Thomas Kurt Knoerl. BENEATH NIAGARA: A METHODOLOGICAL APPROACH TO AN INUDATED EIGHTEENTH-CENTURY SITE. (Under the direction of Gordon P. Watts, Jr.) Department of History, April 1994.

A large artifact assemblage was discovered in Old Fort Niagara's cove in 1988. The nature of this collection and what it represents is the subject of this thesis. The historical and archaeological research detailed herein tests the hypothesis that the artifacts were not randomly deposited throughout the cove but in a pattern. Experiments with different testing procedures resulted in a methodology which provided data on stratigraphy and artifact provenience. Historical and artifactual analysis suggests the assemblage marks the approximate location of an historic shoreline dating from 1762 to the mid-1780's. Data concerning the Fort's mililtary and civilian populations during the British occupation period have been recovered from the cove, thus adding to the historic record. But more importantly, the success of the methodology offers the opportunity to conduct similar research at other sites.

BENEATH NIAGARA:
A METHODOLOGICAL APPROACH TO AN INUNDATED EIGHTEENTH-CENTURY SITE

A Thesis

Presented to

the Faculty of the Department of History

East Carolina University

In Partial Fulfillment

of the Requirements for the Degree

Master of Arts in History

by

Thomas Kurt Knoerl

April 1994

This thesis is dedicated with great thanks and love to my father, John Lawrence Knoerl (1923-1991).

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INTRODUCTION

Many studies of colonial and early American history recognize the importance of Old Fort Niagara. Its location at the mouth of the Niagara River, on the portage route between Lakes Erie and Ontario, permitted the garrison to exert a great influence over the much coveted fur trade. It was one of the most important elements in the colonial economies of New France and New York.[1] To the Iroquois, on whose land the post had been built, it was a constant reminder of the white man's power and unrelenting encroachment. Niagara was an important link in communicating with and supplying other Great Lakes posts during the wars for empire, revolution, and Indian rebellion. A variety of historical studies have examined the sieges, troop movements, diplomacy, trade networks, and architectural changes that took place at Old Fort Niagara.[2] While those studies are fairly comprehensive, there has been little examination of the civilian trade area located not in the fort itself, but on the adjacent lowland next to the Niagara River.

During the late eighteenth century the British used that area, or "Bottoms" as it was called, extensively for trade, taverns, Indian diplomacy, and the receiving and dispatching of supplies, communications, and men.

Those were the common day to day civilian activities without which this isolated post could not have survived let alone effectively protected British interests. The lack of information about such an important part of Old Fort Niagara justifies additional research.

Non-military topics can pose a serious problem for historical researchers. Few of the tavern keepers, blacksmiths, Indians, artisans, and fur traders who operated in the Bottoms, produced documents that have survived to the present. To retrieve new information some researchers have turned to the archaeological record. Items such as nails, pins, bottles, and ceramics not only offer information about the daily activities of the common man but also indicate gradual changes in tastes and technology through time. Such a marriage of historical and archaeological research techniques was the basis of this investigation.

The Archaeology in Progress Project at Old Fort Niagara has conducted excavations inside the fort since 1979. They have answered many questions about the fort's physical and cultural development over the past three centuries. These excavations were undertaken primarily in response to proposed construction that threatened to destroy the archaeological record. Little such construction has taken place on the Bottoms, resulting in

brief archaeological testing of the area in 1983, 1987, 1988, and 1990. The reports issued from that testing indicated a "tremendous potential of finding British and Indian cultural material along the shores and in the underwater sediments..."[3] This "tremendous potential" prompted the Archaeology in Progress Project to initiate a preliminary underwater survey in 1988 that laid the ground work for the project described in this report. The 1988 project confirmed the presence of a large artifact deposit in the cove. Identifying the nature and extent of this assemblage became the focus of this research project.

Unlocking all the information contained in a site is a time consuming process involving many phases, all of which may take years to complete. This project's goal was to complete the first phase of research in the shallow water adjacent to the Bottoms. Objectives included locating, identifying, and assessing the site's potential significance through historical research and archaeological testing. The investigation began with a review of the site's most intensive period of use 1759 - 1796 (the British occupation) and a survey of site development through time. This background information provided a crucial element for correctly interpreting the archaeological record at the site.

The mere presence of artifacts does not guarantee they will provide much insight into historic activity. To

be productive the site must have integrity. This can be determined by exposing and analyzing the artifacts in relation to the stratigraphic lenses in which they are found. To be of significance the archaeological record must be relatively undisturbed.

Can this occur in the dynamic environment of a swift flowing river? Some archaeologists have assumed not, arguing instead that submerged cultural deposits must represent a mixed group, redistributed by river currents and winter ice flows. As such, they are devoid of meaningful context, and of limited use in the reconstruction of human activity. If, however, the artifacts in the Niagara River shallows adjacent to the Bottoms were in their primary locations with undisturbed stratigraphy then the record they preserve would represent as valuable a source of data as any terrestrial site. This becomes especially important when we realize that the activities that took place in the cove and on the Bottoms are very different from those inside the fort. Thus, a new dimension of Old Fort Niagara's history can be studied.

This of course is contingent on a systematic recovery of the archaeological data. Conducting site tests underwater in a dynamic riverine environment can be very much like building a sand castle in a surf zone. The

environment would appear to prohibit site testing with the same accuracy as is possible on land. A review of the current literature offered little help in solving this problem.[4] Thus developing an inexpensive, accurate, and reliable methodology became an equally important aspect of this research project.

The research goals detailed in this report include a survey of the site's historical background and physical development, the development of careful excavation techniques capable of providing accurate and reliable data, and the completion of phase one archaeological testing of the cove sediments. The data generated from this project support the conclusion that underwater sites of this nature can possess integrity. Preliminary results from comparisons made between cove and land artifacts demonstrate the value of this type of research. The cove data both confirm and add information about Old Fort Niagara as a whole. This project affects not only Old Fort Niagara but suggests to other researchers with similar sites that their resources do not end at the waters edge.

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NOTES

1
Many studies of the fur trade trade note Fort Niagara's geographic position as key to its importance. Some examples are: Thomas Elliot Norton, The Fur trade in Colonial New York 1697-1776 (Madison, Wis., 1974); Donald Creighton, The Empire of the St. Lawrence (Toronto, 1956); and Michael G. Kammen, Colonial New York: A History (New York, 1975).

2
Some examples include: Brian Dunnigan, Seige-1759: The Campaign Against Niagara (Youngstown, N.Y., 1986); Dunnigan,Forts Within a Fort: Niagara's Redoubts (Youngstown, N.Y., 1989); W. J. Eccles, The Canadian Frontier 1534-1760 (Albuquerque, N.M. 1969); Jack Sosin, Whitehall in the Wilderness: The Middle West in British Colonial Policy, 1760-1775 (Lincoln, Ne., 1961), and Ian K. Steele, Guerillas and Grenadiers: The Stuggle for Canada, 1689-1760 (Toronto, 1969).

3
Stuart D. Scott and Patricia K. Scott, Coast Guard Station Niagara, Archaeological and Historical Survey (Youngstown, N.Y.,1983), 37 and Stuart D. Scott and Patricia K. Scott, Supplement to Coast Guard Station Niagara, Archaeological and Historical Survey (Youngstown, N.Y., 1990).

4
Papers on inundated terrestrial sites, occasionally published in the proceedings from the Society for Historical Archaeology's conferences on underwater archaeology, and articles published in The International Journal of Nautical Archaeology and Underwater Exploration, suggest no general consensus on the problem of controlled underwater excavations. This topic is discussed in more detail in chapter 3.

CHAPTER 1

THE COVE AND "BOTTOMS" DURING THE BRITISH OCCUPATION PERIOD 1759-1796

The historical landing area of Old Fort Niagara was located in a tiny cove adjacent to a small section of low land known as the Bottoms. This area was bordered by the Niagara River, Lake Ontario, and the fort. During the British period of occupation, 1759-1796, civilian traders, the British military and the British Indian Department used the cove and Bottoms extensively. Their activities linked the fort economicaly, militarily, and diplomatically with all other posts and Indian tribes on the frontier. It was not merely the personnel, however, that made Old Fort Niagara one of the most important posts on the frontier but rather its location on the Great Lakes. Its strategic location on the portage route between Lakes Ontario and Erie attracted Europeans and Iroquois Indians alike as early as the mid-seventeenth-century. Archaeological evidence indicates a Native American presence in the Niagara region as early as the Archaic period which dates to 8,000 B.C.[1]

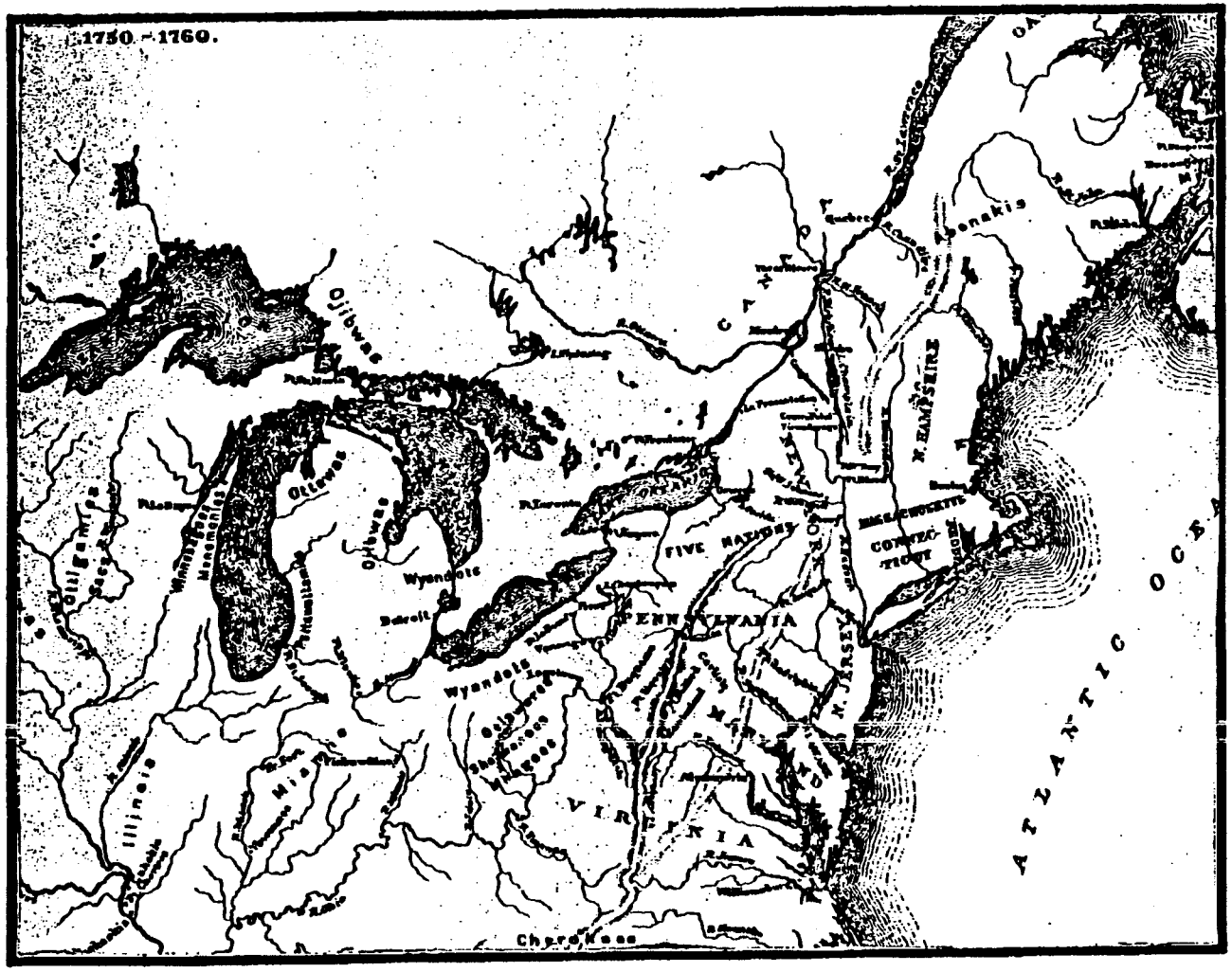
Throughout the period of European colonial expansion in North America the French, British, and Iroquois competed for control over the fur trade. It dominated the

economies of the Iroquois, New France, and New York. For the Iroquois it was not only a means to acquire European goods but also a tool in diplomacy. Iroquois control over trade routes to colonial centers helped them maintain a balance of power between the French and British. It was not in the Iroquois' interest to see either colonial power gain control of the entire continent, squeezing them out in the process.[2] By the 1670s the beaver population in the East had dwindled considerably necessitating farther westward hunting.[3] To maintain their supply of furs and expand their influence, the Iroquois fought and defeated the Neutral and Erie Indian tribes in the mid-seventeenth century for control over the Niagara region and hunting areas around Lake Erie.[4]

The trade held diplomatic significance for the French as well. They used the Great Lakes and connected rivers to disperse traders deep into the interior. Their adoption of indigenous birch bark canoes allowed traders to transport ample supplies for trade.[5] This allowed them to extend their influence without the necessity of permanent settlements and the land disputes they often caused. The diplomatic function of the fur trade was so important that even in times of economic inviability the trade was continued to maintain good relations with the Indians.[6]

The British settlers, and the Dutch before them, conducted the trade differently from the French. They were more agriculturally based and remained closer to the eastern seaboard. New York merchants relied primarily on Iroquois Indians and French smugglers to bring furs to trade centers like Albany.[7] Diplomatically the trade united the British and the Iroquois. The clandestine Montreal trade, which involved furs smuggled down the Lake Champlain, Hudson River route to Albany in return for British woolens and other goods, provided a substantial portion of New York's fur supply. French smuggled furs accounted for 80 percent of exports in 1725.[8] Despite its illegality and annoyance to both the French and British governments, the clandestine trade continued until the fall of Canada. The New York method of aquiring furs gave the French an advantage that helped them attain the lion's share of the trade.[9]

The French fostered trade and military alliances with the Huron Indians who were enemies of the Iroquois. This led to almost constant conflict during the seventeenth century between the two and cost the French much of the Iroqouis fur trade that by 1633 amounted to an estimated 30,000 pelts a year.[10] It also delayed French expansion into the Niagara-Lake Erie region, forcing the French to travel west via the Ottawa River (See Map 1). This route, as opposed to the Lake Ontario, Niagara Portage, Lake Erie



Map 1.

Francis Parkman, Montcalm and Wolfe; France and England in North America (Boston, 1925), 1-2.

passage, was much slower and more difficult.[11]

The fighting, along with disease, had taken a toll on the Iroquois as well. Their population diminished from an estimated 10,000 in 1640 to 8,600 by the late 1670s.[12] Faced with further losses, the two sides attained a brief respite from hostilities in the 1670s. Continued pressure for more hunting territory for the Iroquois and intensifed French aggression, renewed hostilities in the 1680s. The Iroquois looked to their English allies for aid. In 1684, however, England and France were at peace; by 1688 the Glorious Revolution and the political chaos in New York known as Leisler's Rebellion prevented the English from rendering much aid.[13] With these factors in mind it is not surprising that by the end of the seventeenth century the Iroquois and French moved toward establishing more peaceful relations.

In 1701 the two sides came together and agreed upon The Grand Settlement. It provided for Iroquois hunting rights east of Detriot, allowed western Indians to pass through Iroqouis territory to trade, and perhaps most importantly, gained an Iroquois pledge to remain neutral in future Anglo-French wars. The Iroquois defended this settlement to their English allies by offering trade with the western Indians and a stronger English claim to western territory under Iroquois control.[14] The benefits of Iroquois neutrality were immediately evident for the

French in Queen Anne's War, 1702 -1713. Britain's failed attempts to invade Canada and generally poor showing in the conflict chilled Anglo-Iroquois relations for a decade.[15]

The French desired access to the Niagara region and made three major attempts to construct a post where the Niagara River flows into Lake Ontario. Each effort illustrates that success came only through overtures of increased trade rather than through military strength. The success or failure of their attempts during the late seventeenth and early eighteenth centuries correlated directly with the state of hostilities and trade with the Iroquois. The Grand Settlement and the easing of tensions in the early 1700's marked the beginning of extended French occupation of the Niagara region. This caused the British great distress and began a string of events which led to the fall of Canada and the development of Fort Niagara into the crossroads of the Great Lakes.

