’d up in Camp after the Army mov’d</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Axes</td>
<td>Broad</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>Felling</td>
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<tr>
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</tr>
<tr>
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<td>Croscut</td>
<td>6</td>
</tr>
<tr>
<td></td>
<td>Whip</td>
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</tr>
<tr>
<td></td>
<td>Tennant</td>
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</tr>
<tr>
<td>Spades</td>
<td>Iron unhelv’d</td>
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</tr>
<tr>
<td></td>
<td>helv’d</td>
<td>5</td>
</tr>
<tr>
<td></td>
<td>Irish</td>
<td>3</td>
</tr>
<tr>
<td>Shovels</td>
<td>Iron shod unhelv’d</td>
<td>4</td>
</tr>
</tbody>
</table>

Source: PRO 34/77/171.

**Contemporary References to Tool Use**

In addition to inventory lists, references to tools, like references to fatigue duty, are scattered throughout soldier’s daily diaries, general’s journals, and orderly books from both sides in the conflict. Indeed, the discussion of fatigue duty often went hand in hand with discussion of the tools necessary for the job. For instance, tools were employed in Abercromby’s ill-fated expedition against Fort Carillon in 1758 to clear roads and make camp. What would the outcome have been if he had used them in a formal siege against the French defenses? After the disastrous assault on July 8, 1758, the British retired to their camp at Lake George. The British feared a French assault on the camp after their successful defense of Carillon. Hence, Alexander Moneypenny’s entries in his orderly book, exactly one month after the defeat, recorded a great deal of work on the camp’s defenses and lines of communication. On 7 August 1758 he writes, “The Piquets of the Army, with one Hundred Rangers, to parade at one o’clock, & march towards Fort Edward, to meet
the convoy. They are to carry with them 20 Axes & 50 Bill Hooks" (Moneypenny 1969[1758]:460). The next day he writes, "The Piquets of the Army, with one hundred rangers to march this day, at one o’clock towards Halfway Brook, to meet the convoy. They are to carry with them Hatchets & Bill Hooks, as ordered yesterday. They are to clear away & burn, the thick woods on each side of the road" (Moneypenny 1970[1758]:89).

A year later, numerous references to tools can be found in contemporary accounts from Amherst’s 1759 expedition as the general kept the army busy building new works at Crown Point and repairing the newly-captured Fort Carillon (Ticonderoga). While Captain Loring supervised the construction of the brig *Duke of Cumberland* and the sloop *Boscawen*, the lakeshore bristled with British activity. Daily orders assigned groups of regular and provincial troops, from 10 to 500 men, to various tasks. These groups were ordered to procure the appropriate tools and work on fortifications, clear camp, cut timber, or build roads. Companies of armed men usually accompanied the work parties if they were to range far from camp or fort. Work parties were mentioned every few pages in Commissary Wilson’s orderly book from the summer of 1759 and an entry for 15 July 1759 includes a typical reference to numbers of workmen and tools. Wilson writes, “450 working men and 2 covering parties for Engineers, 100 working men for artillery, 40 for Capt. Loring, 200 for Lieut-Colonel-putnam to finish his garden, to take what Tools he directs” (Munsell 1857:78). Other large work parties were ordered to be on parade in the morning with appropriate tools (e.g., “400 ax-men to engineers”, “500 provincials to parade tomorrow with Axes”, “100 men with Bill hooks 500 with Axes under Major Williard”) (Munsell 1857:72, 80-81).

With work underway on two fortifications, roads, camp, boats and ships, and sundry fatigue duties, demand for tools was especially high in the summer and fall of 1759. With large numbers of tools in use, many were broken, unintentionally and intentionally buried in the works, left or lost in the woods, or pilfered by the troops. After digging at military sites from the French and Indian War and Revolution, collectors have found more tools at the earlier sites. It is possible that provincial troops “lost” the King’s tools at a greater rate to avoid fatigue duty during the earlier war than when they were fighting in their own army (Frank Kravic 1996, pers. comm.; George Neumann 1996, pers. comm.). The officers
constantly directed their subordinates to have the men locate and collect the tools. On 26 August 1759, Moneypenny writes, “As All the Tools are now much wanted for the works, the Regts. must deliver in those they have, to the Place, where the Tools are kept, by the Fort, reserving only what they absolutely want” (Moneypenny 1759). For the evening orders on 29 June 1758, Moneypenny writes, “All the spades, axes, pickaxes, shovels & hatchets (except those at present in the hands of the carpenters) belonging to His Majesty, whether they were found on the road, or deliver’d from the store, to be delivered in to Mr. Mann Storekeeper before nine tomorrow morning” (Moneypenny 1969[1758]:357).

Moneypenny continues on 27 Friday 1759, “All tools these Corps have with them, must be collected & great care taken that they leave none behind but bring them to the Front of the Lines” (Moneypenny 1932[1759]:241). Even Commissary Wilson implored his officers to get their men to pick up their tools. On 14 July 1759, Wilson writes, “Return hammers to Mr. Russell at Enginiers Encampment” (Munsell 1857:72). The troops were careless about leaving tools in camp, perhaps especially those obtained in a questionable fashion (see below). The officers collected saws, axes, hoes, picks, spades, and shovels from the camp at Fort George after the British Army moved to Ticonderoga and Crown Point in 1759 (Table 7).

One group may have been excused if they did not return all of their tools. Lemuel Wood writes, “we were informd at ye Lake that yesterday about 20 of ye Jersey Bleues went out of the Encampment a Littel way into ye woods to get Bark. they Lay Down there guns and went to getting Bark in Sight of ye camp and a Party of Indians come upon them Killed and took 13 of them the Indians Put off immediately befor the Jersey Bleues could get there and help” (Wood 1882:71).

Pilferage of the tools was always a problem. Picks, shovels, spades, axes, hatchets, and billhooks made up large percentages of inventories because they were useful for many tasks, including personal tasks in camp. The soldiers’ constant quest to improve their living situation provided an incentive to take the King’s tools and materials. Joseph Plumb Martin describes similar circumstances in the Revolution. Martin writes, “The soldiers, when immediately going about the building of their winter huts, would always endeavor to provide themselves with such tools as were necessary for the business (it is no concern of
the reader's, as I conceive, by what means they procured their tools... to expedite the erection and completion of their dwelling places" (Martin 1993:101). The officers were not blind to this and took action. Men cutting timber and building personal huts were to be stopped, "that there may be no stop put to the King's works" (Munsell 1857:176). Additional orders pertained to this activity. On 5 September 1759, Commissary Wilson wrote at Crown Point, "None of the Men of the Regiments to take away from the Fort any of the Hand-barrows, Wheel-barrows or any of the Tools or Timber belonging to the Fort" (Munsell 1857:151). "Borrowing" a tool for personal camp business was fairly harmless, but more serious crimes warranted more severe punishment. Lemuel Wood writes, "ye 10 [July 1759] this day one Abraham Astin who was Late Captn of ye wagons had stolen Some of ye Kings arms and working tooles was sentenced by a Cort marshall to Receive 400 Lashes" (Wood 1882:72).

Collecting, storing, and protecting the supply of tools, while still making them available to the work parties, must have kept the supply officers bustling. One order directed that 300 regulars and 200 provincials be provided for the engineers, "taking what Tools they want from the Magazine by the fort" (Munsell 1857:121). The troops maintained their own tools in the field much of the time (Wood 1882:205), but at times they delivered them up. At the Lake George camp, in the orders for 7 August 1758, Moneypenny writes, "Instead of the 20 Axes & Bill Hooks ordered above, the Piquets are to carry with them, 100, of each. Those which want sharping to be brought to camp, to be deliver'd to the artillery to be ground; the others, to be left in the charge of the Capt. of the advanc'd guard" (Moneypenny 1970[1758]:460).

It is clear that tools were indispensable for an army in the eighteenth century, whether for daily use or tactical operations. While the preceding contemporary accounts of tools and tool use come from the British side of the conflict, the French employed tools on an equal, if not greater, basis along the shores of Lake Champlain. The French used tools to build and repair Forts Carillon and St. Frédéric, carry out their successful siege against Fort William Henry in 1757, build the highly effective breastwork which defeated Abercromby, and to fortify Ile-aux-Noix. Indeed, it is likely some of the tools recovered
from the *Boscaven* have a French origin. Some tools were acquired as captured enemy equipment and were undoubtedly put to use by their new owners.

The preceding chapter has examined the necessity of tools in eighteenth-century warfare and as Europeans brought their ways of war to the New World and, specifically, to Lake Champlain. The following chapter, Chapter V, provides a general overview of possible origins and sources of the tools recovered from the *Boscaven* inasmuch as they represent a sample of the large number of tools used by both sides in the French and Indian War.
CHAPTER V

ORIGINS OF TOOLS FROM THE BOSCAWEN

It is clear from contemporary accounts how important hand tools were to effective military operations, indeed, how prevalent these items were in eighteenth-century European armies. The source, or sources, of the Boscawen's tools is less clear. Exactly how each tool arrived to the shores of Lake Champlain, and thence into the sloop, will likely never be known. However, general information is presented here as a framework for viewing the specific iron tools recovered from the ship. An educated guess about the origin of each tool recovered accompanies its description in the catalog presented in Chapter VI.

A logical place to begin a general discussion about the origin of these tools is the location of their manufacture. However, such simple, straightforward information has been most difficult to deduce. There are several reasons for this. First and foremost is the ubiquity of these tool types. As evidenced in the previous chapter, vast numbers of picks, shovels, spades, billhooks, trowels, and axes of all sizes and shapes were used by the armies of the French and Indian War. These items represented the most basic and universal products of blacksmithing technology and could be made and repaired at virtually any forge. Readily transportable and universally functional, they rarely stayed near their place of origin. This was especially true for tools which accompanied military campaigns. Tools were dispersed through the capture of enemy equipment and stores. Any gathering of items, such as the Boscawen tool assemblage, likely represents the work of several makers. The tools may have been produced in large factories in Britain or France or smaller concerns in those countries. If made in North America, the tools may have come from small forges associated with itinerant bloomeries, large iron-works, a city blacksmith or edge-tool maker, a small country forge operated by a single smith, or from military blacksmiths. Iron and steel in the tools may have originated in England, France, Germany, North America, Spain, or Sweden (Moxon 1969[1703]:13-14). The tools from the Boscawen and the raw material to make them undoubtedly came from some combination of these sources.
Research Challenges Pertinent to Colonial Iron Tools

Although popular and scholarly interest in early-American technology continues to increase, few secondary sources of information about colonial iron tools are available to the researcher. Often the sources that do exist were developed for the collector's market and basic information about artifacts (e.g., provenience, age, and context) is lacking. Many of the artifacts in these sources belong to private collectors and/or were removed from sites by souvenir hunters. Some typologies of tools do exist from archaeological excavations at colonial military sites such as Fort Ligonier, Fort Michilimackinac, Fort Stanwix, and Yorktown. However, many of these terrestrial sites were used during both the French and Indian War and the American Revolution. Determining the age of a tool excavated from these sites is difficult because the style of universal types did not change perceptibly between the wars. Indeed, some tools may have seen service in both conflicts. Excepting some diagnostic features (e.g., maker's marks, government markings such as the British broad arrow or French Fleur-de-lis, or indicative forms like the French duckbill spade), the universal nature of these tools makes the task of assigning them an absolute nationality very difficult. Harold Peterson (1968) considered the state of research into colonial military tools in the late 1960s, writing, "Students have given little attention to the entrenching tools of the Revolution. There have been no books about them, and actually little survives in the way of documentary data" (Peterson 1968:180). Although more research has occurred since this was written, Revolution-era sites and artifacts have still received more attention than those of the French and Indian War.

Numerous variations between the products of different makers, areas, and nations further confuses the matter (Kauffman 1972:15, 19). Seemingly helpful information like a maker's mark is of dubious value when faced with the prevalence of iron artifacts and numerous manufacturers. Henry Kauffman aptly summarizes the challenges of researching iron artifacts:

Despite the fact that there were so many blacksmiths in the early years of America, little is known about their personalities or their products, and notwithstanding the growing interest in tools and other objects made of iron, little research has been directed toward the subject... Possibly the most valid explanation of the lack of
interest in the blacksmith's products is that, since few of them were marked with his name, both the objects and their makers have fallen into obscurity. The most unfortunate result of this absence of identifying marks is that a collector cannot distinguish between imported objects and those made in America (Kauffman 1976:51-52).

The Boscowen tool assemblage undoubtedly represents the work of manufacturers in both the Old and New World. Although a comprehensive examination of iron production and metalworking in Britain, France, and the North American colonies is beyond the scope of this discussion, an overview of iron industries on both sides of the Atlantic is presented here. It is hoped that, in lieu of information about the specific sources of the tools from the Boscowen, the reader will better understand the potential origins of these artifacts.

Origin Option 1: British Manufacture

If a tool were made in Britain in the second quarter of the eighteenth century, the iron itself may have been domestic or imported. If domestic, the iron would likely have been produced in a blast furnace in Wales, North Lancashire, the Sheffield area, Gloucester in the Forest of Dean, the West Midlands, or the Weald of Sussex south of London (Schubert 1957:192-193). Relatively small, bowl-shaped furnaces, long used to reduce iron ore to metallic iron in the British Isles, were largely replaced by the blast furnace in the sixteenth and seventeenth centuries. The earlier small furnaces produced a carbon-rich, solid "bloom" of metallic iron which required removal by tongs. After removal, the bloom was heated in a forge and hammered, usually by hand, on an anvil. Reheating and pounding burned and squeezed the carbon and impurities out of the bloom and aligned the fibrous material into a strong bar (Kauffman 1976:3). These small, sometimes expedient bloomeries required little investment of capital and produced iron for local consumption. A decrease in the total number of furnaces in the first part of the seventeenth century surprisingly led to an increase in the total production of iron as numerous bloomeries were replaced by fewer, more efficient, blast furnaces (Schubert 1957:345). Blast furnaces processed the relatively poor iron ore found in Britain more efficiently than had the
bloomeries. Before the Industrial Revolution, the iron industries of continental nations such as Germany, Spain, and, above all, Sweden, used their possession of better iron ore to produce a product superior to that of the British iron industry (Moxon 1969[1703]:13-14, Schubert 1957:161). Blast furnaces reduced iron ore to produce liquid iron. Foundry workers tapped the furnace and allowed the liquid iron to flow into troughs, reminiscent of a sow with suckling pigs, where it cooled. The “pig” iron contained less impurities than the bloom produced at small furnaces but it was too brittle for working by a blacksmith. Accordingly, large iron works either sold the pig iron directly or sent it to a separate forge at their own premises where the pig was processed into malleable wrought iron bars. This was often accomplished with the help of a large, water-powered trip hammer (Clarke 1984:50). These “merchant bars” were themselves shipped to market like the pig iron, sold to local blacksmiths, or further refined into marketable forms such as sheet iron or iron rods for nail production. This early wrought iron was surprisingly rust-resistant because it was smelted with charcoal instead of sulfur-rich coal (Kauffman 1976:32).

If any of the tools from the Boscawen were produced in England from imported iron, that iron would likely have come from Sweden during the years preceding the Seven Years War. Although steel had been produced in Britain before the arrival of the Romans, Britons had always relied heavily on imported steel. Before the Seven Years War, large quantities of steel were still imported and most of the domestic steel production utilized imported iron bars from Sweden due to its lower cost and superior quality (Schubert 1957:326). The manufacture of cutting implements consumed much of the domestic and imported steel in Britain.

Blacksmiths were widely dispersed in Britain and, unlike the wide distribution of bloomeries, this did not come to an end with the advent of large iron works. The agricultural communities of eighteenth-century Britain relied heavily on local smiths to make and mend the tools and other hardware necessary for everyday life. All of the Boscawen tools were well within the repertoire of the such modest smithing operations, though some may have been produced by a more specialized craftsman like an edge-tool maker or cutler. Yet, large-scale production of manufactured items expanded throughout the first half of the eighteenth century because of increasing iron smelting, overseas trade,
and population growth. The consumption of manufactured goods by colonials and by the fur trade in North America acted as a strong impetus for volume production of certain iron items like axes. The manufacturing capability of Britain was exemplified by two and three story English factories turning out up to 100,000 axes a year by the mid-1700s (George Neumman 1994, pers. comm.).

**Origin Option 2: French Manufacture**

Although the French surpassed their British counterparts in the production of ornamental ironwork, French iron production remained relatively backward throughout most of the eighteenth century (Diderot 1959:notes). French iron production, often carried out by wealthy land owners, exhibited more feudal characteristics than the British system. The French refused, in the name of quality, to implement many innovations developed elsewhere. For example, the French iron industry was much slower to use coking coal in their blast furnaces. This was partly due to the fact that France did not feel the shortage of wood for charcoal as acutely as did the British Isles, and partly because the French ironmasters, who were often landowners and proprietors of forests, could afford to continue smelting ore with charcoal. However, charcoal produces a more rust-resistant product and the conservative ironmasters of France felt justified in staying with older technologies (Diderot 1959:notes). The provinces of Champagne, Nivernais, Franche-Comté, Dauphiné, Limousin, Périgord, and Normandy all contained iron ore suitable for smelting but which made poor steel (Réaumur 1956[1722]:20). France, like Britain, also imported considerable amounts of iron from Sweden. At times, Swedish pig iron cost barely more than the French domestic product (Réaumur 1956[1722]:23). Unlike the British, who used Swedish iron for the purpose, patriotism spurred the French to use local iron to produce steel. As a result, French steel could not compete with the finer British product (Réaumur 1956[1722]:xvii). The French foundry workers also differed from their English counterparts in technical imagery. Instead of a sow and suckling piglets, French blast furnaces cast a single-bar gneuse, or slut (Diderot 1959:Plate 91).

Once the raw iron was produced in pig form, further refinement at the forge to produce wrought iron proceeded much as it did in Britain. Wrought iron supplied general
blacksmiths, farriers, gunsmiths, anchor makers, ornamental-iron workers, spur makers, locksmiths, tool makers, and, occasionally, pin makers (Diderot 1959) (Figure 12). The fur trade in New France spurred the production of guns, axes, knives, awls, kettles, and other iron trade items by the thousands. As in Britain, and possibly to a greater extent, large factories sprang up in France to supply the demand in North America.

**Origin Option 3: British Colonial Manufacture**

The history of colonial metal production in the British colonies mirrors the early European development of the New World. Easy profits represented by gold, silver, and copper provided much of the initial impetus for European exploration and exploitation of the Americas. Spain and Portugal enjoyed spectacular early successes from their colonies in and around the Caribbean. However, without gold or silver, the colonies in mainland North America had to rely on steady development to make a profit and, eventually, to outpace the economies of their southern neighbors. Mundane iron provided the backbone for this success.

Iron was of critical importance to the first British colonists. All manner of iron tools, utensils, weapons, and hardware were utilized by farmers, woodsmen, carpenters, cooperers, wheelwrights, shipwrights, housewives, and soldiers. At first, all iron items were imported from England. However, tools needed maintenance and repair and other iron objects needed to be manufactured. Blacksmiths to do this work were soon provided.

Exactly when the first iron was produced from ore in the colonies has not been firmly established. Small bloomeries were probably used to smelter small quantities of iron for use by the early Jamestown colonists; a forge was operating at that site in 1620 (Mulholland 1981:20). After a raid by local tribes destroyed the blast furnace at Falling Creek, Virginia, in 1622, large-scale colonial iron production was postponed until ironworks were constructed at Braintree and Saugus, Massachusetts, in the mid-1640s. The furnace, forge, and slitting mill at Saugus produced pig iron, cast iron wares, wrought iron bars, and finished wrought iron goods for thirty years. Before and after their closure in 1676, the Saugus works spurred other colonial ironwork ventures. These attempts originally focused on the Chesapeake Bay area and then spread to eastern Pennsylvania.
(Mulholland 1981:55). The initial efforts to produce iron haphazardly started and stopped, but other developments would soon put colonial iron manufacturing into high gear.

By the outbreak of the War of Spanish Succession in 1703, known as Queen Anne's War in the colonies, Britain began to feel an acute shortage of iron. Because wood charcoal was the only energy source in standard use to smelter iron, deforestation had begun to seriously curtail production of the strategic metal. Although mercantilist doctrine dictated suppression of colonial manufacturing capabilities, this policy was tempered in England by a desire to escape from dependence on foreign iron. At the beginning of the eighteenth century, nearly two-thirds of the bar iron used in England was imported from Sweden alone (Mulholland 1981:62). In addition to domestic needs, Britain's colonies in the Americas also demanded iron for their growing economies. Textiles and iron hardware were the leading exports to the colonies (Perkins 1988:24). A brief embargo on Swedish goods in 1717 and 1718, and increasing political and military threats to the European supply of iron, revealed to parliament the folly of such a dependence on foreign iron when America possessed an abundant supply of ore, wood for charcoal, and flux.

Colonial iron production was piecemeal after the closure of the Saugus works and much of the production had reverted back to small bloomeries and forges, however, the situation in Europe provided a strong incentive to develop large scale colonial production once again. Beginning in 1718, investors on both sides of the Atlantic spurred the establishment of colonial ironworks. Initially, these new enterprises shared the same goals as their seventeenth-century predecessors, to sell raw iron to England, but by the 1740s the intent of colonial production had changed to supply the American market (Mulholland 1981:100). From an annual output of 1,500 tons in 1700, approximately 2 percent of world output, colonial production rose to nearly 21,000 tons, approximately 15 percent of world output, by the beginning of the Revolution (Perkins 1988:25). It did not take long for this marked increase to draw legislative attention.

Although it encouraged production of iron in the colonies, the mother country wanted only the raw pig iron. It did this to assure that British manufacturers enjoyed the privilege, and profits, of fabricating finished products (Perkins 1988:25). Colonial demand for imported goods was especially high for nails, farm tools, firearms, and cutlery. Much to
the chagrin of the mother country, these were the same items colonial ironworks strove to produce (Mulholland 1981:108; Bridenbaugh 1990:18). Accordingly, in April 1750, King George II signed the Iron Act of 1750. Specifically, the title was *An act to encourage the Importation of Pig and Bar Iron from His Majesty's Colonies in America; and to prevent the Erection of any Mill or other Engine for slitting or Rolling of Iron; or Plating Forge to work with a Tilt Hammer; or any Furnace for making Steel in any of the said Colonies.* The Act, as the name implies, consisted of two parts: The law eliminated all customs duties on raw iron shipments to England (London) and simultaneously forbade the construction of colonial facilities capable of producing finished products (Mulholland 1981:106-107).

While the colonial manufacturers readily accepted the reduction of tariffs on their raw iron, active ignorance of the ban on fabricating shops was rampant throughout the colonies. Charged with enforcing the new law, many colonial governors covertly defied the prohibition by filing ambiguous and inaccurate reports to cover new works.

The capabilities of the colonials to make finished iron goods continued to expand. Large iron works increased in number, as did the smaller forges and bloomeries which required far less capital to initiate. Simultaneously, the capability of the expanding colonial economy to absorb domestic production of iron utensils, tools, and implements increased as well (Mulholland 1981:108). However, increased capabilities still failed to fill the colonial needs of finished items like farm tools, axes, and nails and these items were prominent in merchants' importation lists throughout the colonial period (Bridenbaugh 1990:18). With colonial consumption accounting for over one-half of British wrought iron exports, it was becoming clear that the colonial market was growing fast enough to support both the British and domestic iron industry (Perkins 1988:26).

Some of the larger colonial iron works in operation during the French and Indian War were located in New York. Philip Livingston started New York's first large iron works on Ancram Creek in the mid-1740s. These works were situated midway between a rich ore deposit at Salisbury, Connecticut, and the transportation route represented by the Hudson River. Carts carried ore from the mine to the works and iron products from the works to the Hudson where they were loaded on vessels bound for New York City. The *New York Weekly Journal* carried the following advertisement on 2 April 1744:

The “orehill” near Salisbury supplied the principal refiners and secondary iron works in both New York and Connecticut (Bridenbaugh 1990:45; Mulholland 1981:105). Other furnaces began to take shape shortly after the beginning of the Ancram Works. In blatant disregard for the Iron Act of 1750, larger works were established in 1752 at Sterling, New York (Mulholland 1981:105). Together, these two facilities supplied raw pig iron and more refined bar iron and rods to market in New York City, to secondary works in New York and eastern Connecticut, and to blacksmiths throughout the region. With a wide range of European, British, and colonial origins possible, it will probably never be known for certain where the iron in the Boscanen tools came from without chemical analysis. However, if any of the tools were produced from North American iron it was likely smelted in the Ancram or Sterling furnaces.

The production process for iron was the same on both sides of the Atlantic. Small furnaces produced a carbon-rich solid bloom but larger iron works, such as the Livingston or Sterling works, produced pig from liquid iron. The pig iron was sold or further processed into bar iron at or near the furnace, in large iron works, or at a separate secondary facility, such as those in eastern Connecticut. Once in bar shape, the wrought iron was shipped to market, further processed at the iron works, or sold to blacksmiths locally.

The utile characteristics of iron, having been recognized for millennia, found a ready home in the colonies among a plenitude of tasks and requirements associated with the new land. In addition to clothing, prospective settlers to the first colonies were counseled to bring with them arms, tools, and household implements made of iron (Mulholland 1981:26). The need to first repair and, subsequently, to manufacture these items fell to the colonial blacksmith. Blacksmiths played a significant role throughout the colonial period. No community could thrive without access to the services and products of the blacksmith and these men were actively recruited by settlements (Kauffman 1976:51). According to James
Mulholland (1981:83), general blacksmiths, with their forges and anvils, could be found in every small town throughout the colonies. One survey of metal craftsmen inhabiting a rural Pennsylvania county from 1750 to 1800 noted 1 brass-founder, 4 nailers, 1 edge tool maker, 1 tinsmith, 34 wheelwrights, and 104 blacksmiths (Kauffman 1976:51).

The essential products of general blacksmiths were also needed by city dwellers, but cities also provided the larger markets needed to support specialized metal craftsmen like coppersmiths, braziers, founders, anchor forgers, farriers (paved city streets required more horseshoes), edge-tool makers, cutlers, and whitesmiths who worked in tin, pewter, and silver. Most of the tools and other iron fittings found on the Boscawen were within the repertoire of any common blacksmith. However, some of the cutting tools may have been produced by an edge-tool maker. Edge-tool makers specialized in all kinds of axes and hatchets, adzes, chisels, planes, draw knives, froes, cleavers, and other relatively robust cutting implements. These craftsmen also produced shovels and hoes on occasion and, perhaps, billhooks and fascine knives as well. The Iron Act of 1750 enumerated rolling and plating mills which produced sheet iron (Hanson and Haue 1975:98). The iron shovel, spade, and trowel recovered from the Boscawen may have utilized such sheet iron in their construction. Cutlers produced and imported all manner of items including, but not limited to, the following: cutlery, tableware, butcher's knives, surgeon's implements, razors, lancets, scissors and shears, sickles, scythes, and swords (Kauffman 1976:95-99).

There was undoubtedly much overlap among the products and services of those metal craftsmen who worked with iron. This was especially true between the general blacksmith and the edge tool maker, and between the edge-tool maker and the cutler. There was often no distinction. However, the relative use of steel increased from the blacksmith to the edge-tool maker and from the edge-tool maker to the cutler. Before cast steel became readily available in the nineteenth century, all three occupations used blister steel. Steelers made blister steel by surrounding iron bars with charcoal dust in a sealed furnace and then heating the whole to a desired temperature (Kauffman 1976:92). This labor-intensive process took a week and necessitated folding and forging to evenly distribute the absorbed carbon. Steel had to be imported throughout nearly all of the
colonial period and it was only after the French and Indian War that it began to be produced in quantity near Philadelphia and New York (Mulholland 1981:83).

The scarcity of steel precluded full scale production for colonial edge tool makers and cutters. These men often offered an assortment of imported items to supplement their businesses. Most steel went to the production of edge tools and other cutting implements (Kauffman 1972:19). Although the cutting edge of an iron tool can be case hardened or tempered at the forge, an all-iron blade quickly wears with use. To remedy this, many edge-tools combined cheaper and malleable wrought iron in the body of the tool with a hard, but brittle, steel bit. The metal craftsman sandwiched a wedge of steel between two halves of an iron blade at manufacture or “laid” steel on one side after the first steel had worn out. Many of the cutler’s products were finer and could be made entirely of steel.