In 1679, during the brief period of peace, the Seneca Indians, a member tribe of the Iroquois Nation, gave permission to French explorer and trader Rene'-Robert Cavelier, Sieur de La Salle, to construct a vessel and a small supply post above Niagara Falls and at the mouth of the Niagara River to support the fur trade with the upper Great Lakes tribes.[16] It was a logical place to intercept

Seneca Indians, who returning from their hunt for furs in the west, traveled through the Niagara region on their way to trade with the English. Unfortunately for La Salle, the fort he had built burned down soon after its construction due to the negligence of his men. Father Louis Hennepin, the missionary who accompanied La Salle, wrote about the strategic importance of the Niagara region:

> It is at the mouth of Lake Frontenac [Ontario] that a fort was begun, which might have been able to keep the Iroquois in check and especially the Tsounontouans [Senecas], the most numerous and most powerful of all, and prevent the trade which they carry on with the English and Dutch, for quantities of furs which they are obliged to seek in the western countries and pass by Niagara going and coming, where they might be stopped in a friendly way in time of peace, and by force in time of war... and the place is naturally defensive, and beside it there is a very fine harbor for barks to retire to in security. (17)

Although the first French attempt to fortify Niagara had failed, it became increasingly evident to both the French and the English that control of the narrow region could provide a faster water route by way of sail on Lake Ontario while simultaneously controlling much of the Indian fur trade.[18] The growing threat of French control over the Niagara portage aroused English fears of being isolated from the Great Lakes and sparked their interest in the Niagara region.

In 1687 the French reentered the Niagara region and constructed Fort Denonville. It was to be a base for raids against the Iroquois. Unlike La Salle's post, which was constructed to facilitate trade, Denonville was clearly a military fort designed to cower the Indians.[19] It succeeded only in arousing their anger. The Senecas maintained a constant vigil near the fort and ambushed hunting parties that were sent out when the fort's provisions were discovered to be inedible. Of the 100 men stationed at Fort Denonville late in the summer of 1687 only 12 were left alive when reinforcements arrived the following spring. The Iroquois sent an angry delegation to Montreal and demanded the fort be torn down. Faced with the realization that the post could not be maintained, Governor Denonville agreed.[20] In September 1688 Fort Denonville was abandoned. The incursion into Iroquois territory set back French occupation of the Niagara region for over thirty years.

The French did not establish a new post at Niagara until 1720. Chabert de Joncaire the elder, an interpreter, soldier, and Seneca by adoption, constructed a small trading post along the Niagara River. Five years later he attained permission from the Iroquois for the French to build a permanent trading post at Niagara. The French constructed a building that appeared to the Indians to be a stone trading house but was actually designed and

fortified to withstand a siege.[21] Over the next thirty years Fort Niagara, as it became known, was strengthened and developed into a European-styled fortress. Indeed when the British attacked the fort in 1759 it required European siege methods to capture it.[22]

The Onondagas took it upon themselves to represent the Iroquois League. They alone gave permission to the French to build Fort Niagara. Trade had grown between them and warmed the relationship.[23] Their decision may have been based on their declared neutrality and their efforts to balance one European power against another. Nevertheless, those segments of the Iroquois set against the French presence at Niagara asked the French to halt construction and return to eastern New France, to which the French replied, no. They claimed the Indians' request represented the words of New York colonists and not those of the Iroquois who had previously given permission. The pro British Iroquois, prodominately Mohawks, turned to the British and encouraged them to destroy the post. This request was denied as Britain and France were not at war. Instead, the Iroquois permitted the British to construct Fort Oswego on the south shore of Lake Ontario as an alternative solution.[24] Its location offered access to the Mohawk River route to Albany. The British hoped to attract western Indians away from Niagara to trade at

Oswego. For the Iroquois, the British presence on Lake Ontario acted as a counter balance to Niagara. The French objected to the new post claiming the southern shore of Lake Ontario was French territory. The Royal government in France, which at that time enjoyed peace with Britian, rejected Canadian plans to attack Oswego.[25]

Forts Niagara and Oswego competed in the fur trade but operated differently. Niagara was held as a crown monopoly to stay competitive with the cheaper English goods at Oswego. The French commandant was instructed to monitor the trade closely and preserve the good will of the Indians. Prices were kept low, at times even below cost, and the sale of liquor was restricted. In contrast, the sale of cheap rum was unrestricted at Oswego, but while most prices for goods were cheaper, unscrupulous traders often took advantage of their drunken customers. The French owed much of their trade to the resentment Indians felt for the ill treatment they received at Oswego.[26]

Merchants at both Niagara and Oswego complained about the stiff competition for furs.[27] At the same time, however, a clandestine trade existed between them similar to that of Albany and Montreal, exchanging British woolens and cheap rum for furs. As many merchants were still connected to Albany investors, there was no widespread call by New York merchants to destroy Niagara.[28] During

King George's War, New York merchants hoped for a policy of neutrality to preserve good Indian relations and the clandestine trade with the French. In fact, neither post attacked the other, but this was largely due to the Iroquois' refusal to participate on either side.[29]

The treaty of Aix-la-Chapelle, which ended King George's War, was signed on 18 October 1748. Nothing was changed in America including Fort Niagara. In less than one year the French began to construct a string of forts that was designed to bar the British from the Ohio Valley Indian trade and prevent British settlement of the west. Heretofore, the British had been kept from the west by the natural barrier of the Appalachian Mountains while the French spread west through the Great Lakes waterways.[30] As the French traveled through the Ohio Valley constructing forts, they came upon numerous British traders who were infiltrating the area in increasing numbers. These encounters convinced French officials it was neccesary to gain control of the area before the British colonists, with a population of over one million, could settle the area and swell to even greater numbers.[31]

The two powers attempted to dislodge each other from posts in western Pennsylvania and the Hudson Valley. After a year of skirmishes, Britain declared war on France on 18 May 1756. Niagara was strengthened with earthworks

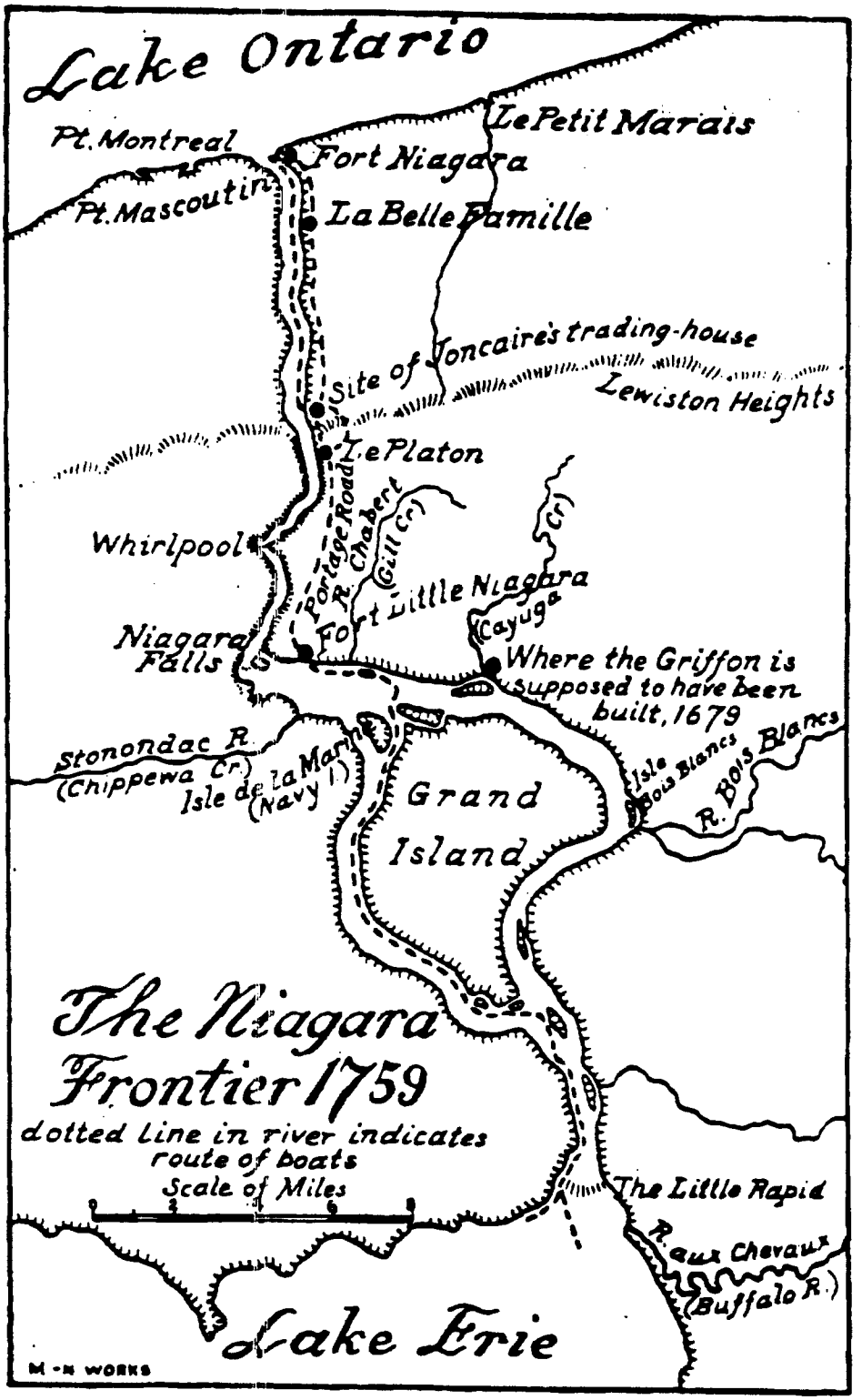
and additional troops to guard French communications with the west. Raiding parties from the fort attacked the British frontier. Although neutral at first, the Iroquois were eventually convinced, at least in part, to support the British and so made possible an attack on Niagara.[32] In the summer of 1759, 2,000 British troops and 1,500 Iroquois left Oswego for Niagara. The strong defensive works at Niagara, garrisoned with 600 French soldiers, required the British to use a European style siege. It lasted more than two weeks and was only successful after the British routed a French relief force of about 1,600 soldiers who had come from the west. With the capture of Niagara the British cut the supply line to all French posts west of Lake Ontario, in effect removing them from the war.[33] By 1763 the rest of New France had fallen.

Soon after the capture of Fort Niagara, the British began the enormous task of occupying former French posts west of Niagara. While this vast territory offered new opportunities for trade and settlement, it also brought with it the problems of management. The new British province required officials and troops to travel great distances between frontier posts and colonial centers. And unlike native Americans who traveled light and lived off the land, Europeans depended on transported food and supplies. Travel and transport on the lakes were easier because there were few roads. Canoes, bateaux, and ships

were more efficient means of transportation. The largest impediment to navigation between Lake Ontario and the upper lakes was Niagara Falls.

In August of 1760, British troops moved over the portage and on to Detroit, Michilimackinac, and other previously French held posts. Communications, military operations, and commercial activity heading west on Lake Ontario all had to pass through the Niagara portage, which began in the cove. Here ships anchored and barges tied up to load and offload trade goods and supplies to and from the Bottoms. They were then either stored in warehouses, both there and in the fort, or transported up river to the lower landing, the location of which is labeled on Map 2 as "Site of Joncaire's trading-house." From this point goods were portaged around the falls on a long established Indian trail to the upper landing, labeled on Map 2 as "Fort Little Niagara" and reloaded into bateaux. From here the vessels traveled up river to the mouth of Lake Erie and began the journey west.[34]

As the fort was the main staging area for the army's movement westward, repairs were begun to defend the post from either French or Indian attack. An effort was made to discover where the French had quarried limestone. The source was found above the falls. Stone was transported over the portage to the lower landing. From there it was placed in bateaux and finally unloaded in the cove.[35]



Map 2. The Niagara Frontier 1759

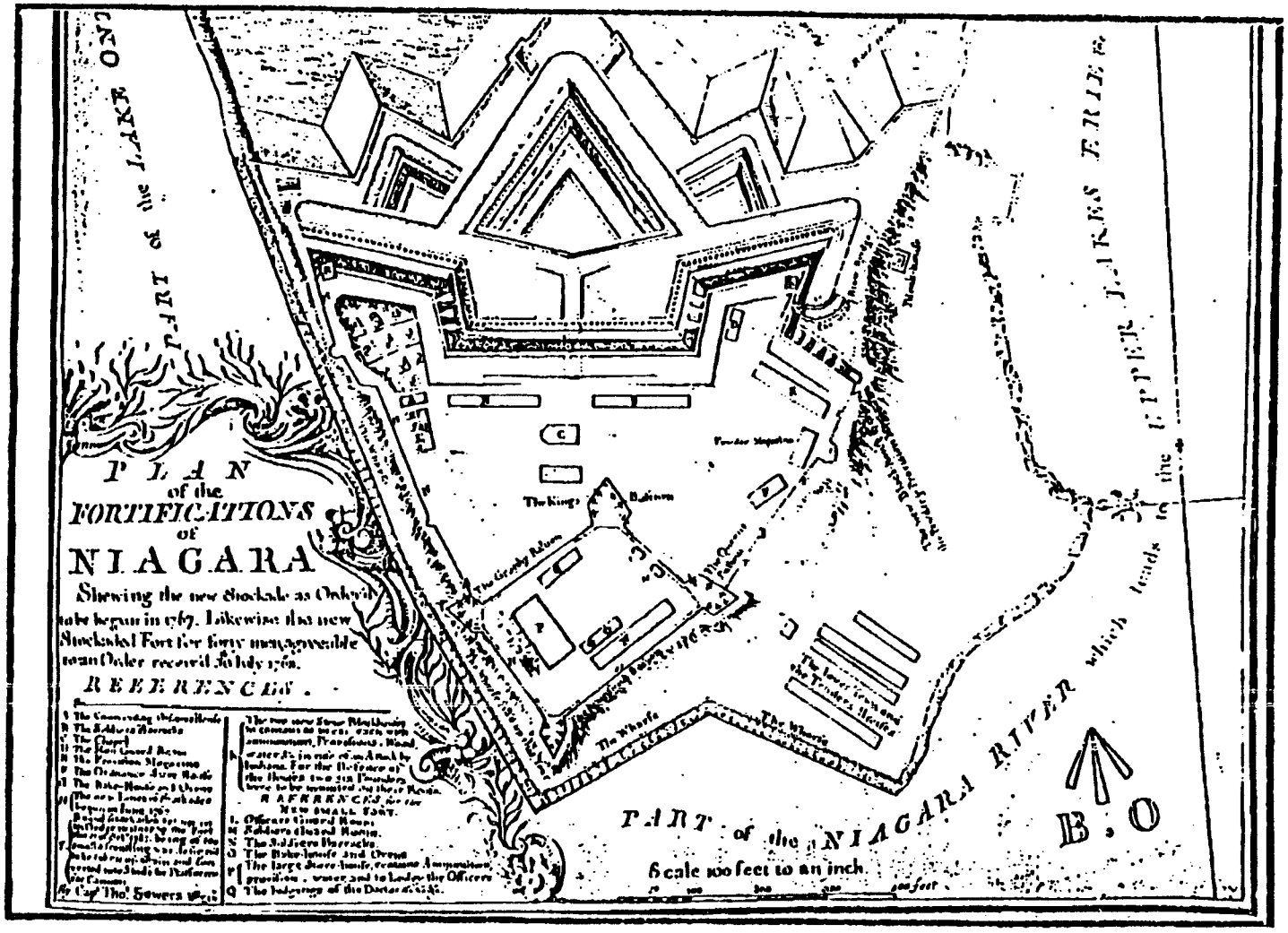
From, Brian Leigh Dunnigan, Siege-1759 The Campaign Against Niagara (Youngstown: 1986), 70.

The Royal Army's most pressing need was to prepare for the winter of 1759-1760. They built additional bateaux in the cove to bring in supplies of firewood from up river. Attempts to secure adequate food supplies forced the soldiers to fish in the Niagara River and Lake Ontario. Some additional provisions arrived at the post from the east, enough supplies in fact to secure the British foothold. The cove area was, of course, central to all of these resupply activities.[36]

Early in 1760 trading houses and Indian quarters had been built on the Bottoms to help support the traders who were making their way west (See Map 3). As hostilities were not yet over, the arriving traders had to be detained at Niagara along with their goods. Lt. Col. William Eyre, who was stationed at the fort in 1760, described the traders' arrival:

> A few days ago...Several Indian Traders reached this Place, with a great deal of Goods ...I have laid out two Rows of Houses, which these Traders are now building by the Water Side of the Beach, to carry on their business; its very convenient for them, and out of the way to the Garrison...(37)

In May of the same year more than three hundred Indians gathered to express their support for the British, to trade, and to receive gifts of food and powder for hunting. To prevent dishonest traders from angering the newly pacified Indians, the army restricted trade to the



Map 3. Sowers map (1768) showing trader town.

Plan in the British War Office, Caxton House, London in 1929 and now believed lost.

Bottoms where it could be easily regulated. Despite this restriction abuses by the traders occurred.[38]

The change in occupation from French to British troops puzzled western Indians. They did not understand how their lands came under British control because of a war between the French and British. The dispossession of the French made the Indians suspicious of British plans.[39] They were unhappy with the prospect of British traders entering the area.

Under colonial control of Indian and frontier affairs dishonest traders and colonial land speculators acted with the approval of the provincial governments. These practices resulted from a colonial policy that saw the Indians as obstacles to be removed to allow for the colonists' commercial and territorial expansion.[40]

Royal officals in Britain felt policy on this matter should be under military control. To this end Sir William Johnson, the Indian Superintendent of the Northern district, held a conference at Fort Niagara in 1761 to help assure the Indians of the King's committment to protecting their rights and land. The success of this first conference is doubtful as the western tribes grew increasingly hostile because of continued dishonest trading practices. Johnson traveled to Detroit to implement new trade regulations. All trade was restricted

to military posts and required a license.[41] The Privy Council, a group of ministers in England who advised the King, took a further measure by prohibiting colonial governments from granting lands or encouraging settlement in Indian territories.[42] Military leaders endorsed these measures as did the Indian superintendents in the colonies who wanted to keep the Indians pacified. A more formal land policy was introduced with the Proclamation of 1763, which prohibited colonial settlements beyond a negotiated boundary line. Despite official efforts, land speculators and dishonest traders continued to anger the Indians. The intensity of their ire was evident in the speed and force with which they attacked. Pontiac, an Ottawa Indian, led attacks on the western-most posts. Within the first two months of Indian rebellion, eight small frontier posts had been captured. Of the forts west of Niagara, only Detroit and Fort Pitt held out. Since their force was incapable of defeating a stronghold such as Detroit, the Indians hoped to starve the garrison into surrendering. Fortunately for the British, vessels built on the Niagara River brought food, ammunition, and communications to the besieged garrison.[43]

The importance of the Niagara portage to Detroit was well known to the Indian attackers. Supplies and men sent to relieve Detroit poured through the cove area. Goods were unloaded either in the cove or farther up river at

the lower landing and placed on wagons for the overland journey to Little Niagara located above the falls. From there they were placed in bateaux and taken to larger vessels for the passage to Detroit.

In September 1763 Seneca Indians ambushed a wagon train carrying supplies from Ft. Niagara to vessels on Lake Erie. When a relief force arrived, it too was ambushed. Few survived the attack. The captured supply wagons and livestock needed in Detroit were thrown into Niagara Gorge. After this attack, troops were used to guard the passage of supplies along the portage. The few small posts located along that route were also strengthened against further attacks.[44] Aid shipped from Niagara helped the garrison at Detroit hold out long enough for Sir William Johnson, superintendent of the Northern Indian Department, to conduct a conference at Fort Niagara that brought about an end to the Indian uprisings in 1764.[45]

The Pontiac uprising taught the British very valuable lessons that influenced the development of frontier policy. It was apparent that the small thinly-scattered posts were useless against Indian attack. Johnson believed that maintaining communications and supply lines to western forts depended on Indian relations. Smaller posts were easy, attractive targets during times of

discontent.[46] Even the large stronghold at Detroit, although never captured, was unable under its own power to quell the rebellion. It remained dependent on supplies from Niagara.

The Indian Rebellion of 1763 also demonstrated the usefulness of lake vessels. Johnson suggested that, "Whenever we can have a good Communication by Water we might tolerable well maintain Posts, and if some small vessels are kept up on Lake Erie, Detroit or even Michilimakina might be kept up."[47] Consequently General Jeffrey Amherst, the commander in chief of British forces in America, ordered the construction of new vessels at Niagara.[48] Carpenters from Fort Niagara became very active in ship building, above and below the falls, providing vessels for both the upper and lower lakes. Vessels were built at Navy Island above the falls and at Navy Hall, located across the river from the cove area. The Navy Hall vessels were fitted out and anchored off the Bottoms to accept passengers and goods for Lake Ontario ports.[49]

After the Pontiac uprising Sir William Johnson suggested to the British authorities that trade be restricted to larger posts such as Niagara and Detroit. Just as before the war Johnson argued:

> If the Trade is carried on at ye principal Posts...the Persons & Propertys of the Traders will be more cautious of

> committing Frauds under the Eye of a Commanding officer...& the Objects of temptation, which so strongly excite many of the Indians, will be in a great degree out of their power.(50)

In the next few years the activities in Fort Niagara's cove increased with the growing use of the adjacent trading area. An attempt was made to keep a close eye on the Bottoms. Each newly arrived trader reported the quantities of ammunition and liquors and discussed with the fort commander where they could trade. No trader could settle on or leave the grounds of the fort without authorization from the commandant. Interpreters for the fort reported the number and names of the various tribes that came to trade. Private and public houses were constructed on the Bottoms along with taverns and workshops to accommodate the growing intercourse.[51]

An example of the enormous amount of commerce coming through the cove area can be seen in the "Report of Indian Trade" prepared by the Commissary of Indian affairs at Niagara. Between 27 April 1767 and 16 November 1768, 245 bateaux carrying 954 men arrived at the cove headed for the western posts. A sample of what they carried included 68,312 gallons of rum, 16,011 pounds of powder, 27,996 pounds of lead and 261 fuses.[52] Table 1 shows the large amount of furs that 886 traders carried in 313 bateaux traveling east through Niagara during a similar period. Merchants provided a wide variety of materials and

services at Niagara or for other posts on the frontier (See Table 2). Common goods such as nails or decorative items like cut glass wine decanters could be found at a post hundreds of miles from the nearest city.[53]

Trading firms in Albany backed many of the merchants arriving at Niagara after its capture. Some used their military service and connections to set up new trading companies. French and Indian War hero Major Robert Rogers, for example, turned his assignment to receive the surrender of the western forts, including Detroit and Michilimackinac, into a trading expedition. Backed by Albany merchants Abraham Douw and Paul Burbeen, Rogers made trading arrangements with the former French officer who commanded Fort Detroit.[54] After the fall of Canada many merchants transferred their businesses to Montreal. Companies took advantage of French experience in the far west and provided the cheaper, more readily available British goods. The old rivalary between Montreal and Albany continued after the French defeat in Canada.[55]

The success of many companies depended on their ability to transport goods over long distances. Shipwrecks, poor warehousing at various points along the Great Lakes, fraud, restrictive trade regulations, and Indian uprisings all acted to ruin many firms including that of Major Rogers. His first venture ended with a law

suit against one of his partners, another ended with bankruptcy caused by the the Indian Rebellion of 1763, and a third collapsed with his court martial for violating offical trading regulations while acting as Governor of Michilimackinac.[56]

For most merchants operating at frontier posts the greatest profits were not earned from the fur trade but from provisioning the military posts and surrounding settlers.[57] While the percentage of furs England imported from New York remained stable through the eighteenth century, the fur trade had actually fallen as a percentage of New York's exports from 40 percent in 1720 to 10 percent in 1765.[58] Gifts, given to tribes by the British army for diplomacy and as an inducement to trade, attracted Indians and facilitated the continuous flow of goods through the Bottoms. The merchants who made the profits from this trade became accustomed to the expected practice of gift giving.[59] After the Pontiac uprising ended, the Indian Department increased its annual budget to £10,000 to reestablish good relations with the natives.[60] The enormous influx of money from military payrolls and supplies allowed the colonial economy to continue to grow.

By 1761, 20 percent of the British Army was stationed in America. The army was primarily distributed on the frontier. The string of forts along the Great Lakes

attempted to protect the Indians from deceitful traders as a way to keep the Indians peaceful.[61] Paying for the military in America became a problem. The Stamp Act of 1765, attempted to reduce this economic burden. The tax revenue created by the act was designated to pay for one-third of the army's budget in America. Requiring the colonists to contribute to their own defense seemed justified to most members of Parliament. When news of the Act's passage reached the colonies, riots and demonstrations broke out in many areas.[62] Relations between the mother country and the colonies became seriously strained. The colonists' attitudes, expressed so soon after the Indian Rebbelion of 1763, that the army was useless and not worth supporting, infuriated many in Parliament. One angry member stated, "We have fought, bled, and ruined ourselves, to conquer for them; and now they come and tell us to our noses...that they were not obliged to us."[63] In the wake of the Stamp Act riots, frontier troops were transferred to the east coast to maintain control, thereby weakening the military presence in the west and detracting from the profitable provisioning trade with the British Army.[64] When the civil unrest in the east turned into revolutionary war, the provision trade rebounded.

During the American Revolution, Fort Niagara's cove played an important role on the frontier. Although no

battles took place at the fort, it was not a quiet time for the post. From the beginning of the war the commandant of Fort Niagara was instructed to convince the Iroquois and western Indians to ally with the British.[65] The Indian Department operated four buildings on the Bottoms that were used to negotiate with the Indians during the war. Presenting gifts to the Indians was an important aspect of these talks. It was an attempt to keep the Indians friendly to the British and to alleviate their suffering. The Indians were dependent, to some extent, on British trade goods, including blankets, arms, and ammunition. One British officer, believed that the lack of such items would, "reduce them to great Miseries."[66]

Commandants at Fort Niagara attempted to demonstrate to the Indians that even in times of war the trade goods that the Indians desired would continue to reach their homes as long as the British ruled in North America.[67] In the first five months of 1778 the commandant purchased 14,769 of goods for the Indians.[68] In 1781 the gifts distributed at Fort Niagara included 12,000 blankets, 23,500 yards of cloth, 5,000 silver ear bobs, 75 dozen razors, and 20 gross of jew's harps.[69] The conferences finally convinced a portion of the Iroquois Confederacy to support the British.

In the summer of 1779 American General John Sullivan led an army into Iroquois territory destroying the crops

needed for the comming winter. The Americans marched within eighty miles of Fort Niagara. Due to limited supplies and the onset of winter, the Americans withdrew instead of attacking the fort. The Indians who lost their crops turned to the British at Niagara for relief.[70]

Before 1776 the nearest Iroquois village had been eighty miles from the fort. After the destructive American march into western New York in 1779, 5000 Indians moved to Fort Niagara and camped on the Fort's outer grounds.[71] The problem of overcrowding became worse due to shortages of fresh vegetables and meat.[72] The cost of maintaining provisions and donations for the Indians grew from a prewar figure of £500 to a staggering 100,000 in 1781. Even with many Indians resettled in other villages or out in war parties, at least 3,500 Indians remained at the fort until the end of the war.[73]

During the Revolution traders used the cove area extensively. Its area was a prime location to serve their customers, which included almost everyone at the fort. Despite the war, the merchants also carried on trade with the posts farther up the lakes. Letters from the commandant throughout the war complain of the vast quantities of goods being sent through the Niagara portage, causing considerable problems for the military;

> Last winter this place was quite lumbered with merchandise; even the officers' barracks was filled with goods, as I would not allow any to

> remain at the landing during the winter, but ordered the soldiers of the garrison to bring down twenty-six batteau (sic) loads...I am astonished that last year...there were goods to the amount of £50,000 on Deer Island... where they intend to lodge their goods this winter I know not, for it will be absolutely impossible to get half of them over (the portage) this year on account of the provisions ordered for the upper posts.(74)

Despite the problems caused by the traders' goods, the military believed that the Indians could not be denied the trade. Their aid in the war or at least neutrality was seen as vital. The merchants, however, were regarded as unpatriotic, with little concern for anything other than profit, One British officer observed, "The fur trade is not the object, it is the great consumption of rum and Indian presents, manifested by the enormous sums drawn...by Government, purchased at a most exorbitant rate from traders."[75]

For most of the Revolution there were two large trading firms and several smaller ones opperating at Niagara. The fierce competition caused some merchants to dissolve trading partnerships and quickly reopen under new arrangements.[76] Many of the merchants at Niagara during the American Revolution were retired military personnel. They used their contacts to gain advantages in trade. John Butler, an agent of the British Indian Department, formed Butler's Rangers, which raided the New York and Pennsylvanian frontier. Butler used his success in battle

and his position with the Indian Department to gain a monopoly for his trading company that operated at Niagara. His firm accounted for £ 97,000, roughly 23 percent of the crown's recorded expenditures during the war years[77] A political rivalry with the descendents of Sir William Johnson broke Butler's monopoly by 1779.

Other merchants provided trade goods, financial services, and military provisions both at Niagara and other posts in the west. In 1782, for example, 120 debtors at Niagara, Detroit, and Michilimackinac, owed 42,000 to the Niagara firm of Taylor and Forsyth. The personal debts of one Niagara officer to several Niagara merchants between 1777-1785 totaled at least 553. Some commodities such as rum brought exceedingly high profit. In a one year period ending May 1778, the military purchased 4,360 gallons from a merchant at the post. By 1781, rum sales returned as much as 200 percent profit.[78] Merchants and traders living at Niagara during the war years competed fiercely for profit. Taylor and Forsyth were arrested for defrauding the government and selling the military's goods to traders in the west.[79] This type of scandal did little to improve the reputation of traders who in the military's view would "for a trifling consideration sell their sordid souls."[80] As the war came to a close, the number of people stationed at or

coming through the fort diminished. Consequently, the profits from supplying the Army and Indian Department at Niagara declined. Trade continued to pass through the Niagara portage after the war, but it primarly served the Indian trade and the new settlements in the Ontario region.[81]

When the war ended, the boundary line between the United States and British Canada generally followed the path of the Great Lakes. Fort Niagara was formally within the United States. Disputes over the treaty, however, prompted the British to retain control of Niagara and the other western posts until 1796.[82]

During the peace negotiations and immediately thereafter, military spending and activities decreased in the Niagara region. Conversely, private trading and merchant activity increased. The nature of the Bottoms became predominately trade oriented. John Dease, the acting Deputy Superintendent of Indian Affairs at Niagara, complained about the situation at the fort and reduced the activities of the Indian Department. Dease wrote to his superiors that no rum was available, the Fort's doctor was poorly supplied, and there was a shortage of ammunition.[83] He reported that fourteen bateaux of Indian gifts had just arrived including 3,000 pounds of powder but without an ounce of lead shot. The various Indian tribes also suffered, partially because of the shortages reported by

Dease, but also from yellow fever which spread through many tribes.[84] By 1788 the Indian Department buildings near the cove area were in ruins and considered beyond repair. The wharf across the river at Navy Hall and Fort Erie at the head of the river were in a similar state.[85] In contrast, public lodgings on the Bottoms were considered "very excellent" and were even preferred over the hospitality of the officers' lodgings inside the fort.[86]

During this period of decline, British control kept Americans off the Great Lakes. Loyalists settled on the other side of the Niagara River leaving the American side a relatively untamed wilderness. In 1794, the Jay Treaty cleared the way for the transfer of the sovereignty of the Great Lakes military posts. In 1796 the Americans officially took command of Fort Niagara, while the British moved across the river to the newly-constructed Fort George.[87] Over the next twenty years numerous settlements sprang up on the American side of the Great Lakes. The British monopoly on Great Lakes commerce and settlement came to an end.