**Origin Option 4: French Colonial Manufacture**

Although iron ore was discovered relatively early in the colonization of New France, the iron industry got off to a slow start, and developed sporadically, only when the Treaty of Utrecht produced a period of peace from 1713 to 1743 (Lanctot 1965:196). Iron ore was discovered near Three Rivers in 1670 but the first attempt to exploit this resource was not until 1732. That year, Poulin de Francheville acquired royal permission and a subsidy to establish the St. Maurice Iron Works (Lanctot 1965:114). Barely in operation, the works closed down the following year upon the death of Francheville. A new company restarted the works in 1737 and produced nails, axes, iron pots, stoves, and shipbuilding hardware for six years. A victim of poor management, the company declared bankruptcy and reverted to the royal ownership. Managed for the crown, the works reopened and, by 1747, was producing between 300,000 and 400,000 pounds of iron a year (Lanctot 1965:114). That same year saw the first production of cast cannon balls and a few iron cannon but the works only occasionally turned a profit for the king.

Iron production was always a tough proposition. Enormous outlays of capital were required to build, man, supply, and maintain iron works and the line between success and failure was slim. These vagaries were compounded in New France. At one-fifteenth the population of the British colonies, and with little agriculture, the lands along the St.
Lawrence did not produce a sufficient market for domestic iron. New France always relied heavily on supplies from the mother country and a large part of these were iron manufactured items. The French bested the British in one regard when it came to metal working in the New World; the French were quick to honor their Indian allies' requests for blacksmiths. As iron replaced traditional materials for essential items, the tribes needed those with the expertise to repair these items. Living at some of the larger settlements, blacksmiths became unofficial emissaries, translators, and, at times, spies for the leaders of New France (Woodward 1946:8).

**Colonial Ironware Distribution**

Between manufacture and their arrival at Lake Champlain, the *Boscawen's* tools may have traveled several routes.

If a given tool were produced in Britain, it may have been purchased directly by the British Army from the manufacturer or a secondary distributor. The tool would have then been sent to the New World in cargo ships accompanying troop deployments. Lists of the equipment which accompanied Braddock on his ill-fated voyage to the Americas included numerous tools such as those found on the *Boscawen* (Table 4). If a tool on the ship were of French origin, it would likely have accompanied the troops of the Marine as they journeyed across the Atlantic to New France.

Instead of "importing" their own, the British regular forces may have purchased the tools from colonial sources. A colonial source seems less likely if a given tool were French because the manufacture of finished goods like tools in New France lagged behind that of the British colonies.

Two groups were responsible for the distribution of such goods in the British colonies: traders and merchants (Perkins 1988:123). Traders were retailers only and merchants were a combination of retailer and wholesaler. On average, small traders supplied the retail needs of remote frontier areas. Small-town merchants acted as suppliers to the far-flung traders and acted as retailers in their own area. Merchants in larger coastal cities supplied the entire distribution network, and often managed long chains of credit, ultimately financed by merchants and manufacturers in England (Perkins 1988:124). The
largest mercantile concerns were separated into those supplying provisions to the West Indies trade, and those concentrating on the importation of dry goods from Britain (Perkins 1988:125). The latter group relied more heavily on British-owned shipping and, because their suppliers in Britain used fractional interests to hedge their bets on the risky trans-Atlantic trade, the colonial merchants rarely specialized in any single line of goods (Perkins 1988:124, 126). Tools on the *Boscawen* may have arrived in assorted lots in British bottoms, military or civilian, or may have been supplied to colonial merchants by colonial manufacturers.

The tools may also have been supplied to provincial troops from the regular army stores or purchased by provincial governments with the understanding that they would receive compensation from the British Parliament. The colonies raised troops for their own defense throughout the colonial period, with compensation usually arriving at the end of the campaign season or the following year. In a letter dated 30 December 1757, William Pitt promised compensation if the colonial governors raised provincial troops for the ill-fated 1758 season:

> The King is further pleased to furnish all the Men, so raised as above, with Arms, Ammunition, and Tents, as well as to order Provisions to be issued to the same, by His Majesty’s Commissaries, in the same Proportion and Manner as is done to the rest of the King’s Forces: A sufficient Train of Artillery will also be provided, at His Majesty’s Expense, for the Operations of the Campaign...The Whole, therefore, that His Majesty expects and requires from the several Provinces, is, the Levying, Cloathing, and Pay of the Men; And, on these Heads also, that no Encouragement may be wanting to this great and salutary Attempt, the King is farther most Graciously pleased to permit me to acquaint You, that strong Recommendations will be made to Parliament in their Session next Year, to grant a proper Compensation for such Expenses as above (Pitt in Jennings 1988:362).

Although tools are not specifically mentioned, this letter seems to indicate that such equipment would be purchased and/or supplied to provincial troops by the British
government. In some instances, however, colonial troops may have been supplied tools and equipment from their own colony; the colony then expecting reimbursement from the Crown (Frank Kravic 1994, pers. comm.). In either instance, the tools may have been imported or of domestic manufacture.

The construction of three large vessels and two forts along the shores of Lake Champlain demanded large numbers of tools in the summer of 1759. In preparation for building the *Duke of Cumberland* and *Boscawen*, Captain Joshua Loring purchased materials necessary for ship construction at Albany and New York. Perhaps shipwright’s and ship carpenter’s tools were included in his shopping list. These men and their tools were badly needed. On 27 August 1759, Captain Thomas Ord forwarded a requested to Loring that lumber and “Ship Carpenters with their tools” be sent to Ord at Crown Point in order that he might complete the radeau *Ligonier* (Public Records Office [PRO], Record Group 34, Volume 42, No. 208). The British Army, in the person of a Mr. Russel, definitely purchased tools from private sources in Albany during this period of heavy construction (Table 7).

The army was also capable of manufacturing its own tools. Blacksmiths attached to the British Army were apparently extremely busy in the summer of 1759. Along with the tools he purchased in Albany, Mr. Russel also purchased the following blacksmith’s equipment: 1 anvil, 1 bellows, smith’s rubbers, and 1 large standing vice (Table 7). Additional blacksmithing material sent to Ticonderoga and Crown Point included fagots of German and English steel (Table 6). The same inventory containing the steel included instructions to forge 20 drag chains, 48 draw knives, 18 froses, 50 mason’s trowels, and to increase the weight of 40 mason’s hammers by two pounds (Table 6). Blacksmithing equipment found around Fort Ticonderoga during its reconstruction includes: several anvils, broken fire tongs, hammers, grindstones and whetstones, and one blacksmith’s “field” vice which could be fixed to a tree or stump. Interestingly, froses, draw knives, trowels, and drag chains have also been recovered from the site (Pell 1949:165, 169).
British Broad Arrow Markings

The general consensus among parties interested in colonial iron artifacts is that the presence of a hot-stamped broad arrow on a tool would tend to indicate British manufacture. Conversely, a cold-chiseled broad arrow, or no markings of the crown, would likely indicate a colonial product (Frank Kravic 1994, pers. comm.; Jay Gaynor 1996, pers. comm.; Jim Hasket 1996, pers. comm.). A hot-stamped broad arrow may also indicate a domestic forge under contract to the army and a broad arrow may have been cold-chiseled into a domestic or imported tool upon its purchase (Frank Kravic 1994, pers. comm.; Ivor Noël Hume 1996, pers. comm.). Even if it could be ascertained whether the few broad arrow markings exhibited in the Boscawen assemblage were hot- or cold-chiseled, the information would be of dubious value as to the question of ultimate origin.

French Army Sources

To further complicate matters, some of the tools probably arrived on board the Boscawen from French sources. The British took tools from the captured French fortifications at both Crown Point and Ticonderoga in the summer of 1759. On 10 August 1759, Major Thomas Ord of the Royal Artillery reported to Alexander Moneypenny the return of French ordnance and stores taken from Forts Carillon and St. Frédéric. Included in large amounts of artillery paraphernalia were the following: “intrenching tools, felling axes 100; pick axes 8, hoes 232, sledges 2” (Moneypenny 1932[1759]:252). A month later, based on information given by French prisoners, Amherst reported that the British dug into the works at Fort St. Frédéric and located iron “kettles, tools &c” (Amherst 1931:165). Some of these tools may have themselves been captured from the British upon Braddock’s defeat of 1754, Munro’s defeat at Fort William Henry in 1757, or from other British reverses during the first years of the war.

Additionally, the Boscawen was used in 1760 to ferry guns, matériel, and miscellaneous scrap iron from the captured French fort at Isle-aux-Noix to Crown Point. When they abandoned the works, the French left 77 pieces of unsiked ordnance, 2,586 rounds of shot, and a great deal of equipment (Lee 1969:17). Amherst elected to destroy
the enemy works and recover any usable materials. After visiting the island, he drafted the following orders for 12 October 1760:

I have ordered the works of the Isle au Noix to be raised & leveled, and all the artillery & stores of all kinds are to be sent to Crown Point. Whatever there you may have with you of the Royal Artillery that are not wanted for taking the Radeau to Crown Point, I would have you order to remain at the Isle au Noix, to prepare everything belonging to the Artillery for Embarkation and I shall order the Boscawen sloop to be Loaded on the return from St. Johns, and other vessels shall be sent from Crown Point to take in the whole that will be transported to that Garrison, that nothing may be left in the winter at the Isle au Noix except a house to lodge a few Rangers (PRO 34/42/280).

On the same day, Amherst continued with specific orders for the Boscawen's commander. Amherst writes, "The officer commanding the Boscawen sloop will on his return from St. Johns stop at the Isle au Noix and apply to Col. Thomas commanding there that the sloop may be loaded with Artillery, Ammunition, and Stores of any kind which Col. Thomas has my orders to Crown Point, and when the sloop has taken in her full lading, the Officer Commanding the sloop will proceed with the same to Crown Point" (PRO 34/42/281).

Anything useful was loaded on board the Duke of Cumberland, Boscawen, and other vessels for the trip to Crown Point. This included cannon, artillery stores, cheueux-de-frise, wheelbarrows, boards, planks, platforms, and a "quantity of iron of all kinds". (PRO 34/51/97, 98). Iron in all forms was considered a useful substance worth retrieving. Lieutenant Adolphus Benzell reported to Amherst the following passage: "The Great & Littel Radeaux's with the Brigh and Skooner (which the Easterly winds have hindered their arrival) Left [Ile-aux-Noix] the 20th [October 1760], Loaded with Colonel Haveland's Light Artillerie, and with the Cannon, quantity of Iron & Other Artillerie stores taken from the Enemy there. [The?] two vessels were mostly taken up with Regimental Baggage of the 22nd & the others Loaded with Planks, Bords, utensiles and Old Iron" (PRO 34/51/97).

British officers expressed disappointment at not being able to extricate the large chain which
the French had used to block the east channel at Isle-aux-Noix, for it represented more than a ton of iron (PRO 34/51/98). Iron may have been more scarce when the French still held the island. In May of 1760, as Bougainville struggled in vain to make the position defensible, his men complained of poor rations, valueless paper money, and poor iron tools (Bougainville 1895[1760]:140). Some of these poor tools may have been part of the scrap iron loaded onto the Boscawen after the French defeat.
CHAPTER VI

CATALOG

The tool assemblage from the Boscawen is not large, but it is quite diverse for its size. This chapter presents a full inventory of this assemblage. Unlike some artifacts, buttons for example, there are not multiple examples of each type. In fact, the set of tools from the ship primarily consists of one example of each type; thus it is possible to present descriptions of the specific tool and pertinent background information in one catalog listing. How these tools were likely employed during the French and Indian War was covered at length in Chapter IV and, unlike some artifact classes, most of these tools are self-explanatory. Hence, a lengthy description of their use is unnecessary. Their potential use on the Boscawen, however, is discussed in the catalog descriptions below. Text accompanying each catalog listing contains the recovery-location, details and dimensions of the artifact itself, a brief examination of the tool type and comparable examples found at contemporary terrestrial and nautical sites, and options for why the tool was located on Boscawen. A discussion of the distribution of the tools within the hull of the Boscawen follows the catalog.

Although there is usually only one example of a given tool, the tools themselves fall into three classes: (1) digging tools, often referred to as miner's tools in contemporary accounts; (2) cutting tools, often referred to as pioneer's tools in contemporary accounts; and (3) construction tools, whether for working in wood, metal, or stone. A fourth category includes iron objects which may be tools but are probably hardware or scrap.

Digging Tools (Miner's Tools)

Digging tools recovered from the Boscawen, also known as entrenching tools or miner's tools, include a pick-mattock complete with helve, a shovel blade, a spade blade, a shovel or spade socket, and a fragmented wooden "shod" shovel.
1. Pick-Mattock

03-546 PICK-MATTOCK HEAD, 02-419 HELVE
FIGURES: 13, 14, and 15
UNIT: 308 level F
MATERIALS: Iron, Wood (Ash)

DIMENSIONS (Head):
- Overall length 20 in. (50.8 cm)
- Overall width 2-3/4 in. (6 cm)

DIMENSIONS (Helve):
- Helve length 37 in. (94 cm)

DIMENSIONS (Wedge):
- Wedge length 2-7/8 in. (7.3 cm)
- Wedge width 1 in. (2.5 cm)

This pick-mattock was the largest complete tool recovered from the *Boscawen*.

Closely resembling the design and construction of modern pick-mattocks, this complete artifact consists of three parts: (1) an iron head; (2) an ash handle, or helve; and (3) a wood wedge to hold the head in place.

Twenty inches long, the head consists of a 9 in. (22.9 cm) pick point, a 3 in. (7.1 cm) socket, and an 8 in. (20.3 cm) mattock blade. The pick point tapers to a point and the mattock blade flattens and flares to a width of 2 in. (5 cm). The eye is formed by thin cheeks and its shape clearly demonstrates the origin of the name. Although nearly 2-11/16 in. (6.8 cm) long, the eye is presumably designed for an oval helve top with a 2 in. (5 cm) maximum dimension. In order to grip the top of the helve, the width of the eye tapers from 1-7/8 in. (4.2 cm) at the top to 1 5/8 in. (4.1 cm) at the bottom. The top of the cheeks are slightly rounded and protrude 1/2 in. (1.3 cm) above the top line of the head. The bottom of the cheeks form rounded ears which extend a maximum of 3/4 in. (1.9 cm) down the length of the helve.