The successfull operation of Fort Niagara, regardless of its occupants, depended on the activities that took place in and around the cove. Food, alcohol, medicine, arms, clothing, communications, intelligence, trade goods,

and vessels all came to its shore. This enabled the fort to assist in the defense, diplomacy, and commerce of the frontier.

The cove area can be seen as a barometer for the rest of the Great Lakes. Through its shallow waters passed the communications of the far western regions and the eastern centers. Although the posts were distributed over an enormous area of land, what happened at any post on the lakes west of Ontario had an impact on Niagara. The cove area was in a way the center of the French and British Great Lakes. From its shore began the European occupation of the far west when soldiers, explorers, and trappers set forth over the portage. Its inhabitants profited from the Michilimackinac fur trade, responded to the war cry of the Pontiac uprising, and fed the Iroquois refugees of the American Revolution. In conjunction with the shrinking of the British Empire in North America, the last loyal subjects departed for the Canadian shore when Fort Niagara was transferred to the United States in 1796.

Table 1.

"Return of the Peltry Traded for at, & passed Niagara"

Type of skins	No. of Packs
Beaver	786
Otter	31.5
Fisher	1
Bear	612
Dressed Leather	1,255
Undressed Leather	729
Raccoon	849.5
Fox	17
Cat	29
Martin	2
Elk	114
Mixed	355
Total	4781

Source: Normand MacLeod, "Report of Indian Trade", The Papers of Sir William Johnson, eds., James Sullivan and Milton W. Hamilton (Albany, N.Y., 1925), 650, 660-661.

Table 2
Sample List of Goods and Services
Provided by Merchants at Niagara

Goods:

Horses
Cows

Tea
Chocolate
Sugar
Brown Sugar
Coffee
Tobacco
Madeira Wine
Spirits Brandy and Rum

Blue Cloth
Flowerd Flannel
Scarlet Cloth
Fine Cloth
Blue Thread
Calico
Fine Muslin
Fine and Coarse Linen
Fine Brown Cloth
Very Fine Broad Ribbon
Fine Black Cloth
Gold Lace
Feathers
Warm Shoes
Women'shoes
Moccasins
Stockings
Coats
Buckles
Gilt Buttons
Fine Green Leggings
Warm Cotton Stockings
Boys Shoes
Silk Mittens
Leather Mittens
Beaver Hats
Silver Wrist Bands
Silver Ear Bobs
Large Arm Bands
Gold Epaulets
Looking Glasses
Broaches
Handkerchiefs - silk
Blankets
Brass Kettles
Wine Glasses
Wine Decanters
Tumblers

Dressed Deer Skins
Smoked Skins Grindstones

Provisions for War Parties
Files
Double Bolt Padlocks
Stock Locks
Hammers
Axes
Hand Saws
Grindstones
Spades
Common Nails
Coffin Nails
Panes of Glass
Guns
Powder
Soap
Wampum Belts
Coffins

Services

Labor on Barracks
Provided Rooms for Boarders
Carried Provisions for Hire
Ran Taverns
Ran Brick Kilns

Source: Ledger Book of Taylor and Forsyth, February 26, 1780-February 10, 1781, Old Fort Niagara Association Library, Docs. 181334-181371, and 1989 archaeological testing.

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CHAPTER 2

SITE LOCATION AND DESCRIPTION

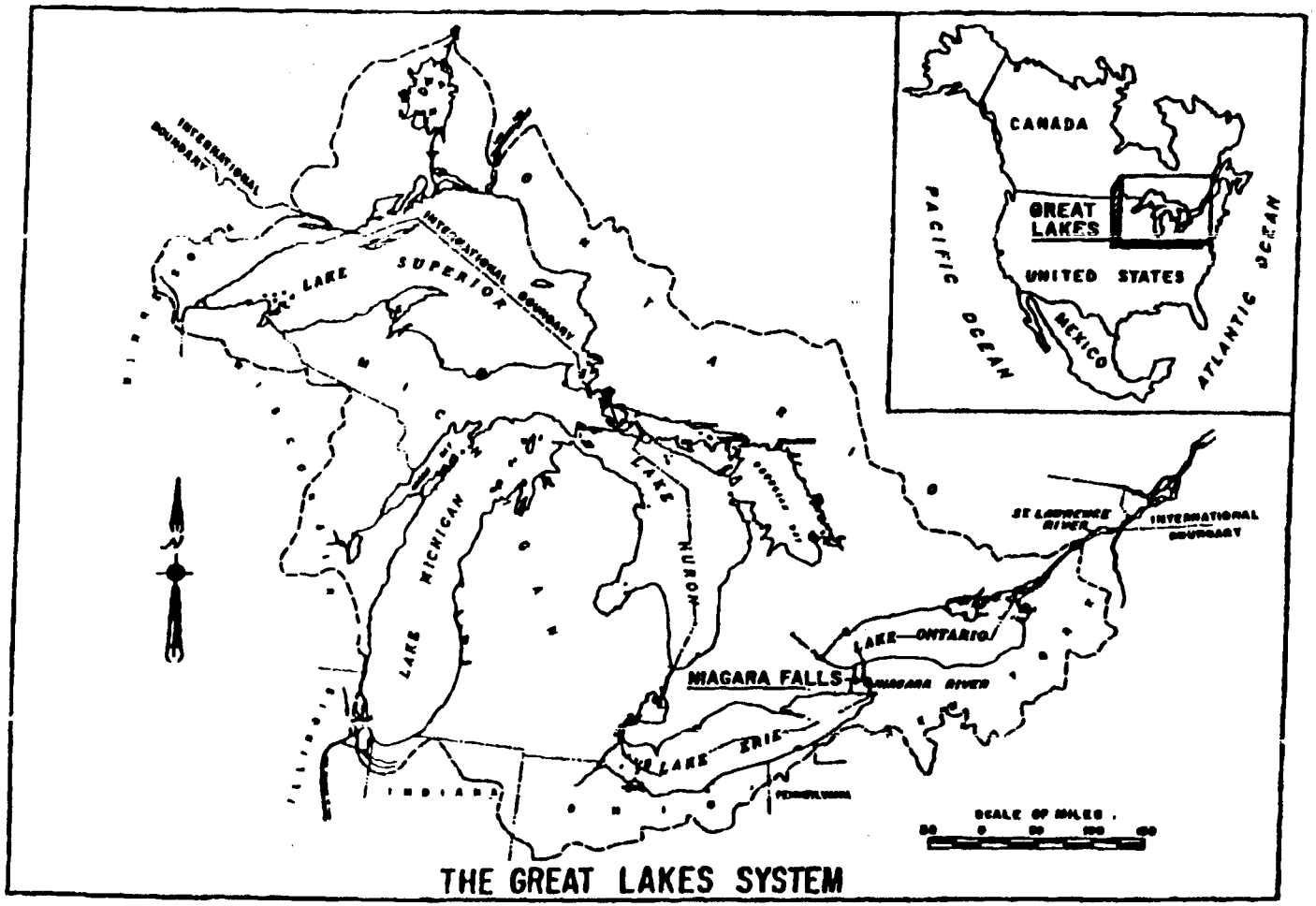
Location

The Niagara River flows from Lake Erie over Niagara Falls and into Lake Ontario, thus forming the only natural direct connection between Lake Ontario and the four other Great Lakes. There is a small cove located just southeast of the river's mouth. The cove is on the western side of Fort Niagara, on land now occupied by U.S. Coast Guard Station Niagara. A 100 foot by 100 foot test grid placed on the bottom of the cove marked the site of the 1989 summer underwater field season. Maps 4 through 7 show the approximate location of the grid, the cove, and the river in relation to the five Great Lakes of North America.

Site Description

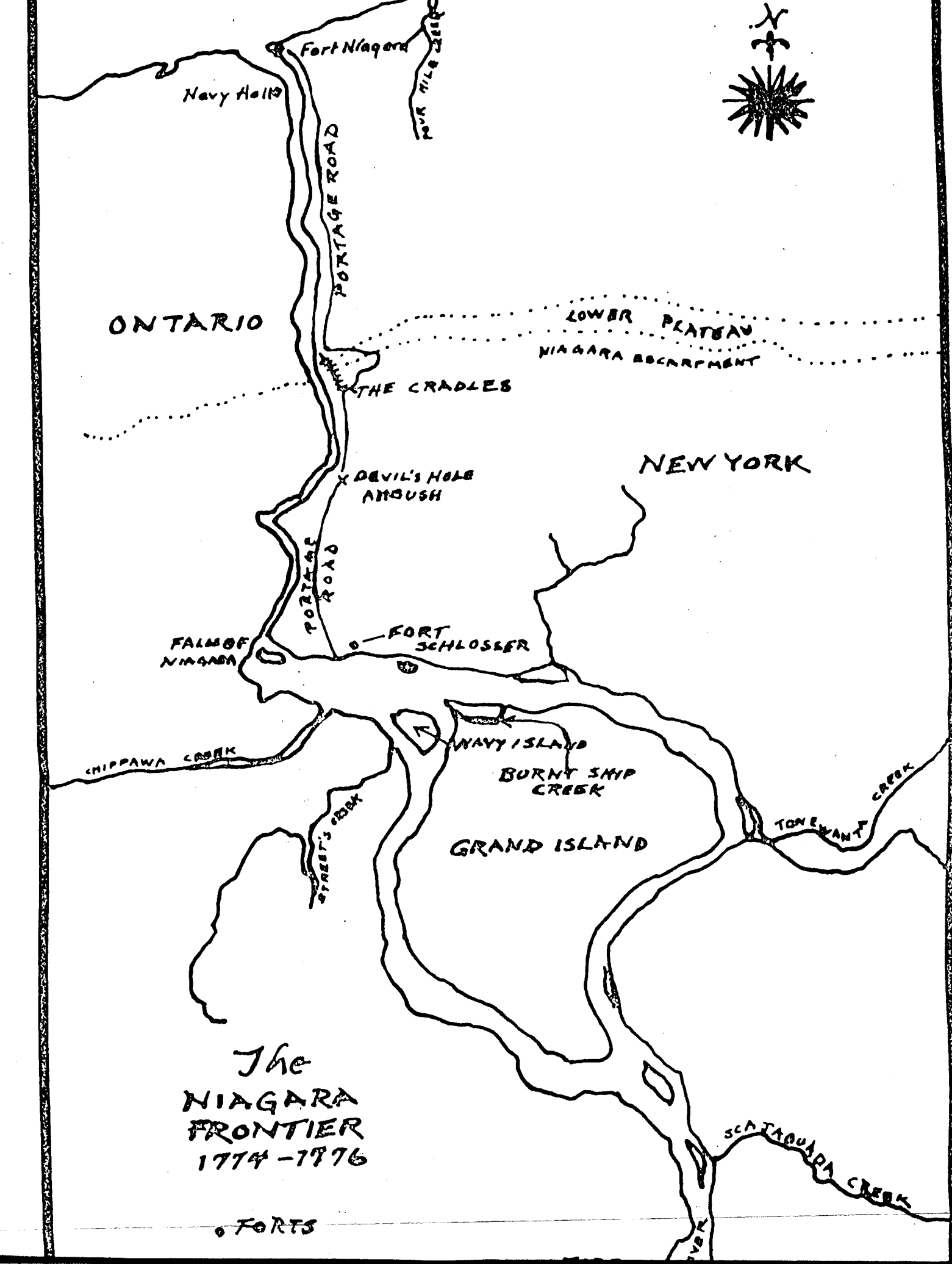
Site History

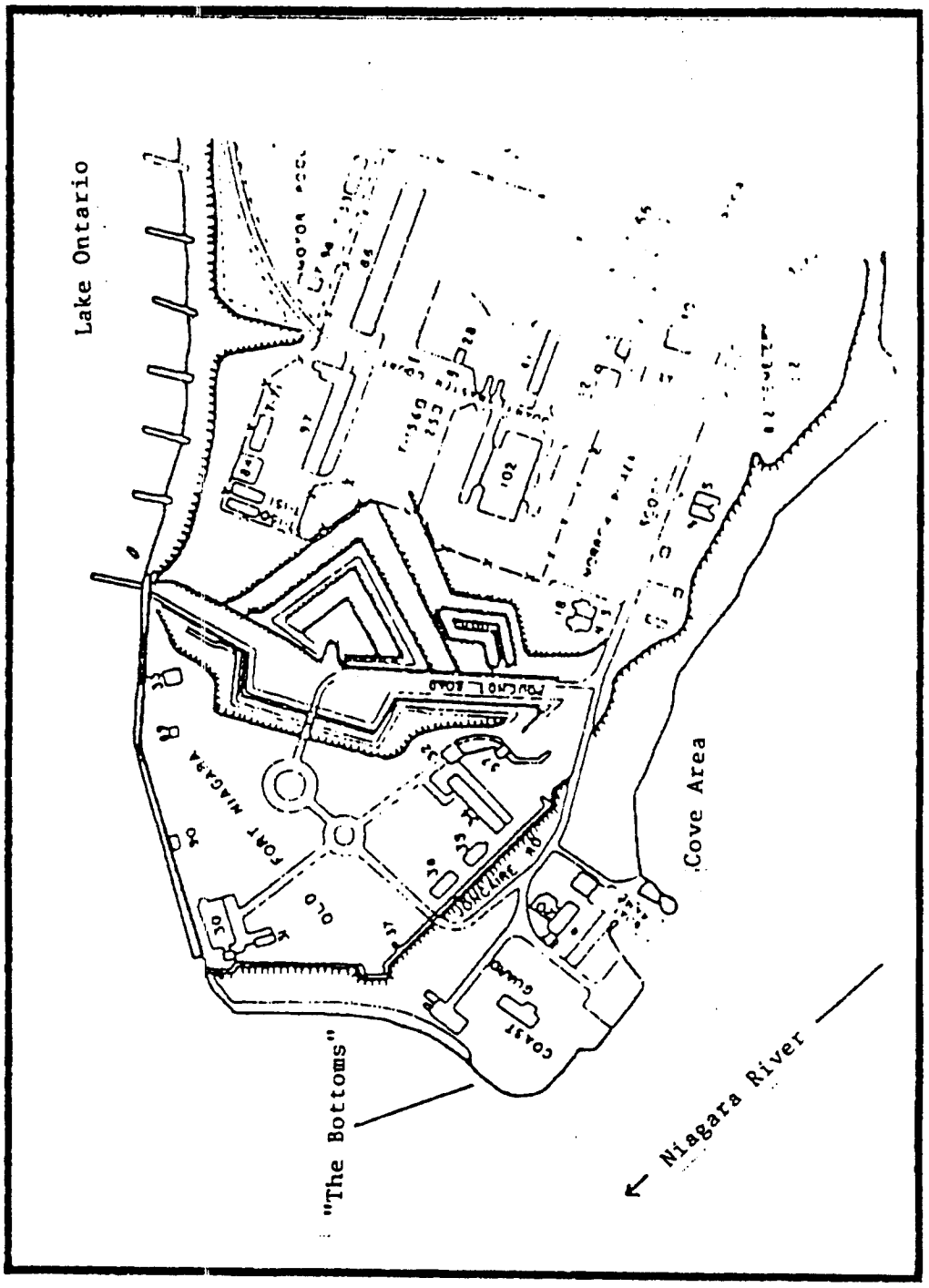
Since the formation of the Niagara River, geological forces, such as currents and ice flows, and man made structures, including seawalls and cribbing, have caused constant changes in the shape of the cove. The period of European and American use of the cove is no exception. The utility of the cove was important to occupants of Fort Niagara in the movement of supplies, men and



Map 4. The Great Lakes.

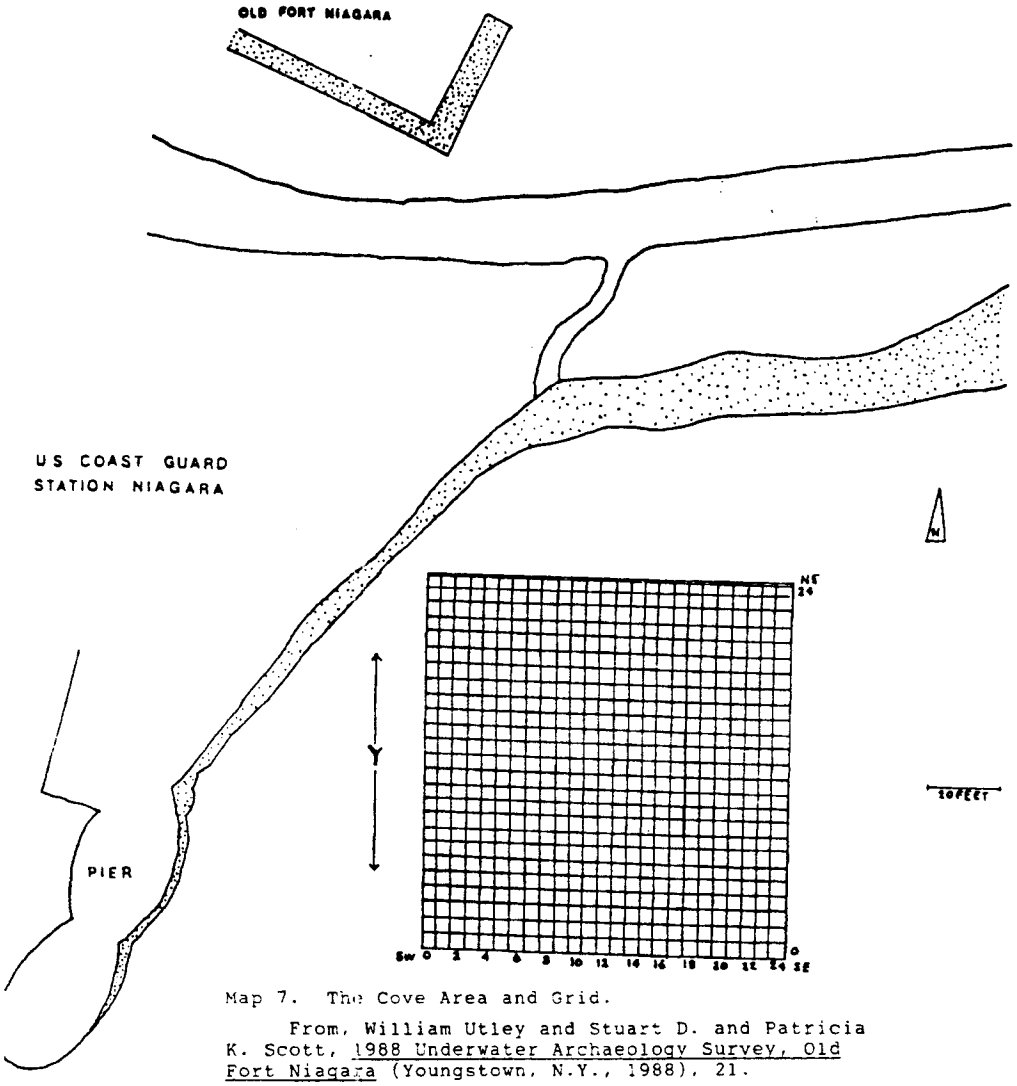
From, Irving H. Tesmer, ed. Colossal Cataract (Albany: 1981), 89.


Fort Niagara
Four Mile Creek
Navy Hall
PORTAGE ROAD
ONTARIO
LOWER PLATEAU
NIAGARA ESCARPMENT
THE CRADLES
NEW YORK
DEVIL'S HOLE AMBUSH
PORTAGE ROAD
FALLS OF NIAGARA
FORT SCHLOSSER
CHIPPAWA CREEK
NAVY ISLAND
BURNT SHIP CREEK
STREET'S CREEK
GRAND ISLAND
TONAWANDA CREEK
SCAJAQUADA CREEK
The NIAGARA FRONTIER 1774-1776
FORTS



Map 6. April 1962.

Site Plan of Fort Niagara, New York.



Map 7. The Cove Area and Grid.

From, William Utley and Stuart D. and Patricia K. Scott, 1988 Underwater Archaeology Survey, Old Fort Niagara (Youngstown, N.Y., 1988), 21.

communications. A combination of natural forces and the influence of Niagara's French, British, and American occupants, through their development of the adjacent lowland, has affected changes in the cove's shape through time.

Little evidence exists of the cove's earliest period of use by the first European explorers and their aboriginal predecessors. Father Louis Hennepin offered the first written description in 1679 while accompanying Robert Cavelier de le Salle in his exploration of the western Great Lakes region, "...the place is naturally defensive, and beside it there is a very fine harbor for barks to retire to in security."[1] With the first permanent occupation of the adjacent land in 1725 came the earliest documented evidence of the cove's shape. Military engineers and architects included the cove area in their maps and plans of the Fort.

The first map to be examined shows the present shape of the cove area and the peninsula upon which Fort Niagara sits. This map will act as a basis for comparison with historic maps. The French Castle is present on all maps to be examined and will aid in orientating the location of the cove as it exists now and through time. Map 7 shows the present shore of Lake Ontario, a mere ten to twenty feet from the north face of the castle. The adjacent lowland extends into the river channel roughly 150 feet.

Its southeastern end is bordered by the cove area which in turn curves to the south becoming part of the main river channel.

The area of lowland mentioned above is presently United States Coast Guard Station Niagara. Located on this property is a residence, administration building, boat house, parking lot, a small pump house, docking facilities for small vessels, a figure-eight shaped pier, and a boat ramp that extends from the river into the boat house. The figure-eight shaped pier, located where the northwest part of the cove meets the river, is the only modern structure directly bordering the cove. Tracing the cove shoreline away from the pier, the Coast Guard land was in 1989, approximately three feet above the level of the cove water. Turning towards the south the shore rises forming a bank roughly twenty-five feet in height. This steep bank continues up-river joining the escarpment that forms the Niagara Gorge.

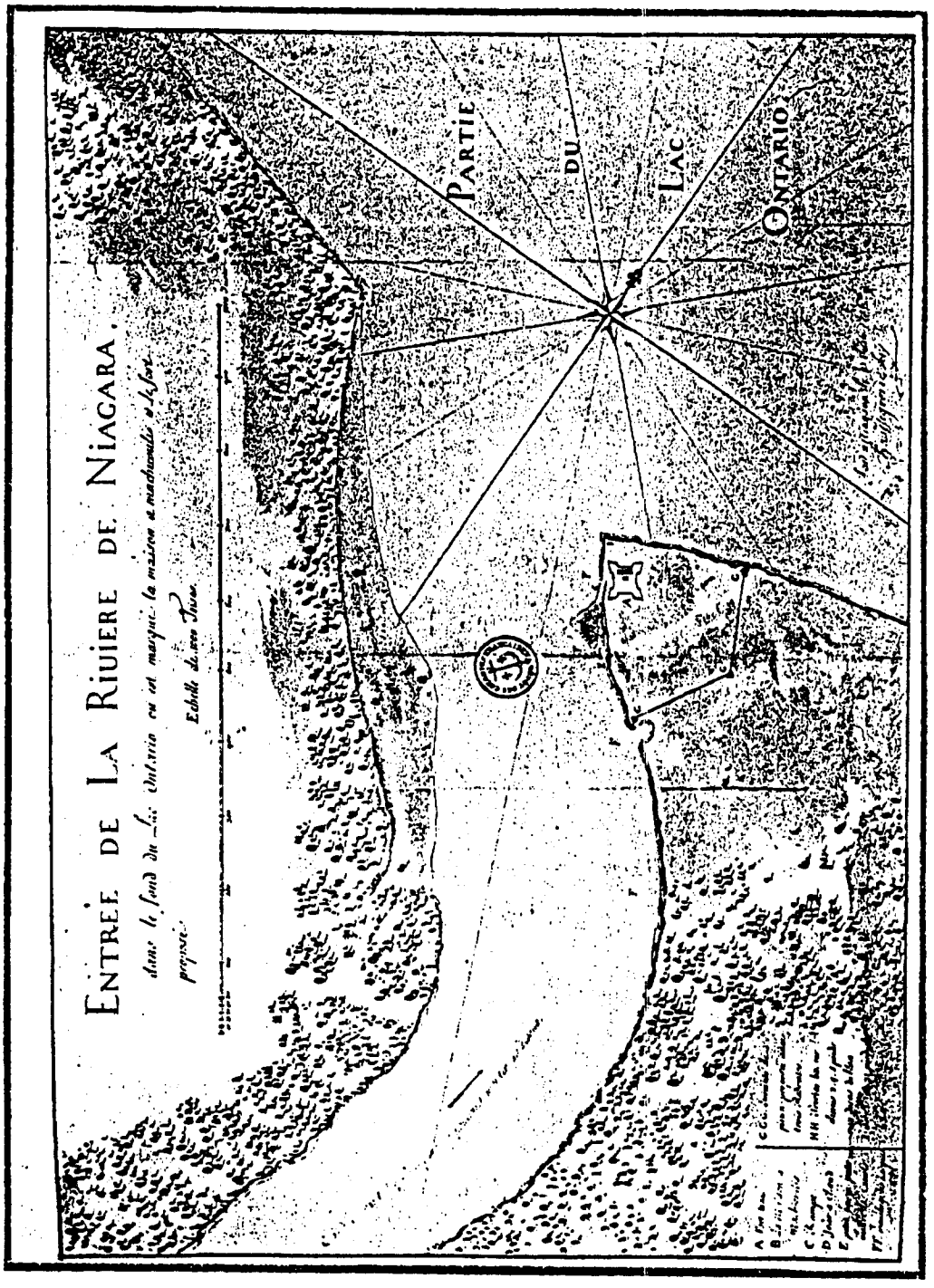
One problem that arises when studying historic maps of Fort Niagara's cove area is determining their accuracy. This problem was addressed by Old Fort Niagara researchers who reoriented historic maps using computer-assisted cartography.[2] Using ARC/INFO (Version 4.0), the researchers determined the relative accuracy of thirty-two maps of the Fort's interior. The maps shown to be most accurate will be used to study changes in the cove area.

Accuracy in drawing buildings unfortunately does not guarantee an accurate rendering of other landmarks. The draftsman or architect may not have been as concerned with natural features, such as shore lines, as with military structures. In some cases non-military structures were omitted entirely. The following examination will make note of these problems as they occur in cove area maps. As this report deals mainly with the British period, only a few French maps will be examined.

French Period Maps

In 1726, Gaspard Chaussegros de Lery, the Elder, drew the earliest known French map of Old Fort Niagara (See Map 8). It is believed that only the castle and a stockade had been built by 1726 and that the defensive line marked G was never constructed. To the southwest of the castle a small point of land is shown. If the shape of the shoreline is depicted accurately, then a comparison with the modern map would suggest that much of the 1726 shoreline is now underwater, including the small inlet shown just south of the defensive line.

Despite the small scale of this map, it does demonstrate an early use of the river for shipping activity. The cove provided an anchorage much safer than the turbulent and unprotected waters of Lake Ontario or the swift flowing Niagara River channel. The areas along



Map 8. De Lery Map 1726.

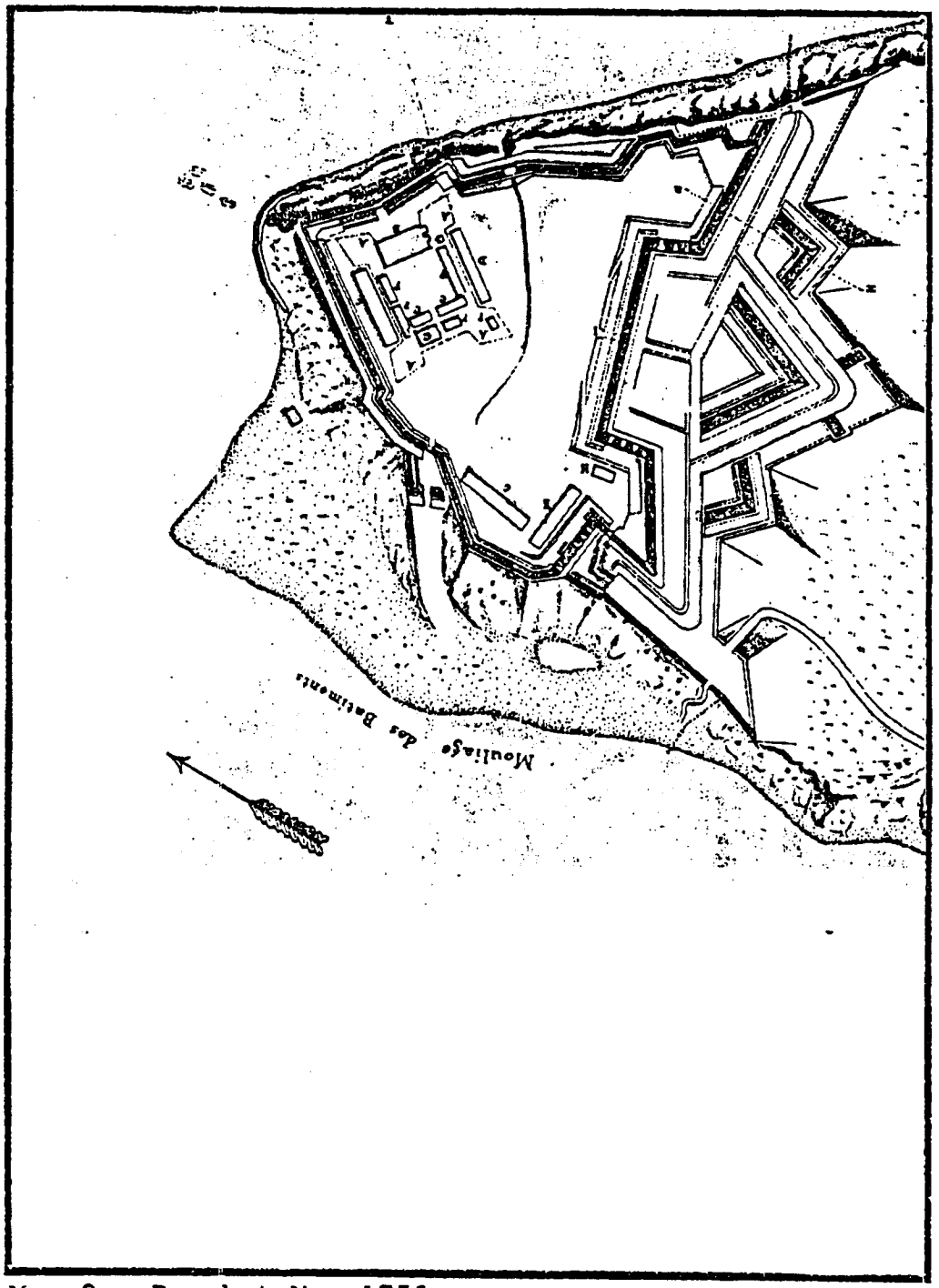
Courtesy, Public Archives of Canada, NMC-16288.

the river indicate anchorages for vessels. A small dock area used for canoes is marked E. These two areas were used to load and unload military supplies, soldiers, traders, and their goods. The only lowland structure indicated on this map is a kiln, which is indicated on the map by the letter D. While the French must have crossed the lowland and used the cove many times, the lack of permanent structures or seawalls indicates little man-made influence on the cove's shape.

By 1755 the French had made many improvements to the Fort. As the map drawn by the French military engineer Francois Pouchot shows, many buildings had been constructed along with defensive earthworks in preparation for an attack by the British during the French and Indian War (See Map 9). Despite the many changes to the Fort, little construction took place on the "Bottoms". The kiln from 1726 is not shown, but a row of pickets extends into the river which may or may not have effected erosion of the cove shoreline.