It is likely that two pieces of iron were forged to make the head. The separate pieces were welded together around a mandrel to form the socket and shaped at the ends to form the pick point and mattock blade. Hammer marks are still visible on the top of the blade. A damaged maker’s mark and a poorly-struck British broad arrow can be seen on the bottom of the blade one-third of the way down its length from the socket. The maker’s mark consists of raised letters in a rectangular indentation. One letter is a clear “N” but the other letter is damaged. The second letter appears to be either a “W” or “M”, for a maker’s
FIGURE 13. Pick-mattock head (03-546).
FIGURE 14. Pick-mattock helve and wedge (02-419).
FIGURE 15. Complete pick-mattock as found. (Drawing by Scott Cooper).
mark of "MN" or "NW". A nearly identical example of this style of maker's mark is exhibited on an axe in the private collection of Robert Wheeler. Ironically, the mark is a clearly struck "NM" or "WN" and offers little towards resolving the issue of the questionable letter on the pick-mattock from the Boscawen. Unfortunately, no provenience information accompanies the illustration of the axe (Wheeler 1957:129). A small broad arrow indicating the tool was the property of the British government is located near the maker's mark. The broad arrow is not symmetrical and is either damaged in the same manner as was the maker's mark or was unevenly struck. The rough broad arrow may indicate that the tool was produced by a commercial manufacturer in Britain or in the colonies under contract to the army, the arrow being hastily struck on a "civilian" tool to meet the demands of the contract (Noël Hume 1996, pers. comm.). The arrow may also have been cold-chiseled into the tool by the British army after its purchase from a European or colonial source.

The helve, or handle, is a single piece of ash. The top of the helve is a split 3 in. (7.6 cm) segment which is oval in section and exhibits a slight flare. It is 1-1/2 in. (3.8 cm) wide where it meets the main shaft and flares to 1-3/4 in. (4.4 cm) at the top. This flare obviously matched the flared interior of the eye when the wedge was in place but subsequently compressed after the artifact was disassembled for conservation. The top is 1-7/8 in. (4.2 cm) across along the axis of the head and there is no pronounced flare. There is a gouge or crushed area below the mattock blade where the top meets the main shaft. There are other dents and gouges on the shaft within a few inches of the head. The deepest impressions are on the side below the mattock blade and may be damage sustained when the tool was being used to cut roots. The main shaft is round and 33-1/2 in. (85.1 cm) in length. Although it is wider at the top and tapers to a point at the bottom, the shaft diameter averages 1-3/16 in. (3 cm). The surface of the shaft may have been considerably eroded (Kevin Crisman 1996, pers. comm.). The helve is slightly warped, probably from its 220 year interment, and has the appearance of a natural ash stick. This gives the helve the appearance of being an expedient field replacement. Parallel end grain, however, is clearly visible and the helve was obviously formed from a larger section of ash and is not natural round stock. This helve may have been the original one supplied with the tool or may have been a replacement.
Spare helves for tools were included in contemporary lists of army stores (Table 2 and Table 3) and spare pickaxe helves were specifically mentioned on occasion (Table 1 and Table 4). Spare helves were also illustrated in contemporary drawings of tools used in fortification and siege warfare (Figure 11). Perhaps the type of round pick helve represented in the Boscawen assemblage was particularly prone to breakage.

The last separate piece of the pick-mattock is the wooden wedge used to spread the top of the helve inside the eye of the head. The wedge is 1/2 in. (1.3 cm) thick at the top and tapers to a thin edge. The complete wedge was presumably 2 in. (5 cm) wide; approximately half of the width remains. The other half may have been lost in use or while the tool lay within the Boscawen at the bottom of Lake Champlain.

Picks, half-picks, pick-axes, pick-mattocks, mattocks, mattock-axes, hoes, and pick-hoes for loosening and moving dirt and cutting roots have been located at many colonial military sites (Neumann and Kravic 1989:267; Pell 1949:165). Just like today, some of these names were used interchangeably to describe such universal tool types. These tools were used in great numbers in fortification, siege work, and fatigue duties, and were often accidentally lost or, occasionally, intentionally buried by troops during the colonial wars (Peterson 1968:181-183). Two picks closely resembling Boscawen's pick-mattock head were located at Fort Stanwix (Hanson and Hauser 1975:100-101). Unfortunately, Fort Stanwix was used during both the French and Indian War and the American Revolution and a definite age cannot be assigned to picks found there.

The pick-mattock was the only tool recovered from unit 308. Excavation unit 308 was located directly amidships on the starboard side of the Boscawen's remaining hull. The good condition of the pick-mattock, and the presence of the British broad arrow, indicates that it was not scrap iron picked up from the French fortifications at Ile-aux-Noix. Picks are not the type of ship repair and maintenance tools usually recovered from shipwrecks. It is difficult to imagine a use for such a tool on a ship and, unless the crew was using it on land for some unknown purpose, the pick-mattock was likely cargo for the British army.
2. Shovel Blade

03-098 SHOVEL BLADE

FIGURE: 16

UNIT: 413 level G

MATERIAL: Iron

DIMENSIONS: Overall length 13-7/8 in. (35.3 cm)
Overall width 10 in. (25.4 cm)
Blade length 9-3/8 in. (23.8 cm)
Outside socket diameter 1-7/8 in. (4.7 cm)
Inside socket diameter 1-9/16 in. (3.9 cm)
Average thickness 1/8 in. (.3 cm)

Although the terms shovel and spade are often used interchangeably, for the purposes of this discussion I define shovels as dished and spades, whether round-nosed or square, as flat. The shovel blade closely resembles modern shovels in construction but is slightly wider and more rounded. The socket protrudes 4-1/2 in. (11.4 cm) above the blade and extends into the blade roughly 4 in. (10.2 cm). The blade itself is dished approximately 1 in. (2.5 cm) and is cracked along the length of the socket. The crack accelerated corrosion and some material has been lost along its length and corrosion has also eroded the shoulder of the blade on one side. There are no foot platforms along the shoulders of the blade. The blade was riveted to the helve with a bolt or nail which pierced the socket from front to back. This fastener may have gone all the way through the socket or terminated inside the helve. The remaining hole on top is 1/4 in. (.6 cm) in diameter but the bottom hole, if it existed, may now be an extension of a hollow at the back of the socket. Metal which once separated the bottom hole from the hollow may have eroded due to wear and/or corrosion.

Many contemporary shovels and spades had two sheets of iron riveted or welded together to form the socket, but this shovel is formed from a single piece. The blade shape and socket were cut from sheet iron and the top was hammered over a mandrel and lap-welded to form the round socket. In modern steel shovels the socket is often not welded and the two halves are held together by a bolt passing through the sides of the socket. Nearly all illustrations and examples of contemporary shovels and spades exhibit a front-to-back bolt. This arrangement undoubtedly strengthened two-piece sockets but also suggests
FIGURE 16. Shovel blade (03-098).
that all of the sockets formed from one sheet of iron were welded at the back. A
disarticulated iron spade or shovel socket (03-484) from the Boscawen assemblage has a
hole in the front but not in the back (see below).

A shovel excavated at Yorktown and on display at the Smithsonian Museum of
American History exhibits the degree of dishing found in modern shovels and the shovel
from the Boscawen. Another dished shovel was recovered from the waters below Mount
Independence and Fort Ticonderoga in 1993 (McLaughlin 1993). However, most of the
digging tools recovered from camps, forts, and battlefields of the French and Indian War
and the Revolution are flat spades with a round-nosed, square, trapezoidal, or rectangular
shape (Peterson 1968:180-184; Grimm 1970:89, 144-145; Hanson and Hsu 1975:98-100;
Neumann and Kravic 1989:94, 268). French-style duckbill-shaped spades have also been
recovered from excavations in the Champlain Valley and at Fort Niagara (Neumann and
Krvic 1989:268; Dunnigan 1986:110). The shovel from the Boscawen is unusual among
its contemporaries, however, due to its dished shape. The profile is similar to spades
excavated from colonial sites in the Champlain Valley (Neumann and Kravic 1989:268) but
it is most similar in size and proportion to a flat spade excavated from Yorktown and
believed to be standard French issue (Peterson 1968:181-182). French shovel patterns may
have been broader than British patterns.

The shovel may have been used on board the Boscawen to spread sand for cleaning
the decks or to move ballast. It may have also been used to collect these materials and
perform other fatigue duties of the crew while ashore (Crisman 1985b:393). Most likely,
however, the shovel was not a viable tool when brought aboard the ship. The cracked
shovel was stacked atop a broken spade (03-111) and shares its shape with French spades
recovered at Yorktown. Although the British did recover viable tools from captured French
sites, the shovel was probably picked up as scrap iron from the French works at Ile-aux-
Noix in 1760.
3. Spade Blade

**SPADE BLADE 03-111**

**FIGURE: 17**

**DIMENSIONS:**
- Overall length 9-1/2 in. (24 cm)
- Overall width 9-1/2 in. (24 cm)
- Average thickness 1/8 in. (3 cm)

Although the spade has a profile similar to the shovel, I refer to this artifact as a spade because it is smaller, has straighter sides, and exhibits so little dishing across its width, less than 3/16 in. (.4 cm), that it is practically flat. The socket has broken off and the blade is cracked and eroded along one shoulder, the cutting edge, and inside the blade itself. A bulge forming the end of the socket extends into the blade approximately 2-1/2 in. (6.3 cm). There is no foot platform on either shoulder.

As previously discussed, round-nosed spades similar to the example from the *Boscawen* have been recovered from many colonial military sites. Two spades, identical to each other but larger and with a sharper point and shorter socket than the example from the *Boscawen*, were recovered from Forts Ligonier and Stanwix (Hanson and Hsu 1975:99-100; Grimm 1970:89, 144). A two-piece spade with the same profile as those recovered from Forts Ligonier and Stanwix was recovered from the waters below Mount Independence near Fort Ticonderoga in 1993 (Mul holland 1993). A large, rounded spade was recovered from the trenches at Yorktown (Peterson 1968:181, 182). Other round-nosed and pointed flat spades have been recovered from military sites in the Champlain Valley (Neumann and Kravic 1989:268; Pell 1949:163). A spade similar to the *Boscawen* example was recovered from a French and Indian War or Revolutionary War camp in the Champlain Valley (George Neumann 1996, pers. comm.). Alas, little information is available about this particular spade.

The shovel and spade blades may have been used by the crew of the *Boscawen* aboard their ship or on shore but this seems unlikely. The two damaged blades were found stacked together in unit 413 and a spade or shovel socket was found separately in unit 410. The separate socket (03-484) may or may not be associated with the spade blade, but all three artifacts were likely miscellaneous scrap iron brought on board the *Boscawen* after the
FIGURE 17. Spade blade (03-111).
fall of Ile-aux-Noix. This theory is strengthened by the shape of both the shovel and spade which are similar to French tools recovered from Yorktown (Peterson 1968:182). The closest example of this artifact recovered on land may have come from a French site from the French and Indian War, a British site which included captured French tools, or an American site from the Revolution where the tools were supplied to the Americans by their French allies.

4. Shovel/Spade Socket

SHOVEL/SPADE SOCKET 03-484

FIGURE: 18

UNIT: 410 level F

MATERIAL: Iron

DIMENSIONS:
- Overall length 3-11/16 in. (9.3 cm)
- Outside diameter 1-3/4 in. (4.4 cm)
- Inside diameter 1-1/2 in. (3.8 cm)
- Width at break 1-7/16 in. (3.6 cm)

This socket is from a spade or shovel cut and lap-welded from a single piece of sheet iron. The socket was secured to a wooden handle with a nail which passed through the front and top of the socket but did not continue through the back side. The hole for this fastener is 3/16 in. (.5 cm) by 1/4 in. (.6 cm) and presumably contained a nail which was rectangular in cross section at the head. The socket broke from its blade where the socket and flat blade connect. It is interesting to note that the hollow behind this socket and the socket of the shovel (03-098) formed to the same side of the centerline. Both sockets also exhibit a bulge at the front just above the top of the blade. This bulge may have been created by the mandrel over which the tool was formed.

The socket was the only tool or tool fragment recovered from unit 410. The socket may be associated with the spade blade, although it was located over 16 ft. (4.9 m) forward of the spade and shovel. The socket appears to be the correct size for the spade but the breaks do not match and the flare at the break of the socket seems too pronounced to have fit the straight top of the spade blade. The fatigued metal in the area of the break may have been more susceptible to corrosion processes. This corrosion may have destroyed the fit between the two pieces if they did come from the same tool. It seems most likely, however,
FIGURE 18. Broken socket from a shovel or spade (03-484).
that the shovel, spade, and socket were distinct objects brought aboard as scrap iron from Ile-aux-Noix.

5. T-Handle

SPADE T-HANDLE 02-368

FIGURE: 19

UNIT: 509 level G

MATERIAL: Wood (Ash)

DIMENSIONS: Overall length 5-1/2 in. (14 cm)
Overall width 1-1/2 in. (3.8 cm)
Overall height 2 in. (5 cm)

This artifact was initially identified as a cleat and was the only tool part found in excavation unit 509. It formed the T-shaped crosspiece on top of a short-handled iron spade or shovel, or a wooden “shod” shovel (see below). This crosspiece was attached to the main shaft of the handle via a pegged mortise-and-tenon joint. Slightly trapezoidal in section, the mortise is 1-1/4 in. (3.2 cm) in maximum length and 5/8 in. (1.6 cm) in width. The deepest remaining corner of the mortise is 13/16 in. (2.1 cm) deep. Approximately one-third of a 3/8 in. (1 cm) diameter wooden peg, which originally secured the tenon within the mortise, still remains in the side of the handle. The peg may have been sheared off when the two parts of the handle broke. This peg was itself secured with a thin wedge pounded into the end and a small wood shim along the side. The mortise was secured to a tenon which extended from a platform on top of the handle shaft. The top end of the handle shaft presumably flared to form the platform and to smoothly extend the curved sides of the crosspiece. Much of the mortise and flat surface at the bottom of the crosspiece have broken and/or eroded away.

T-shaped handles on spades and shovels were commonly illustrated in contemporary treatises on artillery, fortification, and siege work (Figure 7 and Figure 9). This particular artifact may have been part of a handle to the spade or either of the shovels, iron and wood, found on the Boscawen. It is not associated closely with any of these items but such a small, light object could have easily been displaced. However, the broken crosspiece was probably left over from a group of tools brought aboard as cargo. It does not appear to be
FIGURE 19. Wooden T-handle crosspiece (02-368).
the type of object that would have been collected along with scrap iron from Ile-aux-Noix but there is no way to know this with certainty.

6. Wooden “Shod” Shovel

02-215 WOODEN “Shod” SHOVEL

UNIT: 411 level I and level J

FIGURE: 20

MATERIAL: Wood (Ash)

DIMENSIONS: Overall length 12-1/4 in. (31.1 cm)

Overall width 2-5/8 in. (6.7 cm)

Maximum thickness 15/16 in. (2.4 cm)

This fragment of a wooden “shod” shovel blade was the only tool or tool part recovered from excavation unit 411. The piece represents approximately one-third of the blade from a dished shovel made entirely of ash. The center of the blade is approximately 7/8 in. (2.2 cm) thick but is rounded along the shoulder and tapers towards the side and cutting edge. The blade is dished approximately 3/4 in. (.9 cm) along its length but is only dished 1/4 in. (.6 cm) across its face. The corner of the thin forward edge is fragmented and exhibits remnants of the thin metal “shoe” which originally strengthened the wooden edge. The metal edges on these types of shovels were primarily formed from sheet iron but the thin metal from this shovel appears to be tin.

Wooden spades and shovels with iron-reinforced blades were commonly used in place of all-metal spades and shovels. Ivor Noel Hume suggests that wood spades were common in the seventeenth century, began to be replaced in the eighteenth century, and were completely replaced by all-metal forms by the nineteenth century (Noël Hume 1969:274-275). However, treatises on artillery, siege work, and fortifications dating to the time of the Boscawen and after often contain illustrations of wood/metal spades and shovels (Figure 7, Figure 8, Figure 9, Figure 10, and Figure 11). “Wooden shovels bound with iron” were also included among lists of tools deemed necessary for a well equipped European artillery train (Table 3). During the French and Indian War, 35 shod shovels were included in an engineer’s inventory for the expedition against Fort Niagara in 1759 (Table 5). Numerous metal reinforcing edges, or shoes, from shod shovels were found during work on Fort Ticonderoga. In his inventory of these items, John Pell noted that Philip
FIGURE 20. Wooden "shod" shovel fragment (02-215).
Schyler had put in a requisition for shoes during a tool shortage to enable men to make their own shovels out of wood with a metal tip (Pell 1949:165). Perhaps the French made wooden shovels at Ile-aux-Noix in the spring of 1760 when they were facing a lack of decent iron tools (Bougainville 1895[1760]:140). Captain Philip Schyler was known for his logistical skill and ability to profit from supplying the army as a deputy commissary. He was stationed at Fort Edward in 1758 and supplied Amherst's 1759 and 1760 expeditions from Albany, New York. Three “Irish” spades were abandoned at a British camp when the army moved (Table 7). This term may apply to iron-reinforced wooden spades. Half of the 16 spades and shovels recovered from Fort Stanwix were made from metal-reinforced wood (Hanson and Hsu 1975:98-100). Seven shod shovels, formed with a short stirrup-topped handle from a single piece of beech, were scattered along the orlop deck of the 1758 wreck of the Invincible (Bingeman 1985:199, 202). Hence, both the historic and archaeological record indicate that metal-reinforced spades and shovels were used for martial purposes during the French and Indian War.

John Bingeman (1985:202) does not positively identify the exact use of the shod shovels he located on the Invincible. He does speculate, however, that they would not have been strong enough to be used on land and suggests that they were used to shovel ballast or for large scale serving of food (Bingeman 1985:199). Contemporary sources, however, suggest that reinforced wooden shovels were used extensively for engineering purposes on land. The wood shovel from the Boscawen, like those from Invincible and the terrestrial sites discussed above, was reinforced with metal. This particular shovel may have been used to shovel food for the crew of the Boscawen. It also may have been used ashore by the crew to gather ballast, sand for cleaning the decks, or for other purposes (Crisman 1985b:393). However, it was probably left over from a collection of engineering or entrenching tools brought aboard the ship.

Cutting Tools (Pioneer's Tools)

Cutting tools, also known as pioneer's tools, recovered from the Boscawen include a billhook, a fascine knife, and a belt axe with separate helve.
7. Billhook

03-071 BILLHOOK

UNIT: 413 level F
MATERIAL: Iron

DIMENSIONS:
- Overall length 15 in. (38.1 cm)
- Blade length 9 in. (22.9 cm)
- Blade width with beak 3-1/2 in. (8.9 cm)
- Tang length 6 in. (15.2 cm)

The iron billhook was located in excavation unit 413. Half of the tools recovered from the Boscowen were located in this unit. The tool consists of a hooked wrought iron blade and a tapered tang extending from the center of the blade base. The blade is 1/4 in. (.6 cm) thick and is relatively straight along the back. The back of the blade is largely flat but damage or corrosion have eroded the edges and given it a slight bevel in some areas. Conversely, the very center of the back appears to be slightly indented and widened. This may be how the tool came from the forge or is deformation from being struck at this point. The back of the blade may have been used as a striking implement itself. Three billhooks removed from military sites in the Champlain Valley share the same sway-back characteristic (Neumann and Kravic 1989:118). The back of 03-071 curves gradually down and around the end of the blade and extends to form the back of the hook, or beak. The beak is small but distinct. Although the cutting edge is quite corroded, a distinct swelling is discernible in the middle and slight concavities near the inside of the hook and near the base of the blade accentuate this feature. A broad arrow, denoting the tool as British property, is well struck approximately a quarter of the way up the blade. The tang is roughly rectangular in cross section where it attaches to the blade but tapers and becomes more rounded down its length. Like that exhibited on the fascine knife (see below), the tang is thicker (7/16 in. [1.1 cm]) than the blade at its maximum width and flares in depth at the juncture with the blade. The tang was originally set into a wood handle which may have been turned on a lathe and reinforced with a ferrule.

During the colonial wars and the Revolutionary War, billhooks and fascine knives were dispersed in large numbers, officially for clearing brush from camps and roads, making fascines and gabions, and other engineering and fatigue duties. However, they were also
useful for gathering animal fodder, firewood, bedding material, grain and other crops, boughs for spruce beer, and for splitting kindling, whittling tent pegs, and a myriad of other camp tasks. Hence, these tools are commonly recovered from colonial military sites and many exist in private collections. The billhook located on the Boscawen is similar to a type frequently discovered at Revolutionary War sites (Neumann 1973:251; Neumann 1994, pers. comm.; Neumann and Kravic 1989:118). Two examples of this same type were also recovered from the Revolutionary War gondola Philadelphia, and are presently on display at the Smithsonian Museum of American History in Washington, D.C.

The billhook from the Boscawen may also have been cargo or used by the crew. If the billhook were simply cargo, it could have remained from a shipment of tools for use by the British army or may have been recovered with the intention to refurbish the tool with a new handle. If it were used by the boatswain or crew, this handy tool may have been employed for any number of tasks. Like sailors throughout history, the crew of the Boscawen may have gathered brushwood, or dunnage, on shore to secure cargo and cushion the inside of her hold from cargo and ballast (Bass 1972:36; Crisman 1985b:393; Bass and van Doorninck 1982:233-237, 265). Although no mention of dunnage for the Boscawen was located in the archival record, Commissary Wilson’s orderly book for the summer of 1759 describes work parties “cutting boughs for dunnage in batteaux [to provide for the] security of the provisions” (Munsell 1857:111). The crew could have used the billhook to cut kindling for the ship’s small brick oven or to cut brushwood and grass for bedding materials for use on shore or on board the Boscawen. Indeed, a four-foot diameter mass of straw noted during excavation of units 411 and 511 may have been the remains of a bed or animal fodder (Crisman 1985b:433). Another possibility is that the crew produced or acquired fascines and affixed them to the side and bulwarks of the Boscawen for added protection from enemy musketry. During the siege of Ile-aux-Noix, Samuel Jenks recorded the following journal entry on Saturday, 23 August 1760. Jenks writes, “Last night we had no molestation from the enemy. Our batteries are almost compleat, & the brig [the Duke of Cumberland] has sent on shore to git fasshines to hang over on her sides, so as to attcke the fort at the same time the batteries are opened” (Jenks 1890[1760]:370). If the crew of the Duke of Cumberland employed fascines to bolster her defenses, perhaps the crew of the
Boscawen did as well. The crew of the Revolutionary War gondola Philadelphia hung fascines on the support stanchions for her awning to protect the crew from British musket balls and perhaps make her profile more imposing (John Bratten 1996, pers. comm.). This may explain the recovery of the two billhooks from the Philadelphia and provides an intriguing possibility for why the billhook and fascine knife were located on the Boscawen as well.

8. Fascine Knife

03-203 FASCINE KNIFE

FIGURE: 22

UNIT: 511 level G
MATERIALS: Iron
Wood (White Pine)

DIMENSION:

Total length 18-3/16 in. (46.2)

DIMENSIONS (Blade and Tang):

Overall length 16-11/16 in. (42.4 cm)
Blade length 9-1/2 in. (24.1 cm)
Blade width 2-5/8 in. (6.7 cm)
Tang length 7 in. (17.8 cm)

DIMENSIONS (Wood Handle):

Length 7-7/16 in. (18.9 cm)
Maximum diameter 1-5/8 in. (4.1 cm)

This fascine knife, or brush knife, was the only tool located in excavation unit 511. The tool consists of a heavy, rectangular iron blade with a tang set into a cylindrical white pine handle. The blade is approximately 1/4 in. (.6 cm) thick and does not exhibit a beak or the graceful curves of a billhook. The top of the blade is flat across its width but exhibits slight undulations along its length. A relatively sharp curve forms the corner between the back of the blade and the blunt end. This sharp curve is mirrored at the end of the cutting edge. The sharp edge is relatively straight but slight concavities near the base and at the end give the center the appearance of having a slight convex curve or bulge, although the blade at the center is not as wide as at the end. The pointed, tapered tang is 7/16 in. (1.1 cm) at its widest point and 5/8 in. (1.6 cm) deep where it joins the blade. The tang inserts into the cylindrical white pine handle approximately 7 in. (17.8 cm).
FIGURE 22. Fascine knife (03-203).
The round wood handle gradually thins and tapers toward the blade. The sides and back are relatively straight but the bottom of the handle is slightly curved, similar to the cutting edge of the blade. This may be a deliberately carved grip or simply the result of slight differential shrinkage of the handle during conservation. Although the dimensions did not change appreciably during conservation, the handle is uniformly split with small honeycomb checks and is badly cracked around the widest part of the tang. There is no evidence that a ferrule was employed on this tool and the handle has a crude appearance in comparison to lathe-turned handles extant on some contemporary billhooks (Neumann and Kravic 1989:118). The handle may have been a replacement manufactured in the field or the whole tool may have been produced locally (Crisman 1985b:391).

The fascine knife from the Boscawen is unique in appearance due to its complete lack of a hook, or beak, although this would not prevent it from being used in the same ways as a billhook (see above). Two somewhat similar examples of this form were located at Fort Niagara and from an unidentified military camp in the Champlain Valley (Dunnigan 1986:110; Neumann and Kravic 1989:118). The two terrestrial examples have a more gradually curved back at the end of the blade than the hard angle and blunt end exhibited on 03-203. They also have a slight hook which may have been the result of deliberate design or substantial wear of a larger beak. A similar vestigial beak may have been ground away on the example from the Boscawen to make a straight edge. Billhooks often exhibit a swelling at the center of the blade and perhaps the slight curve barely discernible in the cutting edge is vestigial as well. The curve may also be the result of wear, uneven sharpening, or corrosion.

Because it displays no discernible markings, and similar examples provide no conclusive evidence, this tool may have had a French or British origin. It may have been carried aboard as cargo with British stores or as useable material from Ile-aux-Noix or other French fortifications along the shores of Lake Champlain. Alternatively, like the billhook, this form would also have been handy for a myriad of uses on land and on board the Boscawen (see above). It is possible this tool was a relatively rare knife-free used for splitting staves, shakes, and other wood (Sloane 1964:33). Froes for making shingles are listed among items to be made by army blacksmiths for the intense British construction
along Lake Champlain in 1759 (Table 6). The fact that blacksmiths at the British camps made froes may explain the rough characteristic of this particular tool. It seems unlikely this tool was a froe, however, since the back of the blade does not exhibit evidence of deformation due to strikes by a froe club. Faunal evidence from the Boscawen indicates that deer and waterfowl were consumed by the crew and perhaps this tool was used as a cleaver. The straight edge and heavy blade would have been ideal for this purpose. Whatever its use, or uses, the fascine knife was a viable tool which may simply have been cargo or may have been used for any number of purposes by the crew of the Boscawen.

9. Belt Axe

03-124 BELT AXE HEAD, 02-130 HELVE

FIGURES: 23 and 24

UNIT: 413 level G and level H

MATERIALS: Iron

Wood (Ash)

DIMENSIONS (Iron head): Overall length 5 in. (12.7 cm)
Blade length 2-5/8 in. (6.7 cm)
Blade width 2-7/8 in. (7.3 cm)
Cheek and poll length 2-3/8 in. (6 cm)
Cheek and poll width 1-3/8 in. (3.6 cm)

DIMENSIONS (Helve): Length 20-1/16 in. (51 cm)
Handle width 1-1/2 in. (3.8 cm)
Handle thickness 1-1/4 in. (3.2 cm)
Neck width 1-3/8 in. (3.5 cm)
Neck thickness 7/8 in. (2.2 cm)
Maximum width at top 1-3/4 in. (4.4 cm)

The iron axe head was found nearly directly on top of the wood helve in excavation unit 413. Although they were not assembled when found, it seems clear that the head and helve belong together. By modern standards the helve seems too large for the small axe head, but such long straight helvæ were commonly fixed to contemporary belt axes (the Diagram Group 1990:24, 80; Kauffman 1972:15; Neumann and Kravic 1989:24; Sloane
FIGURE 23. Belt axe head (03-124).
FIGURE 24. Belt axe helve (02-130) and fit between the head and helve.
1964:vii, 10-13, 18; Wheeler 1957:127-128; Woodward 1946:5, 18, 22). Also, the top of the helve is clearly formed to fit the eye of the axe head (Figure 24).