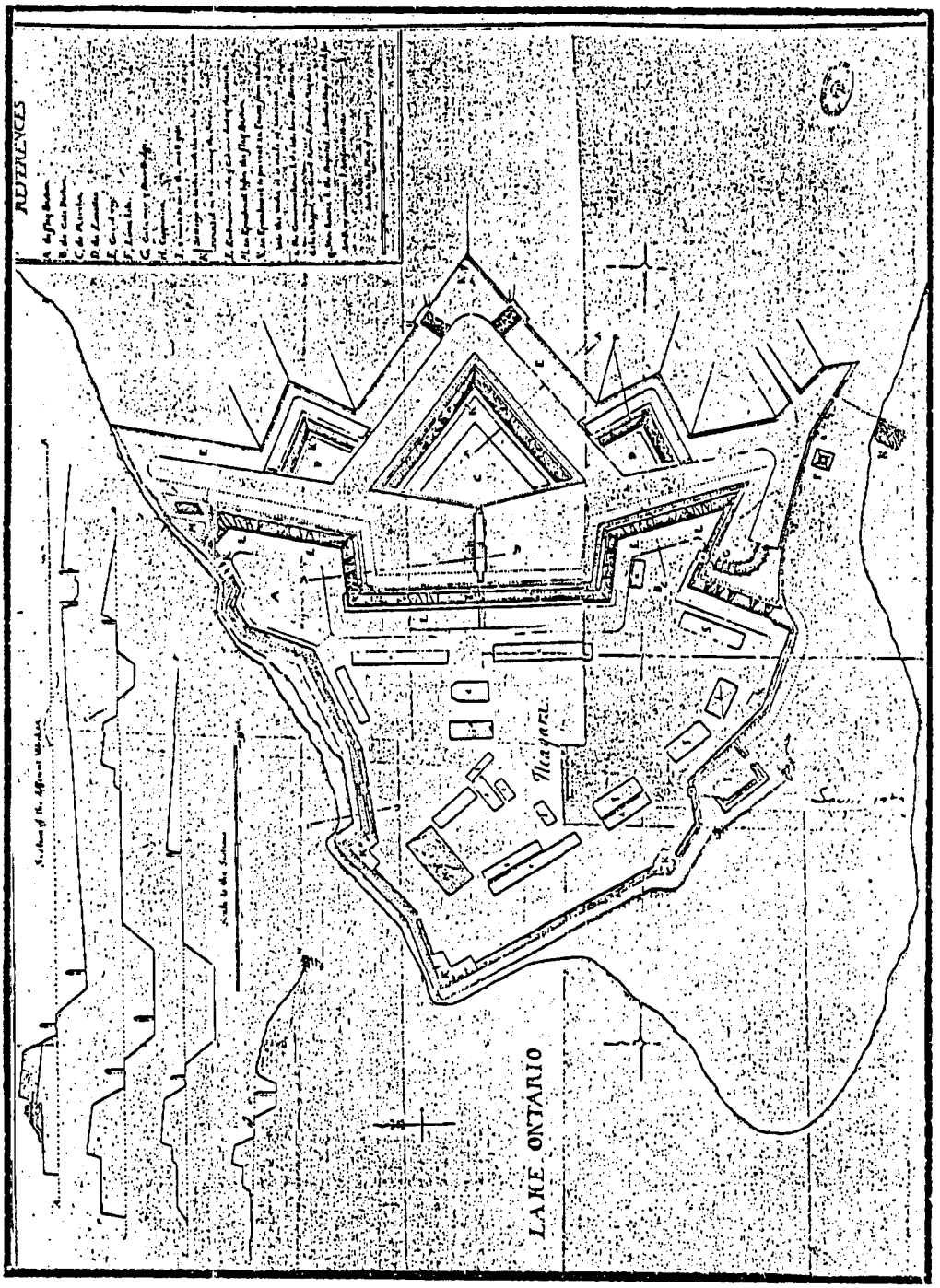
British Period Maps

The capture of Fort Niagara by the British in 1759 caused an increase in activities in the cove area and the adjacent lowland. The earliest known British map of Fort Niagara was drawn in September 1759 (See Map 10). The delineator is thought to be Lt. Thomas Sowers.[3] A



Map 9. Pouchot Map 1756.

Courtesy, Public Archives of Canada, NMC-26647.



Map 10. Sowers Map 1759.

Courtesy, British Public Records Office, MPG 342.

comparison between this map and the French map from 1755 shows a similar shape for the lowland area. There is a difference in the indicated use of the cove between the two maps. The French map indicates an Indian hut while the British map shows only a lime kiln. The British map includes an Epaulment, or wooden picket, which extended into the river to prevent an enemy from wading into the works. The French map does not.[4] Despite these differences both maps point to relatively little use of the lowland as well as to no effort made to influence the shape of the cove. As with the earlier maps, it is still likely that the cove area itself was being used as the safest anchorage for the Fort.

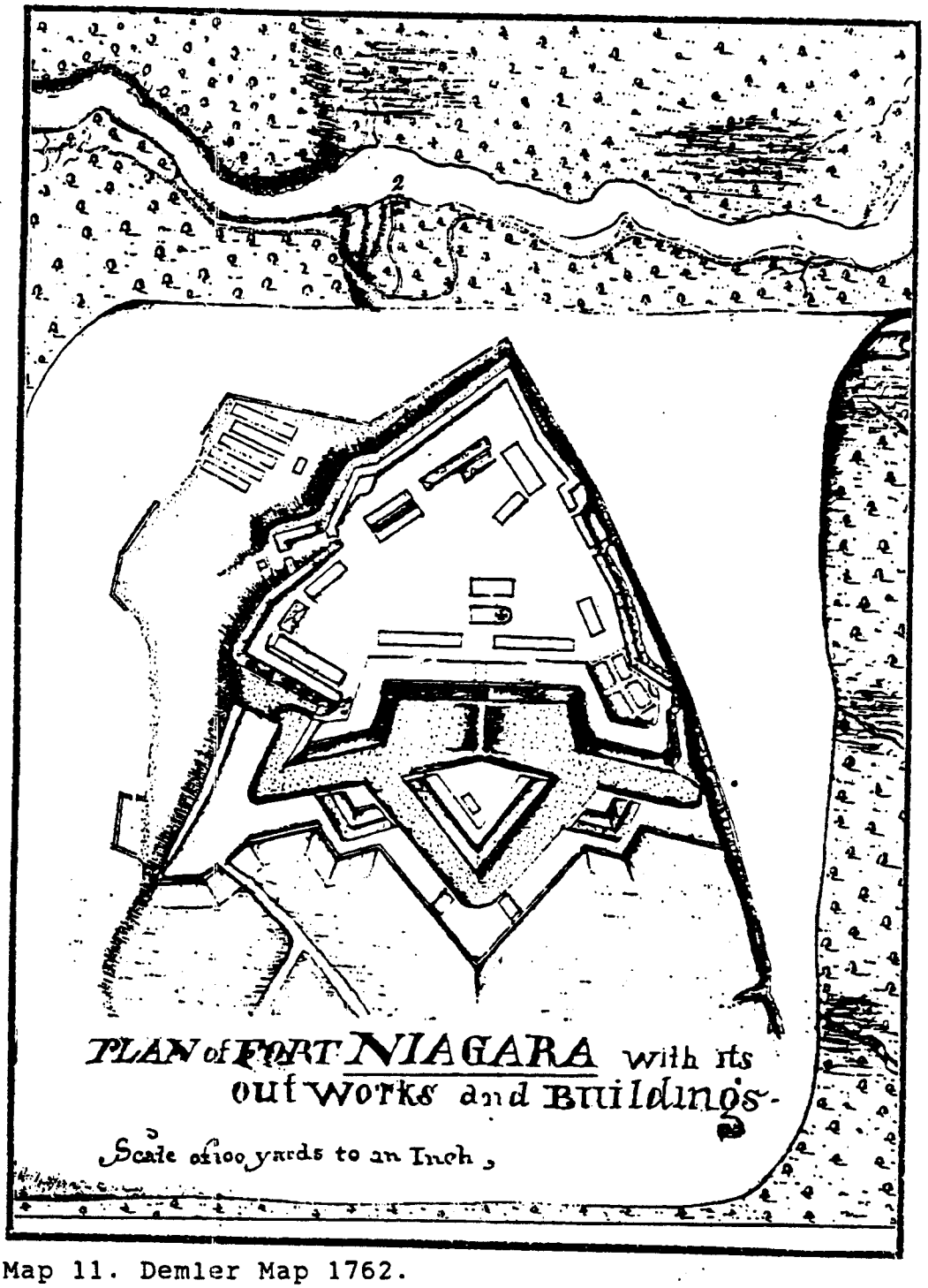
The primary changes which occurred in the cove and the lowland after 1761 involved increased building and utilization of the area by traders. Maps from the British occupation reflect these activities and their impact on the cove. A map drawn in 1762 by Lt. George Demler shows that an attempt was made to control erosion of the lowland through the use of cribbing. In describing the situation Demler wrote,

> I Have during my being here made it my particular Study to prevent the Damage, that may arise from the Surfe of the Lake and find that nothing will answer better to oppose these Encrochments than a Sort of a Frame made of Solid good Oak timber which with its proper Braces is to be fasterned to the ground with Strong Pickets as shewn in the Plan I send your Excellency hereby for a better Explanation therof.(5)

Map 11 shows the cribbing constructed by Demler along the lake side of the Fort. It continues along the lake side of the lowland near the newly constructed traders' buildings. It ends just after turning to the river side but begins again near the corner of the lowland. The cribbing ends completely after turning onto the cove side of the land. A basin constructed further upstream in the cove, like the cribbing, defines the shape of the cove. This structure protected small vessels such as canoes and bateaux from currents and flowing ice.

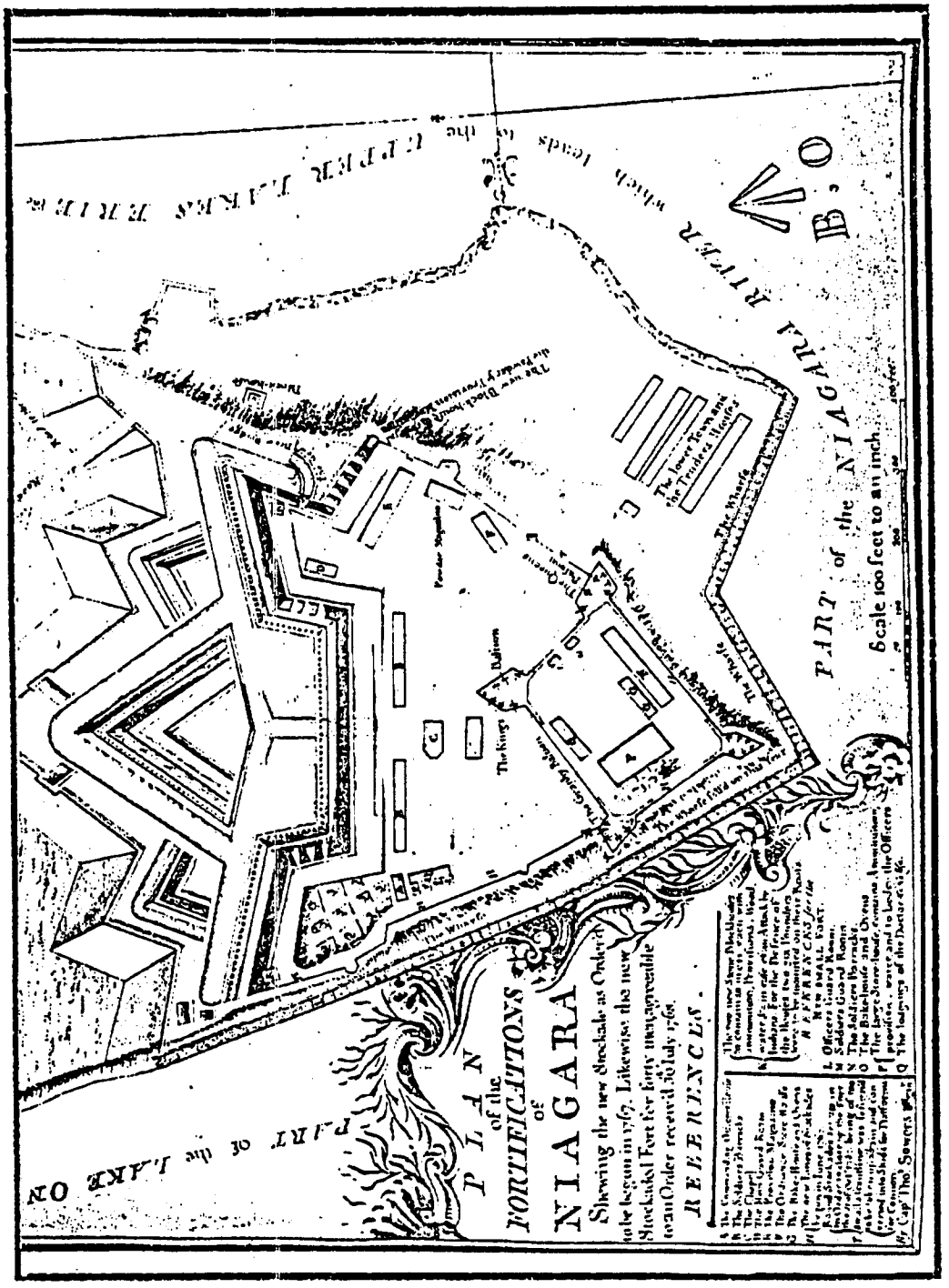
By 1768 the cribbing on the river and cove sides of the lowland was in disrepair. A map drawn that year, by Capt. Thomas Sowers, shows that despite the loss of the cribbing, the area of lowland bordering the cove and the river maintained the same general shape. The rocks from the cribbing may have continued to provide some erosion control. The basin shown on Demler's 1762 map was still present or had at least been maintained.

By 1771 the cribbing on the corner of the lowland and cove had been rebuilt. The basin was also present. A map drawn by Lt. Francis Pfister in 1771 shows structures near the cove for the first time. A wood yard and two other structures, one of which was occupied by the Fort's Barracks Master, can be seen around the cove's shore. The shape of that shore had remained fairly constant since the construction of the basin and the cribbing in 1762.



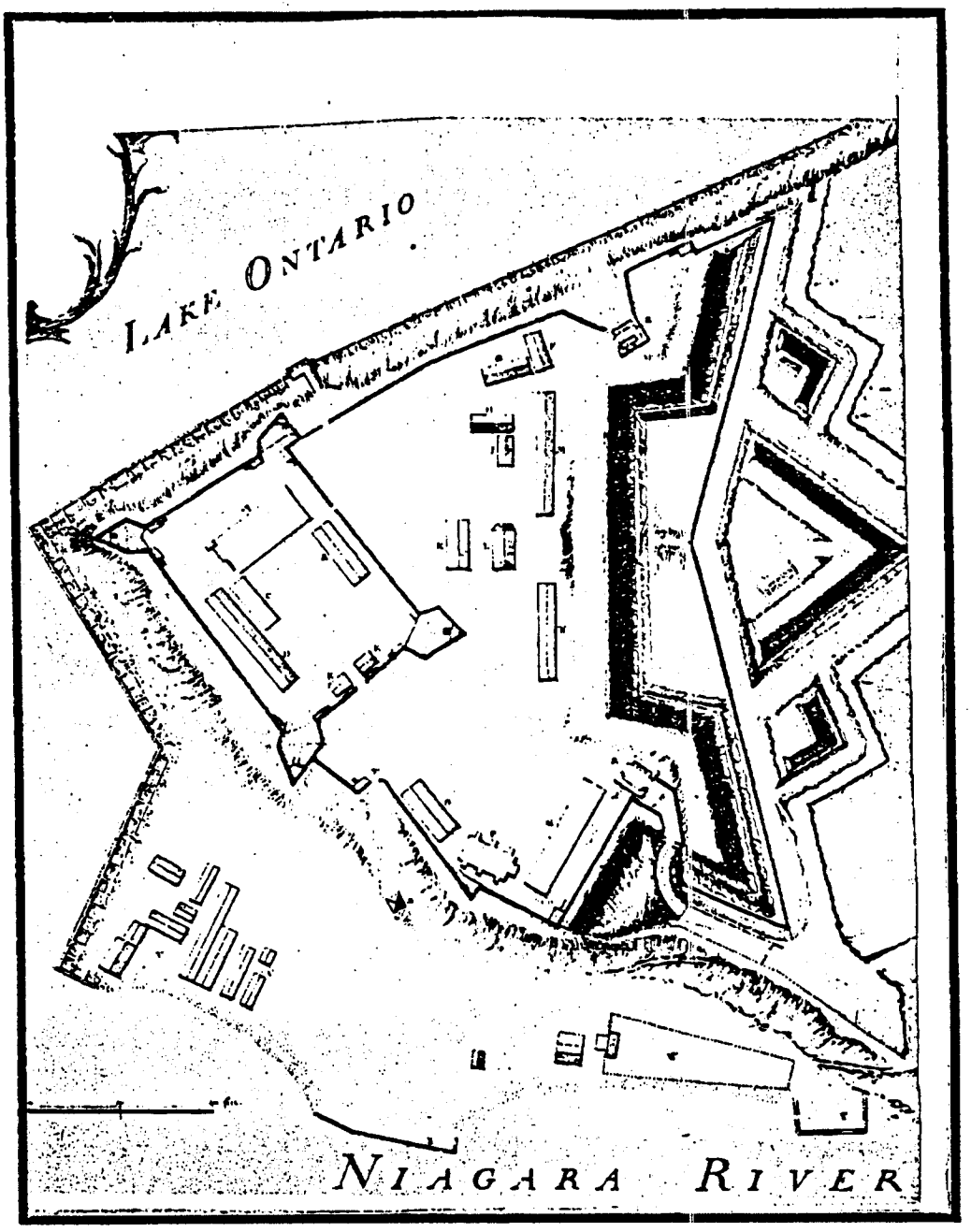
Map 11. Demler Map 1762.

Courtesy, British Museum, Crown Maps, cxxi, 73.



Map 12. Sowers Map 1768.

Plan in the British War Office, Caxton House, London in 1929 and now believed lost.



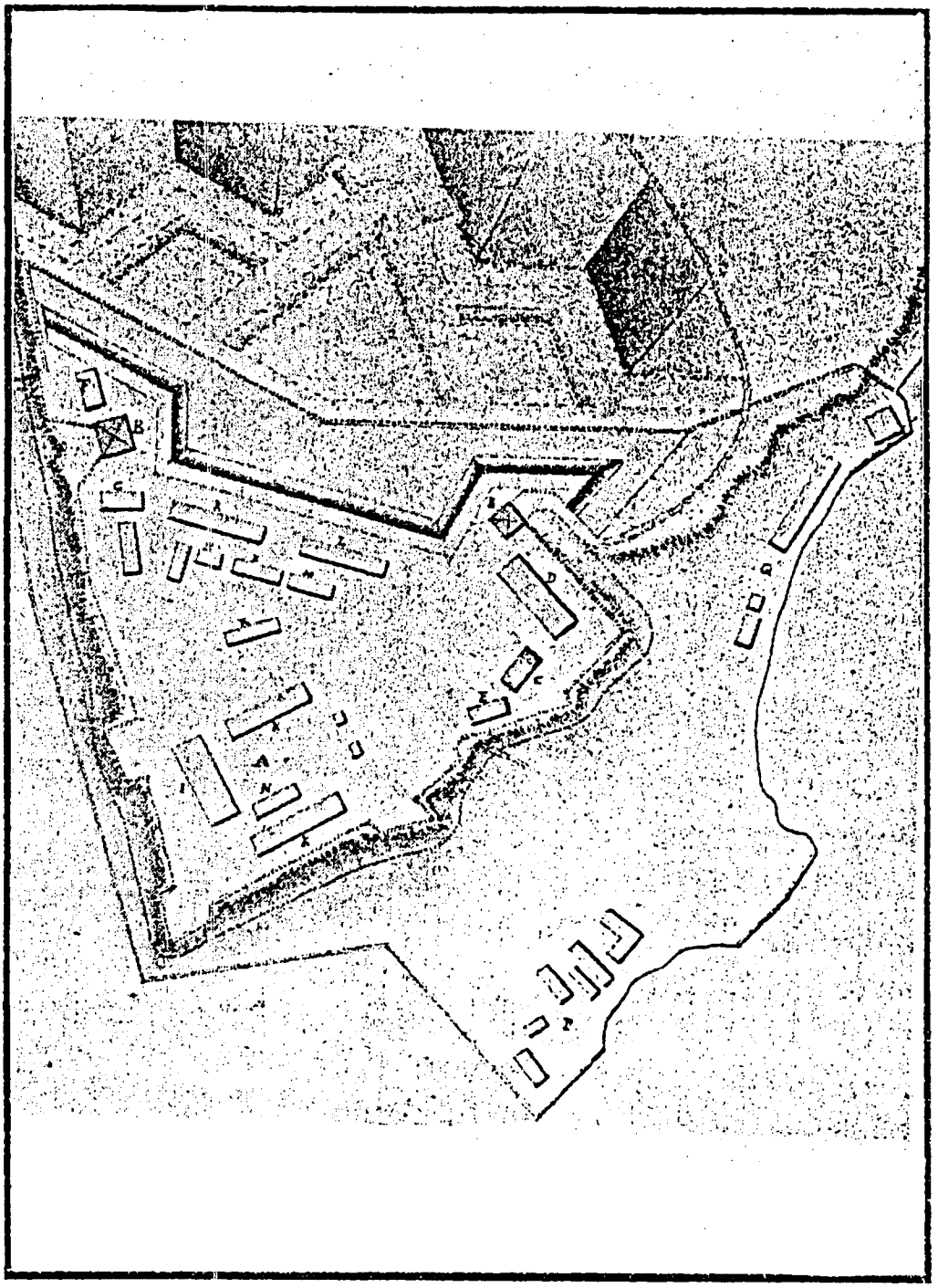
Map 13. Pfister Map 1773.

Courtesy, British Library, Crown Maps, cxxi, 76.

The basin was designed to protect vessels from currents and ice. It also provided protection for the cove shore. The currents that would have eroded the bank were deflected by the basin back toward the main channel of the river. The other end of the cove, capped by cribbing on and off since 1762, resisted the main force of the current. For the first time since Europeans had occupied the area, the configuration of the cove was stablized. When those structures changed so did the cove's shape.

During the winter of 1779 severe flooding carried away 700 yards of cribbing. Ice flows in the spring of 1780 were reported to cause further damage.[6] An undated plan, thought to have been drawn about 1780, shows little left of the cribbing that once capped the cove area (See Map 14). The basin is missing for the first time since its construction in 1762. It, along with the cribbing, does not appear on any map after this date. After those man made features were destroyed, the shape of the cove began to change again. That change continued until the early twentieth century.

During the 1780's construction on the lowlands and the cove shore reached its peak. Figure 1 is a view of the Fort from across the river showing the numerous buildings along the river and lake front. The map 14 indicates another major change related to the cove area.



Map 14. 1780(?) Map.

Courtesy, Public Record Office, MPH 275.

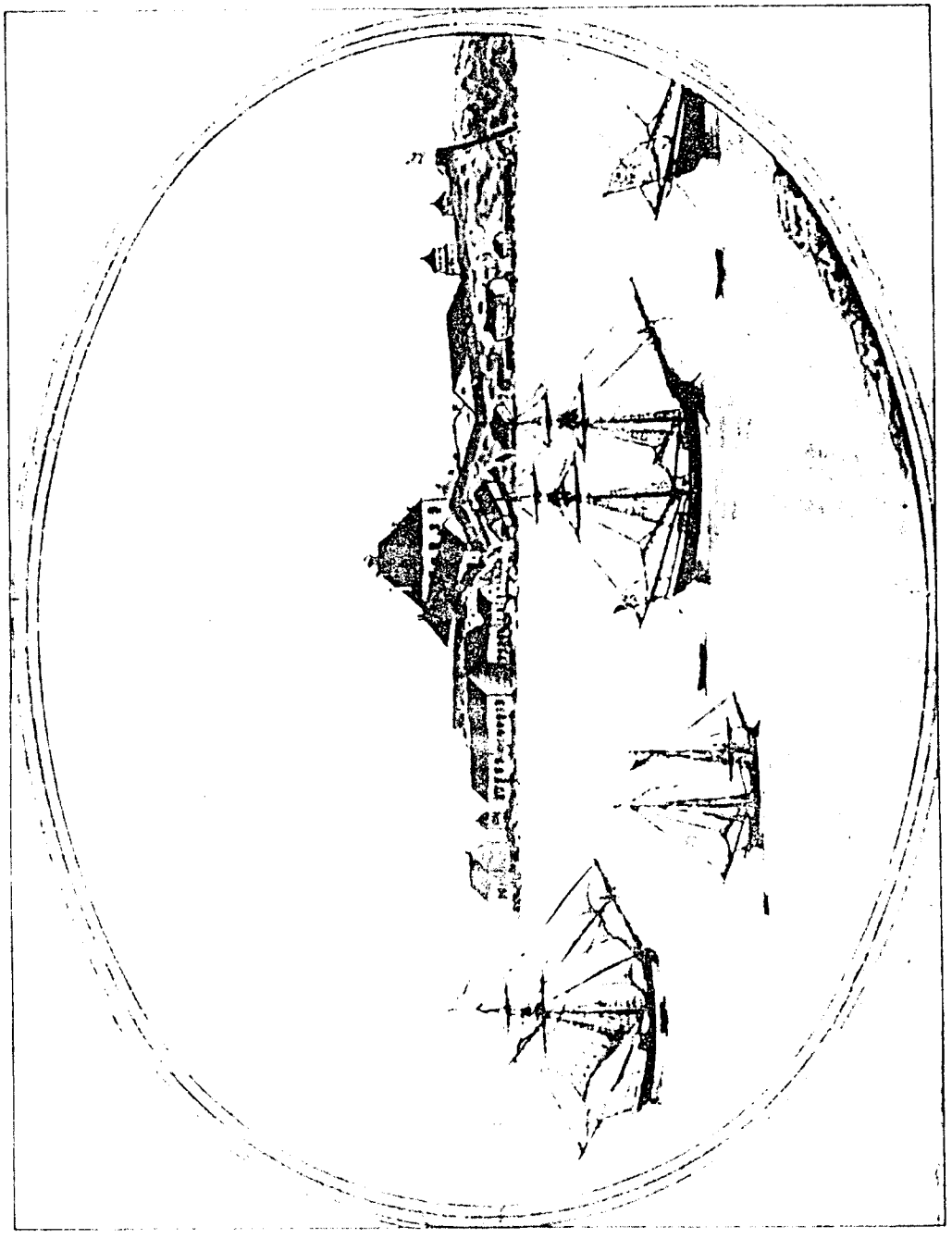


Figure 1. View of Old Fort Niagara.

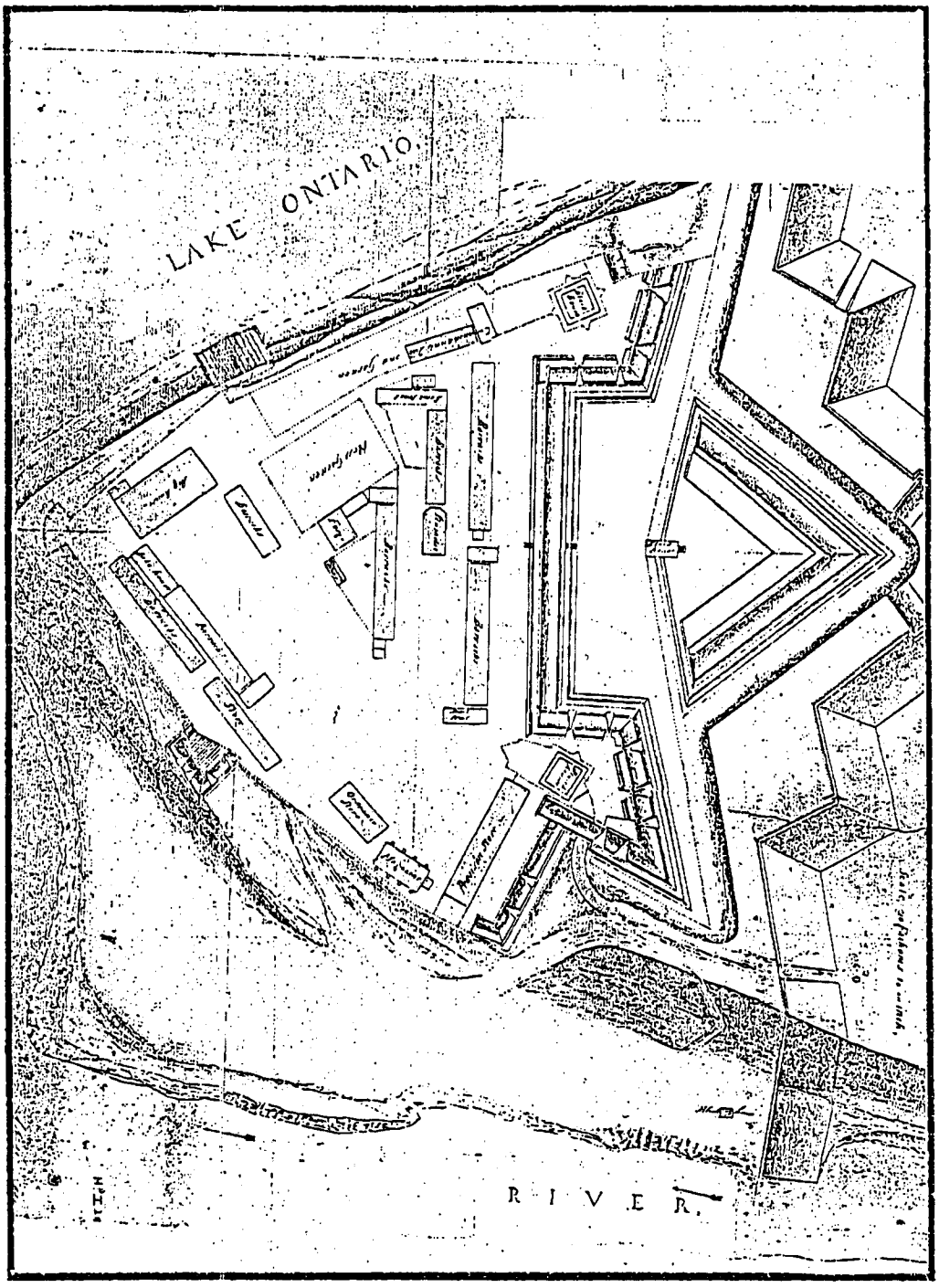
Courtesy, Old Fort Niagara Association, Fort Niagara Collection.

The buildings shown along the cove shore labeled Q are houses of the Indian Department. Many buildings built during this time period quickly fell into disrepair. By 1788 the Indian Department buildings were considered beyond repair.[7]

In 1795, Ens. James Matthew Hamilton drew the last plan made during the British occupation (See Map 15). It appears that only military structures were included. The lowland is shown empty except for a block house located near a line of pickets which extends from the Fort's earthworks down to the shoreline. The shape of the area is so different that no cove appears to exist. The lowland depicted in this map is more reminiscent of the French maps than the British maps drawn fifteen to twenty years earlier. This drastic change in shape continues into the American period.