The small axe head found on the Boscawen is somewhat unique in that the top and bottom of the blade flare out equally from the front of the eye. Small axes of the period, alternatively labeled belt axes, hatchets, hand hatchets, and/or tomahawks, most often exhibited a straight top with a down-flaring blade. The blade on 03-124 is bilaterally symmetrical and the cheeks and short poll form a rectangular box around the wedge-shaped eye. This form was common among larger “British type” felling axes in the mid-1700s, but was rare among small belt axes (Sloan 1964:13). The blade flares from 1-5/16 in. (3.3 cm) at the base to 2-7/8 in. (7.3 cm) at the bit. The blade was possibly manufactured to be an even 3 in. (7.6 cm) in width, but may have decreased due to wear and sharpening. In fact, one edge of the bit is perceptibly more recessed than the other. A steel bit was probably incorporated into the blade during manufacture but this cannot be confirmed upon observation of the blade surface alone. This is not surprising since blacksmiths used glancing blows to form an invisible weld between the iron body of an axe and its steel bit (Bealer 1984:198). Steel was a valuable substance and some blacksmiths left it out of trade axes to increase their profits (Woodward 1946:8). However, a reputable British or colonial firm supplying the army would undoubtedly have used it. A broad arrow is struck into one face of the blade closer to the bit than the eye. Examples of this rare style of belt axe head almost always display the British broad arrow (Kravic 1994, pers. comm.). The axe tapers from a thickness of 7/8 in. (1.2 cm) at the poll to 3/4 in. (1.9 cm) at the front of the eye and continues to taper to the bit. The beveled edge at the bit is approximately 5/16 in. (.8 cm). A mass of iron 3/8 in. (.9 cm) thick forms the poll and the cheeks thicken from less than 3/16 in. (.4 cm) to 1/4 in. (.6 cm) as the wedge- or trapezoid-shaped eye tapers from front to back. The eye is 1-5/8 in. (4.1 cm) long and tapers from 1/2 in. (1.2 cm) to 1/4 in. (.6 cm) wide.

The long straight helve, or haft, was formed from a square stock of ash. Axe heads were often not supplied with helves, their production being the responsibility of the owner (Sloane 1964:6). For example, in November 1756, Sir William Johnson directed the Northern Indian Department to order from London "500 fine hatchets neat and strong.
without handles” (Woodward 1946:9). In other instances, belt axes, or hand hatchets, were supplied with helves (Table 3). The helve located on the Boscowen has an unfinished appearance and was presumably a replacement. Roughly twenty inches long, the shaft tapers gradually towards the top of the helve. Irregular facets beveling the sides give the shaft an irregular section and the helve appears to be an intermediate phase between rectangular stock and a finished oval section. Approximately 3 inches from the end, the neck of the shaft flares and flattens to act as a stop for the base of the iron head. The remaining flat area of the helve tapers in both width and thickness to match the inside of the axe eye.

Hundreds of thousands of small axes were sent to North America as trade items and as military equipment for both sides in the colonial wars. Thousands of axe heads were produced in large English factories for shipment to the colonies (Neumann 1994, pers. comm.). In his comprehensive study of metal tomahawks, Arthur Woodward (1946:12) compiled a list of British firms that manufactured iron goods for the Hudson’s Bay Company and other firms active in the North American trade prior to 1821. The firms which were active prior to and during the French and Indian War are presented below in Table 8.

<table>
<thead>
<tr>
<th>Firm</th>
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</tr>
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<tbody>
<tr>
<td>Bagg, John</td>
<td>1706</td>
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<tr>
<td>Cargill, Peter</td>
<td>1761-1781</td>
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<tr>
<td>Crowley, Hallett, &amp; Co.</td>
<td>1748-1751</td>
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<tr>
<td>Crump, Thomas</td>
<td>1742-1760</td>
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<tr>
<td>Harrison &amp; Bagshaw</td>
<td>1753</td>
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<td>Jukes, William &amp; George</td>
<td>1748</td>
</tr>
<tr>
<td>Sanderson &amp; Co.</td>
<td>1744</td>
</tr>
<tr>
<td>Sanderson &amp; Towers</td>
<td>1745-1747</td>
</tr>
<tr>
<td>Sharp, James</td>
<td>1760-1790</td>
</tr>
<tr>
<td>Samuel Southhouse &amp; Co.</td>
<td>1738-1756</td>
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<tr>
<td>Southhouse &amp; Chapman</td>
<td>1746-1752</td>
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TABLE 8 (Continued)

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<td>Wilson, Samuel</td>
<td>1737-1745</td>
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<tr>
<td>Wilson, Samuel &amp; Son</td>
<td>1746-1760</td>
</tr>
<tr>
<td>Wilson, Samuel &amp; William</td>
<td>1761-1767</td>
</tr>
</tbody>
</table>


Many more axes were produced in New France and the British colonies. Peter Conin, William Printup, William Opy, Joseph Albot, Peter Cremar, and Ryar Bowen were just a few of the many blacksmiths who made and repaired the iron implements of the tribal allies of the British during the French and Indian War (Woodward 1946:9). Although most of the heavy chopping required by life in the open fell to large axes, light belt axes were valuable tools and personal weapons to those that needed to travel lightly. Native Americans, frontiersmen, provincial militia, rangers, light infantry, and, occasionally, regular troops employed belt axes in great numbers. For instance, Massachusetts supplied nearly 1,500 hatchets for the British expedition against Fort St. Frédéric in 1755 (Woodward 1946:9).

Large numbers of axe heads encountered in the archaeological record testify to their widespread use. Arthur Woodward colorfully describes this abundance. He writes, “Certainly those axes which comprise the bulk of the weapons found in the confines of Fort Ticonderoga and the surrounding territory were not felling axes, although for the most part they are quite definitely smaller replicas of the larger tree felling types. They are of a division known as camp axes or belt axes and as such did double duty in chopping light fire wood and enemy skulls” (Woodward 1946:6). The belt axe from the Boscawen certainly could have been used as a personal weapon, as could the billhook and fascine knife in an emergency.

Although large numbers of belt axes have been removed from colonial military sites, the type recovered from the Boscawen is rare. In his years of collecting military artifacts,
Frank Kravic has seen perhaps ten of this type (Frank Kravic 1994, pers. comm.). Of three documented examples, one was located at Fort Ligonier and the other two were located at undisclosed military sites in the Hudson and Champlain Valleys (Grimm 1970:83-84; Neumann and Kravic 1989:25; Woodward 1946:7). According to Frank Kravic, odd variants like this may indicate a single shipment from a particular supplier (Frank Kravic 1994, pers. comm.).

Why was the belt axe, with its separate helve, located on the Boscawen? The axe head is clearly of British origin due to the well-stamped broad arrow, although there is no way to prove that the item was not repatriated after being captured by the French. The two artifacts may have been left from an official cargo shipment or represent a personal item forgotten or misplaced in the hold of the ship. The axe head may have been recovered with the intention of refurbishing it with a new handle, similar, possibly to the billhook and hammer. The Boscawen carried army personnel, including rangers, during and after the fighting and the axe may have been a personal item forgotten or misplaced in the hold of the ship. The replacement handle, however, would seem to indicate that the user and possible owner of the belt axe was on board the ship for some period of time. Just as on land, axes were used on vessels as tools and as weapons. In fact, the bilaterally symmetrical form of the Boscawen's belt axe is reminiscent of some contemporary boarding axes of the British Navy, although most of these had a spike extending from the poll (Chris Fox 1996, pers. comm.; Ross 1981:59; Woodward 1946:22). However, such an axe was potentially useful for any number of tasks confronting the crew of the Boscawen.

**Construction Tools**

Both sides in the French and Indian War needed large numbers of tools to construct building, fortifications, and ships along the shores of Lake Champlain. Some of these tools ended up on the Boscawen. The following construction tools were recovered from the ship: (1) a single, cross-peen hammer head; (2) a small gimlet; and (3) a single, large pointing trowel without its handle.
10. Hammer

03-004 HAMMER HEAD

FIGURE: 25

UNIT: 414 level B
MATERIAL: Iron

DIMENSIONS:
- Length 4-3/4 in. (12 cm)
- Width 1-3/4 in. (4.4 cm)
- Height 1-5/8 in. (4.1 cm)
- Eye diameter 13/16 in. (2.1 cm)

This well-used hammer head was found resting on the stern knee of the ship in excavation unit 414 (Crisman 1985b:392). The head is relatively flat along the bottom, except for a slight upward angle under the poll, and it has straight sides. The top is also flat to just aft of the eye where it angles sharply downward to form the poll. The top side of the poll is slightly concave and it ends in a blunt cross-peen. The hammer is thinner, 1-1/2 in. (3.8 cm), and octagonal in section forward of the eye. The face has been rounded and spread outward through use. One side is considerably distorted and the top is pushed back and up 1/8 in. (3 cm) from the face’s original dimension of 1-1/2 in. (3.8 cm). In addition to the deformation at the face, the top, bottom, and edges of the poll display numerous dents.

The simple cross-peen hammer, chamfered to an octagon between the face and the eye, has for millennia been a common tool of the blacksmith (Bealer 1984:172; Sloane 1964:90). These hammers were usually fashioned from a segment of bar stock but could be forged from folded thin stock. The blacksmith ordinarily welded a piece of steel to the front of the hammer to harden the face. Steel was occasionally welded to the peen as well (Bealer 1984:173-176). Large sledges and rock hammers were separately included in lists of military stores from the period, as were claw hammers, small hammers, and hand hammers (Table 1, Table 2, Table 5, Table 6, and Table 7). Sets of tools for the artillery and various specialists (e.g., carpenters, blacksmiths, wheelwrights, coopers, and armorers) were also included in these inventories (Table 2, Table 4, Table 5, and Table 6). Hammers such as the one recovered from the Boscawen were undoubtedly included with blacksmiths tools and possibly other specialists as well. Inventory lists from 1759 used the term “mason’s hammers” and this may refer to sledges or smaller hammers such as the one located on the Boscawen (Table 6 and Table 7). Sledges seem to be the type of hammer
FIGURE 25. Cross-peen hammer head (03-004).
best represented in the archaeological record from colonial military sites (Hanson and Hsu 1975:105; Neumann and Kravic 1989:266; Pell 1949:163, 169). Claw hammers are also occasionally recovered (Hanson and Hsu 1975:104-105; Pell 1949: 169; Stone 1974:298, 306). Although two small cross-peen hammers were located at Fort Michilimackinac and Fort Stanwix respectively, no types comparable to 03-004 are available in documentation of the archaeological record (Hanson and Hsu 1975:105; Stone 1974:298, 306).

Like the other tools recovered from the *Boscawen*, the source of the hammer is open to speculation. The workmen under Captain Loring may have used the hammer to pound nails, spikes, or drift bolts during the construction of the ship itself. Since no identifying marks are visible on the surface of 03-004, the battered hammer is not necessarily British and may have been scrap iron picked up at *Ile-aux-Noix* or another French site. The hammer may have been left from a cargo of general British tools or from a set of tools accompanying field artillery or a specialist, such as a blacksmith or mason, although it seems unlikely such a tool would have been lost separately from a set. A single bar of wrought iron was located in the same unit as the hammer head, and this may indicate that blacksmith equipment and materials were stored together (Crisman 1984; Crisman 1985a). Although is had seen considerable use, the hammer, like the belt axe, may have been picked up from a French or British site to be refurbished with a new helve.

11. Gimlet

02-120 GIMLET

FIGURE: 26

UNIT: 413 level G

MATERIALS: Iron

Wood

DIMENSIONS (Handle): Length 2-11/16 in. (6.8 cm)

Diameter 1 in. (2.5 cm)

DIMENSIONS (Iron shank): Total length 3-1/4 in. (8.3 cm)

Blade width 3/16 in. (.5 cm)

This gimlet was located in a concentration of rigging equipment and miscellaneous items less than two feet forward of the stacked iron shovel and spade. It is one of the three assembled tools located on the *Boscawen*. The small tool consists of an oval wood cross
FIGURE 26. Gimlet (02-120).
handle with perpendicular iron shank set into it. Most of the lozenge-shaped handle has rough grain caused by differential erosion of the growth rings. The surface is also dented in spots. One end, however, retains the original smooth surface which was probably produced on a lathe. A clear "X" was carved into one side of the handle a small eroded British broad arrow is visible on the opposite side. Two small grooves extend from the top of the arrow to a small slot on top of the handle. The grooves may be cuts left from the lathe. The small slot on top of the handle appears to connect with the rectangular-shape socket for the top of the shank.

Although the iron shank is a total of 3-1/4 in. (8.3 cm) long, the top 3/8 in. (1 cm) is fixed inside the handle. The tapered top of the shank, or tang, may have been longer, possibly reaching the slot at the top of the handle, but has since corroded. The shank tapers from top to bottom and is wider than it is thick. The top one third is relatively smooth but the remaining length is more corroded and the wrought iron "grain" is apparent. Four or five unidentifiable letters and/or numbers are stamped into the face of the shank below the handle. A gouge-shaped bit extends up from the tip of the shank on the same side as the unreadable letters or numbers. The extant bit is roughly 13/16 in. (2 cm) long. The bit may have been a simple spoon bit, in which case most of the original length remains, or it may have been a pod bit. A pod bit point would have originally terminated in a small screw or two small knife points and the total length of the bit may have been nearly one full inch (Sloane 1964:73). Whether screw or knife, these small extensions probably broke off or corroded away.

Awls, punches, reamers, augers, and gimlets were common woodworking tools for starting and making holes. Gimlets were supplied as general military stores, artillery equipment, and in sets of tools for specialists (Table 2, Table 4, and Table 5, and Table 6). Accordingly, gimlets have been recovered from colonial military sites such as Fort Ligonier, Michilimackinac, Stanwix, and Ticonderoga and army camps (Grimm 1970:87; Hanson and Hsu 1975: 107; Neumann and Kravic 1989:265; Pell 1949: 169; Stone 1974:298, 305).

Like a modern drill index, gimlets were occasionally supplied in sets of various sizes (Table 4 and Table 6) (Hummel 1976: 83; Pargellis 1969:482-485). The gimlet from the Boscawen
is identical to the smaller of a set of gimlets illustrated in an eighteenth century British tool catalog (Hummel 1976:83).

The construction and maintenance of a wooden ship required a great deal of drilling. The handle of an auger or large gimlet was located near the main mast step of a mid-seventeenth-century Spanish wreck presently being excavated at Emanuel Point near Pensacola, Florida. The handle of this tool is nearly identical in shape to the example from the Boscawen, though three times as large. The tool may have been discarded in the bilge at the time of the ship’s construction (John Bratten 1996, pers. comm.). Gimlets have also been located on more contemporary ships such as the Defence and Betsy from the Revolutionary War (Broadwater 1996:L-5, L-6; Brendan McDermott 1996, pers. comm.). Two of the examples recovered from the Defence are small lozenge-shaped gimlet handles like the one found on the Boscawen (Brendan McDermott 1996, pers. comm.). These examples may have been shipwright’s tools from construction or the ship’s carpenter’s tools. There is also a third possibility. Small gimlets, like those found on the Betsy, the Boscawen, and the Defence, were also used clean the vents on cannon, both field artillery and ship’s guns (Hanson and Hsu 1975:107; Hogg and Batchelor 1978:frontispiece).

Hence, there are four scenarios which may account for the existence of the gimlet on the Boscawen. The tool may have: (1) remained in the bilge from construction of the ship; (2) belonged to the ship’s carpenter; (3) been part of artillery equipment accompanying field artillery brought aboard the ship as cargo; or (4) been used to clean the vents on the Boscawen’s guns.

12. Trowel

**03-331 MASON’S POINTING TROWEL**

**FIGURE: 27**

**UNIT: 407 level F**

**MATERIAL: Iron**

**DIMENSIONS:**

- Overall length 10-1/2 in. (26.7 cm)
- Blade length 8-1/2 in. (21.6 cm)
- Original blade width 4 in. (10.2 cm)
- Blade thickness <1/8 in. (.3 cm)
- Shank length 1 in. (2.5 cm)
FIGURE 27. Mason's pointing trowel (03-331).
A mason’s pointing trowel, a tool instantly recognizable to archaeologists, was located just starboard and aft of the mast step. Located in excavation unit 307, the trowel was found farther forward in the ship than any other tool. Identical to modern pointing trowel blades, the artifact consists of a flat blade welded to an angled shank. The curved edges of the blade taper to a point from an estimated width of 4 in. (10.2 cm) at the shoulder. The straight shoulder is no longer intact on a side of the blade which exhibits considerable corrosion. Because the remaining edge on this same side is recessed, the blade is no longer bilaterally symmetrical. Although corrosion has occurred at the damaged shoulder and the first one third of the blade, the recessed edge may be due to wear. Well worn modern trowels belonging to a right-handed user exhibit similar asymmetry. The blade is attached via a 1 in. (2.5 cm) weld to a cylindrical shank with a maximum diameter of 7/16 in. (1.1 cm). A lift, or tang, extends outward from the top of the shank and was originally set into a wood handle which was probably reinforced with a metal ferrule (Neumann and Kravic 1989:265). Wider than it is thick, the lift, or tang, tapers from the diameter of the shank to 1/4 in. (.6 cm). The flat top of the lift exhibits a cut on one edge. No markings of any kind are visible on the extant surface of the trowel.

Like all of the other tool types located on the Boscawen, trowels were supplied to armies of the mid-eighteenth century (Tables 2, Table 5, Table 6 and Table 7). With no archaeologists present, these tools were presumably used only for brick and stone work. Mason’s trowels were also made by blacksmiths attached to the British Army in 1759 (Table 6). Many mason’s trowels were discovered during restoration work at Fort Ticonderoga and four pointing trowels, moderately similar to 03-331, were removed from a “British fortified village in central New York, c. 1759-1775” (Neumann and Kravic 1989:265).

It could be argued that this well-worn and damaged tool, without a diagnostic shape or discernible markings, made up part of the scrap iron collected from the French works at Ile-aux-Noix. It may also have been lost from a shipment of British stores. The trowel’s location inside the hull of the Boscawen would not be pertinent to either of these scenarios. However, the trowel was located aft of the mast near the presumed site of the ship’s brick cook stove and may have been lost during the stove’s construction (Crisman 1985b:393).
Possible Tools

Upon recovery, the following items were thought to be some form of tool. Further examination indicates that they were probably not tools but, as this is not certain, they are included here.

13. Unknown use

03-123 IRON OBJECT, 03-051 IRON OBJECT

UNIT: 413 level G and 414 level E

MATERIAL: Iron

FIGURE: 28

DIMENSIONS (03-123):
- Overall length 6-3/8 in. (16.2 cm)
- Shaft length 4-3/4 in. (12.1 cm)
- Flat width 1 in. (2.5 cm)

DIMENSIONS (03-051):
- Overall length 7-1/2 in. (19 cm)
- Shaft length 4 in. (10.2 cm)
- Flat width 1 in. (2.5 cm)

Two iron objects of unknown purpose were located among a concentration of various materials in excavation units 413 and 414 at the stern of the *Boscaven*. They both consist of a wrought iron shaft flattened and flared on one end. Nail holes piercing the flat area were used to fix the items to another object, presumably wood. Remnants of square nails in the flat areas of both objects were observed upon recovery. The flat areas of both objects are on one side of the center axis of the shaft.

Although object 03-123 is shorter than 03-051, it has a longer, more tapered shaft. The shaft tapers from approximately 9/16 in. (1.4 cm) diameter to less than 1/4 in. (.6 cm). The flat area of 03-123 is badly corroded and may have been as long or longer than the extant flat on 03-051. Although corroded, the boundaries of a 3/16 in. (.5 cm) square nail hole are apparent in the center of the flat.

Object 03-051 is longer overall than 03-123 but it possesses a shorter, thicker, and less tapered shaft. The remaining length is formed by a large flat area with two square 3/16 in. (.5 cm) nail holes located along the centerline of the flat.

Although the exact purpose of these objects is not known, they may be a form of marlinespike or fid used to loosen knots and separate strands of rope, hence their inclusion...
FIGURE 28. Possible tools (03-051, 03-123, and 03-517).
in this catalog (Crisman 1985b:392-393). However, collectors of colonial tools and colonial archaeologists consulted during the research phase of the project did not recognize the objects as tools (Jay Gaynor 1996, pers. comm.; Ivor Noël Hume 1996, pers. comm.; Frank Kravic 1994, pers. comm.; George Neumann 1994, pers. comm.). These individuals noted the odd arrangement of an offset flat tang if these objects were indeed tools. The objects may instead be iron hardware (e.g., strap bolts or hinge pintles) from wagons, gun carriages, terrestrial structures, or from the Boscawen herself. Ivor Noël Hume suggested they may be iron thole pins or hardware from swivel guns (Ivor Noël Hume 1996, pers. comm.). They have a shape similar to linchpins used to secure the wheels of artillery carriages but the presence of the nail holes eliminates this possibility. The most similar items available in the documentary record are riveted to the blades of tobacco knives from the late-1700s and early-1800s (Miller 1980:42-43). The fasteners used to fasten the tobacco blades were short metal rivets, however, unlike the square nails observed in the objects from the Boscawen. The loose nails observed in the holes upon recovery indicate that the objects were fixed to wood, or some other perishable material, which prevented the nails from falling out. These objects may be tools, scrap iron from Ile-aux-Noix (although the presence of the loose nails suggests otherwise) or hardware from the ship itself.

14. Scrap iron

03-517 IRON OBJECT

FIGURE: 28

UNIT: 509 level G

DIMENSIONS: Length 2 in. (5 cm)

MATERIAL: Iron

Width 1-1/8 in. (2.9 cm)

This small iron fragment was originally believed to be some form of wedge. However, upon examination, it seems clear this is some form of scrap iron. It is nearly identical to scrap iron fragments found at the excavations at Pentagoet in French Acadia. The archaeologists who excavated that site believed the fragments found there were cut on an anvil hardy (Faulkner and Faulkner 1987:138). This fragment may epitomize the types of scrap iron picked up at Ile-aux-Noix and brought aboard the Boscawen.
The following table (Table 9) lists the tools, tool fragments, and possible tools from the Boscawen and their location, brief description, and possible source.

**TABLE 9**
**TOOLS RECOVERED FROM THE BOSCAWEN**

<table>
<thead>
<tr>
<th>No.</th>
<th>Type</th>
<th>Unit/Level</th>
<th>Description</th>
<th>Probable Source</th>
</tr>
</thead>
<tbody>
<tr>
<td>03-546</td>
<td>Pick-Mattock Head</td>
<td>308 F</td>
<td>usable tool</td>
<td>British Army</td>
</tr>
<tr>
<td>02-419</td>
<td>Pick-Mattock Helve</td>
<td>same</td>
<td>same</td>
<td>same</td>
</tr>
<tr>
<td>03-098</td>
<td>Iron Shovel Blade</td>
<td>413 G</td>
<td>scrap iron</td>
<td>French site</td>
</tr>
<tr>
<td>03-111</td>
<td>Iron Spade Blade</td>
<td>413 G</td>
<td>scrap iron</td>
<td>French site</td>
</tr>
<tr>
<td>03-484</td>
<td>Iron Tool Socket</td>
<td>410 F</td>
<td>scrap iron</td>
<td>French site</td>
</tr>
<tr>
<td>02-368</td>
<td>Wooden T-Handle</td>
<td>509 G</td>
<td>fragment</td>
<td>unknown</td>
</tr>
<tr>
<td>02-215</td>
<td>Shod Shovel</td>
<td>411 I &amp; J</td>
<td>fragment</td>
<td>unknown</td>
</tr>
<tr>
<td>03-071</td>
<td>Billhook</td>
<td>413 G</td>
<td>unknown</td>
<td>British Army</td>
</tr>
<tr>
<td>03-203</td>
<td>Fascine Knife</td>
<td>511 G</td>
<td>usable tool</td>
<td>unknown</td>
</tr>
<tr>
<td>03-124</td>
<td>Belt Axe Head</td>
<td>413 G</td>
<td>usable tool</td>
<td>British Army</td>
</tr>
<tr>
<td>02-130</td>
<td>Wooden Axe Helve</td>
<td>413 F</td>
<td>same</td>
<td>same</td>
</tr>
<tr>
<td>03-004</td>
<td>Hammer Head</td>
<td>414 B</td>
<td>unknown</td>
<td>unknown</td>
</tr>
<tr>
<td>02-120</td>
<td>Gimlet</td>
<td>413 G</td>
<td>usable tool</td>
<td>British Army</td>
</tr>
<tr>
<td>03-331</td>
<td>Mason’s Trowel</td>
<td>407 F</td>
<td>scrap iron</td>
<td>unknown</td>
</tr>
<tr>
<td>03-123</td>
<td>Tool/Hardware</td>
<td>413 G</td>
<td>hardware?</td>
<td>British Army</td>
</tr>
<tr>
<td>03-051</td>
<td>Tool/Hardware</td>
<td>414 E</td>
<td>hardware?</td>
<td>British Army</td>
</tr>
<tr>
<td>03-517</td>
<td>Possible Wedge</td>
<td>509 G</td>
<td>scrap iron</td>
<td>French site</td>
</tr>
</tbody>
</table>

**Distribution of Tools in the Boscawen**

The tools, tool fragments, and possible tools catalogued here were not evenly distributed within the hull of the *Boscawen* (Figure 29). No tools were located forward of the mast step. The complete pick-mattock (03-546 and 02-419) and fascine knife (03-203), and four incomplete or fragmentary tools, including the mason’s trowel (03-331), the wooden T-handle top (02-368), the iron socket (03-484), and the shod shovel fragment (02-215), were all located in separate excavation units amidships or slightly aft. This dispersed pattern is in contrast to the close distribution of the remaining nine tools or
FIGURE 29. Distribution of tools. (Based on drawing by Kevin Crisman.)
Vertical compaction may also explain the lack of wooden handles on some of the tools. Perhaps the mason’s trowel, hammer, spade, shovel, and billhook settled into the hull of the ship from the orlop deck or poop deck only after their wooden handles had succumbed to the greater deterioration rate which acted upon the upper elements of the ship. This would imply that the pick-mattock, fascine knife, gimlet, and the belt axe with its helve were within the hold when the Boscawen was abandoned.

Although post-depositional processes affected the distribution and condition of the tools to some degree, other factors (e.g., materials, condition, and association) support the conclusion that the tools were found at or very near where they were located when the Boscawen was abandoned.

Most of the tools are iron, or contain iron components, and are not the type of small light objects which could be readily displaced by post-depositional processes operating within a lake. Also, the shape of these tools would not, unlike round objects, facilitate down slope movement. Neither of these characteristics would prevent vertical displacement, however. Indeed, the large dense tools would have dropped nearly straight down if they came from upper portions of the ship during decomposition. Yet, if the handles of iron tools had eroded away before they fell into the hull of the Boscawen, it seems likely that portions of the handles would still exist inside the sockets of these tools. Large numbers of spades were recovered during the Mount Independence Underwater Survey in 1993 and the majority contained stubs of wooden handles. It could be argued, however, that any tools on the decks of the Boscawen might have been held up and out of the preservative effects of the silt for a longer period of time than the spades found during the 1993 survey. Being held out of the anaerobic silt, and in an area of other decomposing wood, could cause handles to disintegrate completely. Even so, the fact that no fastener was recovered in the socket of the shovel and that many of the tools without handles were in poor condition does lead one to doubt that they were usable tools with handles at the abandonment of the Boscawen.

A strong argument against significant post-depositional displacement comes from the relationship between the tools and other objects associated with them. For instance, the cracked shovel blade was found stacked on top of the broken and eroded spade. This gives
possible tools in units 413 and 414, which were located just forward of the sternpost. Seven of the nine remaining tools, tool fragments, and possible tools, were located in a relatively tight cluster in excavation unit 413. These tools consisted of the iron shovel (03-098), the iron spade (03-111), the billhook (03-071), the belt axe and helve (03-124 and 02-130), the ginlet (02-120), and one of the questionable iron tools (03-123). Only the hammer head (03-004) and one potential iron tool (03-051) were found in unit 414.

At the beginning of the excavations in 1984, archaeologists working on the *Boscawen* assumed that the vessel had been stripped of usable materials before she was abandoned. They expected to find small items such as musket shot, broken glass, ceramic sherds, gun parts, buttons, and other bits and pieces left from life aboard the once crowded vessel (Crisman 1985b:375). These items were encountered in expected frequencies in the forward portions of the ship, but, in addition to these small materials, the discovery of more significant artifacts increased amidships and then increased markedly at the stern (Crisman 1985b:143). Here, units 412, 413, and 414 contained the heaviest concentration of rigging equipment, tools, and other large artifacts encountered in the ship (Crisman 1985b:393).

Some of this distribution pattern may have resulted from post-depositional processes. Depending on the circumstances, vertical compaction of artifacts and ship material occurs when the upper elements of a vessel decompose and settle into the lower hull. During the life of a ship, items placed in the thinner bow and stern areas of the hold will naturally be congregated along the centerline. Structural decomposition may also compact items at the bow and stern as the steeper sections of the hull funnel items from the upper levels of the ship toward the centerline. This process may have occurred in the stern of the *Boscawen*, which rested with a slight list to port and with her stern considerably deeper than her bow (Crisman 1985b:357). A poop deck covered the after portion of the *Boscawen*’s main, or orlop deck, thus creating a protected area of the orlop deck. This protected space may have encouraged the placement of supplies at the stern. Items such as tools may have fallen into the hull from the poop deck or the covered afterdeck and been horizontally and vertically concentrated along the stern centerline, the very area covered by excavation units 412, 413, and 414. Conversely, the tools found in the middle portion of the ship, where the hull is more flat, were not concentrated along the centerline of the ship.
the appearance that the two were deliberately stored together. Two other objects which may have been stored together were the hammer and what may have been a merchant's bar of wrought iron. These two items may represent blacksmith's equipment (Crisman 1984; Crisman 1985a). The strongest evidence against post-depositional displacement of the tools is provided by ballast stones which were located among and over rigging supplies and tools in units 413 and 414 (Crisman 1988:147). There is some evidence that ballast was removed from the ship prior to abandonment and this activity may have resulted in ballast being mixed with or placed on top of tools and equipment (Crisman 1985b:367). Nevertheless, if tools and rigging equipment fell from decomposing decks above at a later date, they would have landed on, not under, the ballast stones.

By all indications, the hold of the Boscawen was a sloppy place. Passages to allow water to flow to the pump for expulsion from the hull were apparently clogged with construction debris even before she was finished (Crisman 1988:146). This allowed stagnant water to build up in the bilge during use and encroach into her hold. Stinking water may have coursed among the ballast stones. As the Boscawen ferried men and matériel up and down the length of Lake Champlain, various cargoes were hauled into and out of the low damp space below the orlop deck. From contemporary records, it appears that army equipment was not always treated with the respect the officers would have hoped for. The men's blasé attitude probably intensified when they were dealing with marginal materials, such as incomplete tools or scrap iron. It is easy to understand how such materials would be misplaced and lost among the ballast stones of the Boscawen. It is also easy for usable and even valuable equipment, once it becomes wet and dirty, to be viewed as junk. This is especially true if the equipment is common, like tools, or belongs to a faceless organization like the British Army. At the end of hostilities, it is hard to imagine the homesick provincial crew of the Boscawen assigning great importance to anything military, let alone miscellaneous items in the hold of a leaking ship.
CHAPTER VII

CONCLUSIONS

The French and Indian War was the last in a series of colonial wars fought to decide whether Great Britain or France would control North America. Although the French bested the British for several years after the war’s beginning in 1754, the tide turned against the French in 1758. Attrition, shortages, and a series of British victories in the final two years of the war brought New France to its knees in 1760. The British campaign strategy for 1759 and 1760 consisted of a three-pronged attack against the heart of New France. The middle prong pushed up the strategic north-south corridor formed by the Hudson River, Lakes George and Champlain, and the Richelieu River. In the absence of good roads, water routes such as these provided the best way to move men, matériel, and information. In 1759, both sides entered into a minor arms race to build vessels to control the strategic surface of Lake Champlain. The Boscawen was one of the ships built at that time. She played a critical role in the British advance during the last months of fighting and helped to consolidate the newly-won territory after the war.

The French and Indian War was largely a war of sieges. The French and British sought to control the area around Lake Champlain and the other vital waterways extending from it by erecting fortifications at strategic locations. Most of the campaigning by both sides involved trying to wrest these forts from the enemy through siege warfare. Although fighting in the wilds of North America, the armies France and England applied weapons, tactics, and equipment developed in Europe to their operations in the new theater of war. Fortification, siegework, and fatigue duty were integral parts of this European-style warfare and none of these could be accomplished without hand tools. The great Sébastien Le Prestre, Marquis de Vauban, refined, codified, and, ultimately, personified the methods and theory of classical siege warfare. Ever the logistician, Vauban wrote of tools in his numerous treatises on positional warfare. In A Manual of Siegecraft and Fortification, Vauban writes:
Before taking the field you should have seen to the tools necessary for the terrain in which the fortress to be attacked is situated. Spades, shovels, and pickaxes are good in a soft crumbly soil such as is found throughout the greater part of the Low Countries; the mattock, the rock pick shaped like a sage leaf, iron-edged wooden scoops, and iron spades are useful in stony or gravelly ground. It is well to gather a great store of tools at the supply dump; you will need hatchets, hedging bills, saws, sledgehammers, mallets, and all sorts of carpenter’s tools (Vauban 1968[1740]:41; Plate III).

The tool collection from the *Boscawen* could have been taken directly out of Vauban’s instructions. In a sense they were. They were derived from the large number of tools brought to war upon the enemy according to the rules of the day, rules which Vauban came to represent; the same rules which French and British officers at Lake Champlain unequivocally applied in their campaigns.

Tools were indispensable equipment for armies in the French and Indian War; engineers, sappers, miners, pioneers, gunners, regulars, and provincial soldiers used many common types. Artisans associated with the army such as armorers, blacksmiths, carpenters, coopers, masons, and wheelwrights often brought their own specialized implements. Other tools came into play when the construction of watercraft called for shipwrights. There were, however, very few forms of tools used exclusively for military applications. Civilians used the same tools. In lieu of a government marking, such as a British broad arrow or French fleur-de-lis, recovery from a known military site is often the only indication that a tool was once army property. The tools from the *Boscawen* are clearly from a military context, but most were probably purchased by the military from civilian sources, including those marked with a broad arrow. There were as many sources of tools as there were uses, and both sides in the French and Indian War came by them through a variety of means. The tool assemblage from the *Boscawen* represents an assortment of tools that were purchased from civilian sources, made by army blacksmiths, or taken from the enemy.
Whether complete or fragmentary, the tools represented in the *Boscawen* assemblage fall into four categories. The first three categories are clearly tools or tool fragments and include: (1) Digging or miner's tools; (2) Cutting or pioneer's tools; and (3) construction tools. The fourth category includes items which may be tools but are probably iron hardware or scrap iron. The first category, digging tools, consists of 1 complete pick-mattock, 1 iron shovel blade, 1 iron spade blade, 1 wooden shod shovel fragment, and 1 cross-piece for a spade or shovel handle. The second category, cutting implements, includes 1 complete fascine knife, 1 iron billhook without its handle, and 1 belt axe head and 1 belt axe helve which are probably related. Construction tools which form the third category include 1 cross peen hammer head, 1 mason's pointing trowel without its handle, and 1 complete gimlet. There is only one complete tool in each category; the remaining tools in the first three categories are damaged or fragmentary. The fourth category includes 2 iron spikes, which were probably some type of hardware, and 1 small piece of scrap iron in the shape of a wedge.

Tools and tool fragments were brought aboard the *Boscawen* under at least five circumstances during her working life over 230 years ago. These included: (1) usable tools brought on for the construction of the ship; (2) tools brought aboard for the use of her crew; (3) usable tools brought on as cargo; (4) broken tools collected as scrap iron; and (5) wooden fragments from tools which probably broke off whole tools being carried as cargo. Three, and possibly more, of these categories are represented in the tool assemblage recovered in 1984 and 1985.

Only three complete tools were located on the ship, and these were found widely separated from each other. They consist of the pick-mattock, the fascine knife, and the gimlet. The first two were located in the middle portion of the hull and the gimlet was located among the concentration of tools, rigging elements, and other artifacts at the stern. That these seemingly usable tools were left in the hold of the ship is probably the result of carelessness by the crew.

Most of the tool types seen on the ship were represented by broken tools or tool fragments. Due to their poor condition, the shovel, spade, trowel, tool socket, and "wedge" were likely collected as scrap iron. Where exactly they were collected is unclear,
although the French sites of Fort Carillon, Fort St. Frédéric, and Isle-aux-Noix are likely candidates. These items were stragglers from one or more larger shipments and were given little attention once they were misplaced in the hold. The T-handle cross-piece and the shod shovel blade undoubtedly broke off whole tools brought aboard as cargo since, even though a large amount of miscellaneous equipment was collected from Ile-aux-Noix and other French sites, it is doubtful that wooden fragments such as these were deliberately collected. It is also doubtful that the hammer and billhook were usable tools at the time the *Boscawen* was abandoned. If the hammer had been a complete tool some remnant of a handle would have survived in the hammer's eye. Billhooks usually had a metal ferrule to reinforce the front end of the wooden handle. Presumably, the ferrule would have survived if the billhook handle had decomposed. Although the nationality of the hammer is uncertain, the billhook was marked with a British broad arrow. The belt axe was also definitely British, and the separate, unfinished wooden helve found with the axe probably belonged to it. The hammer and billhook were British scrap iron or were collected for repair, possibly to be fitted with new handles like the belt axe. The offensive British siegeworks at Ile-aux-Noix may have been one of several sites were British tools and tool fragments were collected.

The distribution of the tools within the hull is not significant. The hold of the *Boscawen* was apparently rather unkempt, as evidenced by the large number of artifacts encountered during her excavation. No tools were recovered from the bow area of the *Boscawen*. Six tools and tool fragments were found aft of the mast step but the tools were distinctly separated from each other in a diffuse scatter. Finally, the stern contained a notable concentration of tools in two excavation units. Broken tools were located in relatively open areas of the hull, as were seemingly usable tools. Broken tools, scrap iron, and usable tools were concentrated, along with many other objects, underneath or, at least, mixed with ballast stones in the stern. This concentration of tools, rigging equipment, and other artifacts at the stern was initially seen as evidence that a boatswain's locker was originally located in the stern portion of the hold. In fact, although fragments of a wooden box were located there during excavation, only one complete tool, the gimlet, was found in this area. Although the belt axe and wooden helve could have formed a usable tool if put
together, but all of the other tools found in the stern were badly damaged and were probably scrap metal.

Few tools from the *Boscawen* are comparable to those normally associated with shipwrecks (i.e., boatswain's tools or tools belonging to ship's carpenters). Instead, the tools are types that are more suitable for use on land. Due to the *Boscawen*’s close association with the shore the crew may have used them there, but they are also the same tools terrestrial armies used in great numbers for positional warfare and fatigue work in the eighteenth century. The assortment of tools recovered from the *Boscawen* is nearly identical to contemporary illustrations of collections of tools used for fortifications and siegework. Indeed, if the tools were found in good condition at one location in the hull, I would have suspected that the ensemble came from an artillery caisson, not a boatswain’s locker. Hence, the tool assemblage recovered from the *Boscawen* was probably cargo for the British Army, either usable tools or scrap iron collected at British or French sites along the shores of the lake, and there is a distinct possibility that none of the tools or tool fragments were ever used by the ship’s crew.

The *Boscawen* was built for use on a land-locked lake. Because the ship was closely affiliated with the terrestrial operations of the British Army, the artifact assemblage reflects the high degree of interchange she and her crew had with the shore. The *Boscawen* is a veritable hybrid between a terrestrial site and a shipwreck. This is fortunate because the ship represents the only site, terrestrial or nautical, where authentic archaeological research has provided a view into life at Lake Champlain during the French and Indian War.
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APPENDIX

PERMISSION LETTERS
October 10, 1996

Mr. David Grant
11077 Madison Ave., N.E.
Bainbridge, WA 98110

Dear Mr. Grant,

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If you have any questions please do not hesitate to contact me.

Sincerely yours,

Christopher D. Fox
Curator
To: David M. Grant  
Date: September 13, 1996

From: Heather Lengyel  
Pages: 1

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Ms. Betty Abeles

I am presently completing my master's thesis at the Nautical Archaeology Program at Texas A&M University. The topic of my thesis is an assemblage of tools recovered from the Boscawen, a 115-ton sloop built by the British in 1759 to drive the French from Lake Champlain. The tools are primarily miner's and pioneer's tools for fatigue duty on land. They include a pick-mattock, iron shovel and spade blades, a wooden "shod" shovel fragment, a billhook, a fascine knife, a hammer, a trowel, a gimlet, and a belt axe. I am generating most of the figures myself but would very much like to include an illustration of similar tools from Christopher Duffy's book Fire and Stone: The Science of Fortress Warfare 1560-1660. The drawing in question is takes up all of page 106. I would prefer to use the original drawing, produced by Pierre Suriray de Saint-Rémy in 1702, from which the illustration was taken, but I do not have access to it. Although the illustration will be used for academic purposes only, a thesis is legally classified as a publication and I have a responsibility to acquire a letter of permission from the copyright holder to comply with United States copyright laws.

May I obtain written permission to use the illustration in question in my master's thesis?

Thank you for your time.

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Bainbridge Island, WA 98110

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e-mail: DGrant1965@aol.com

10/1/96

Dear Mr. Grant:

Permission is granted to copy the above drawing.

There will be no fees.

Betty Abeles, Per. Ed.
VITA

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Education:  
M.A., Anthropology, 1996  
Texas A&M University  
B.A. (with distinction), Anthropology, *cum laude*, 1987  
Member of *Phi Beta Kappa* national honor society  
University of Washington

Experience Related to Historic Aircraft:

1996  
Completed inventory of US Navy shipwrecks, submerged naval aircraft, and terrestrial naval aircraft crash sites in Washington. Developed management plan for these resources.

1995  
Recorded historic SBD-2 Dauntless (BuNo 2106) recovered from Lake Michigan.

Experience Related to Shipwrecks:

1992  
Participated in search for ancient boats in the Sea of Galilee using sub-bottom profiling sonar.

1992  
Searched for two caravels left by Columbus in St. Ann’s Bay, Jamaica.

1990-1991  
Assisted in excavation of Bronze Age Shipwreck near Kaş, Turkey.

Additional Archaeological Work Experience:

1992-1995  
Completed over 20 archaeological projects in Washington and Montana for private contract firms. Duties included archival research, survey, mapping, testing, monitoring, report preparation, sorting, cataloguing, and preparation of artifacts for curation. Positions held: Project Manager, Project Director, Assistant Project Director, Assistant Site Supervisor, Crew Chief, Research Archaeologist, and Field Technician.

1987-1989  
Completed 17 archaeological projects in Washington, Oregon, and California for private contract firms. Duties included survey, mapping, testing, sorting, cataloguing, and preparation of artifacts for curation. Positions held: Laboratory Assistant and Field Technician.