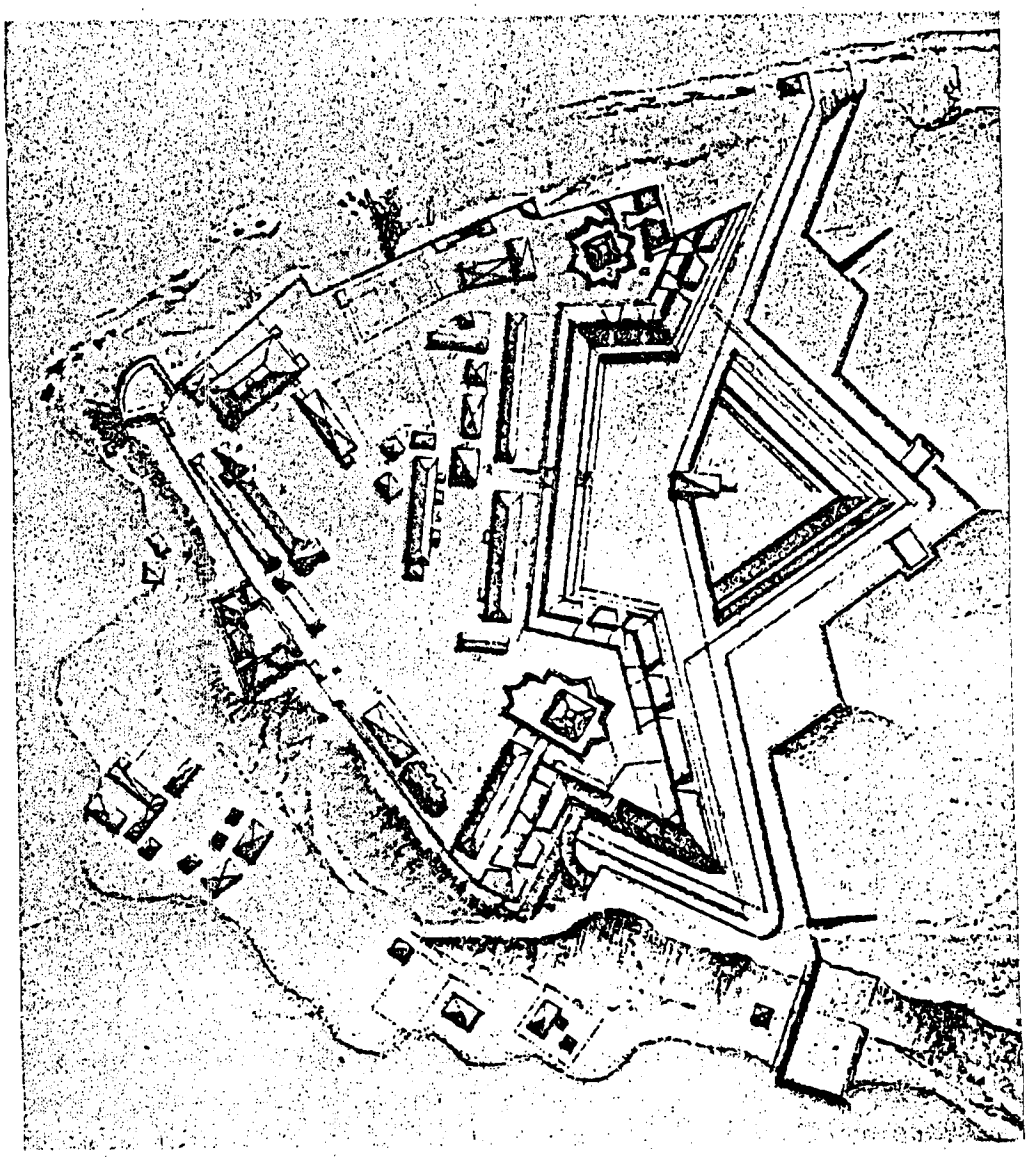
American Period Maps

The first United States Army plan of Fort Niagara was drawn in 1798 by Major John Jacob Ulrich Rivardi (See map 16). The shape of the lowland is quite different from the one drawn only three years before by the British. Rivardi reported that Niagara no longer had a wharf. Those constructed by the British, Rivardi believed, were "constructed in so slight a manner that they were always carried away by the ice." He proposed to build a new



Map 15. Hamilton Map 1795.

Courtesy, Public Record Office, MPI 211.



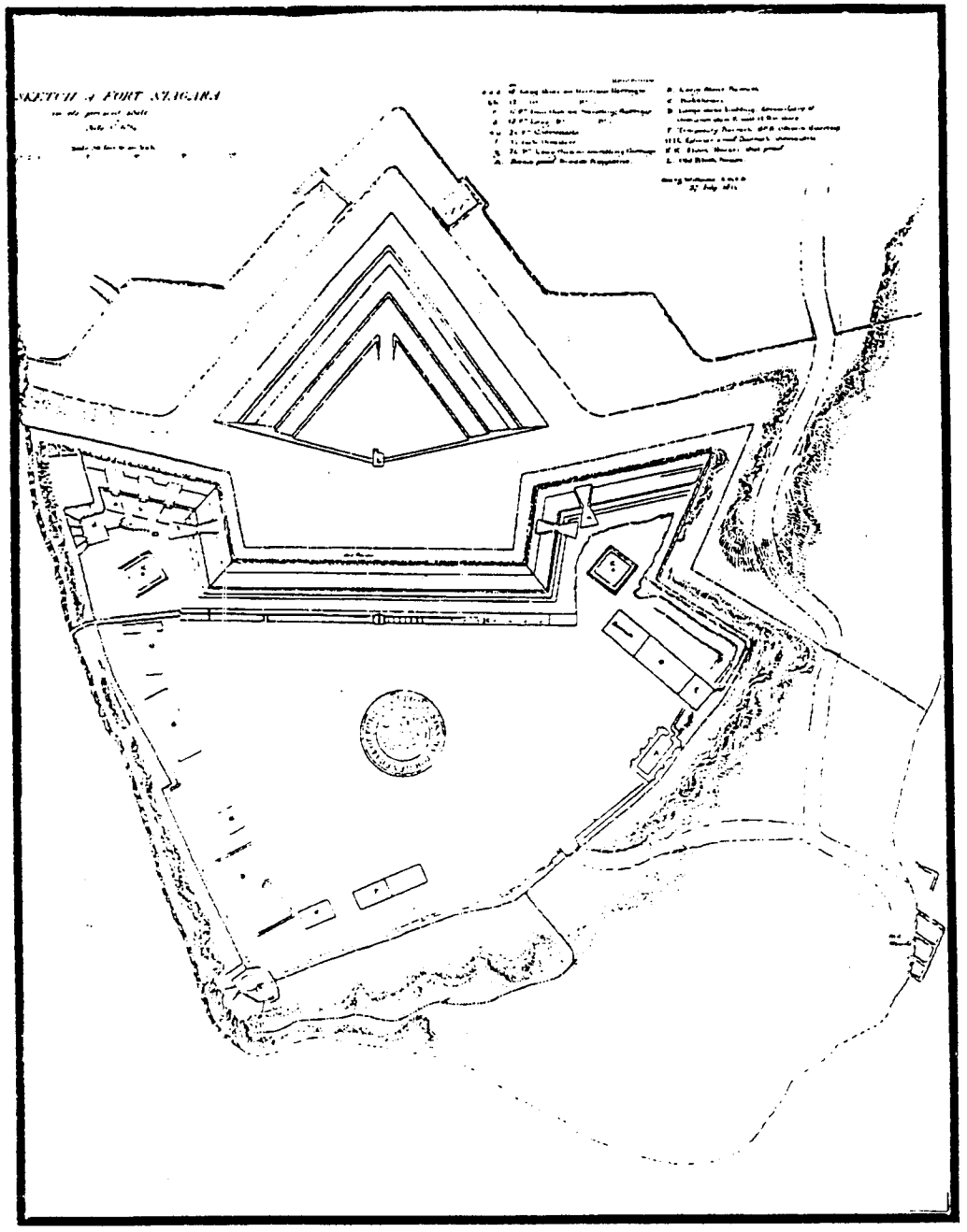
Map 16. Rivardi Map 1798.

Courtesy, National Archives, RG. 77. Dr. 3, Sht. 13.

wharf on the lowland.[8] This wharf appears on a map drawn after the British had captured the post during the War of 1812 (See Map 17). A fierce battle between Fort Niagara and Fort George destroyed all the buildings on the lowland.[9] The shape of the area is again quite different from the preceding map indicating major changes to the "Bottoms" in the early American period. Even with the changes more lowland can be seen than on present maps.

After the War of 1812 several events took place that undermined the commercial importance of the Fort. The rapid settlement of towns such as Buffalo, Lewiston, and Black Rock drew business interests away from Niagara. In addition the construction of the Erie Canal, completed in 1825, allowed the flow of goods to western Great Lakes cities to bypass the Fort.[10]

Tension between the United States and Canada over the Patriots War, in which a small group of Canadians and U.S. citizens attempted to gain Canadian independence from Great Britian, revived Fort Niagara's military importance. Attempts continued accordingly, to maintain the Fort's structural integrity. Seawall construction began in 1816 but was discontinued in 1818. It was strengthened and finished in 1839 and in the early 1840's. Additions to the wall provided protection for the lake and river side of the Fort. The river wall, however, stood upon a bluff



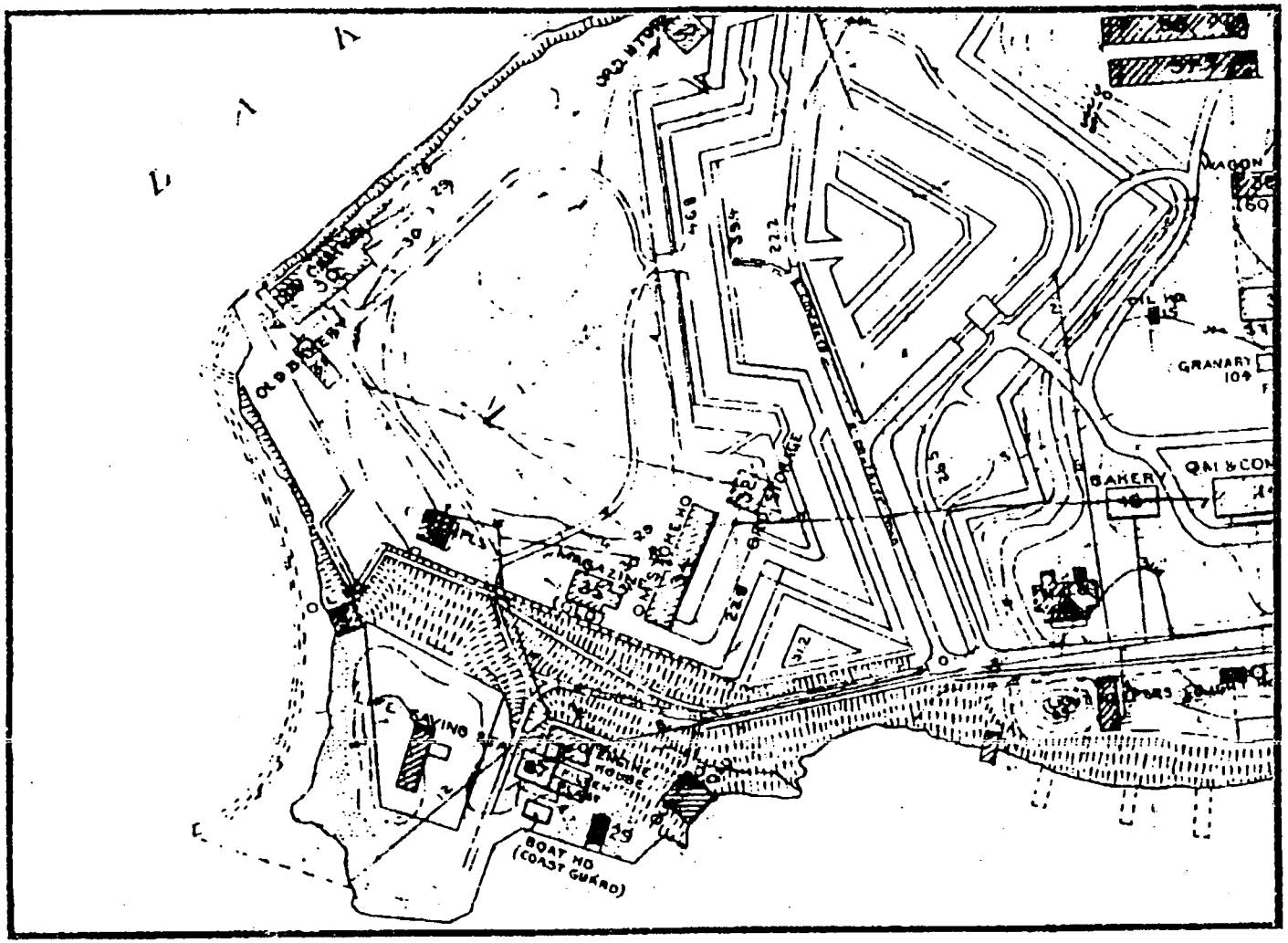
Map 17. Williams Map 1814.

Courtesy, Public Archives of Canada, c 15157/H2/450/ Niagara/1814.

away from the river shoreline and thus offered no stablitity for the cove area.

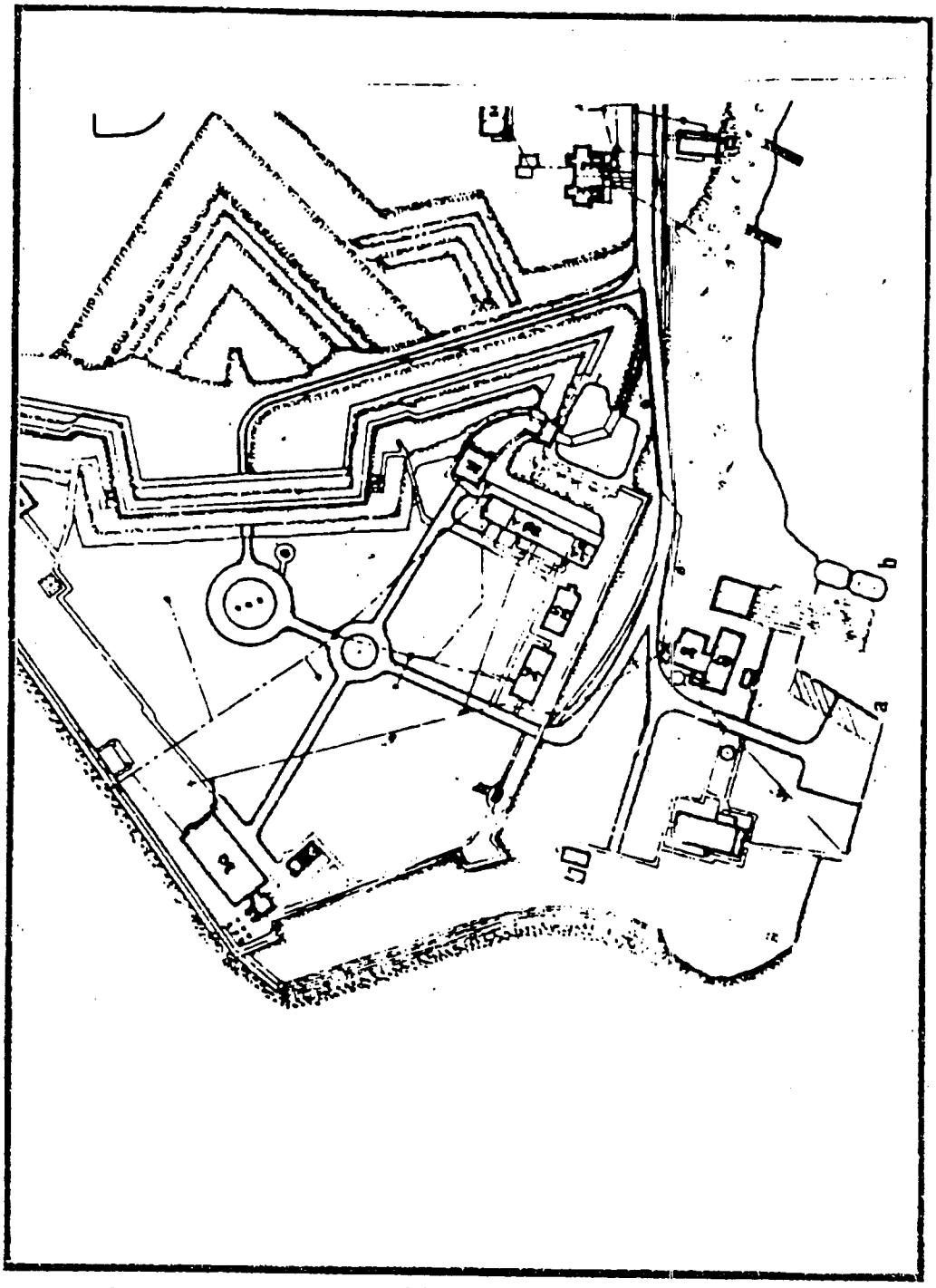
While a few buildings occupied the lowland during the nineteenth century, the area became the home of the United States Lifesaving Service in 1893. This later became a United States Coast Guard station. A small pumping station and a utility plant for Fort Niagara were added in the twentieth century.[11]

During the 1930's the Civilian Conservation Corps constructed jetties and log groins along the river and lake near Fort Niagara to prevent erosion. In the late 1930's the Works Project Administration built a low sea wall at the base of the 1816-1839 sea wall. It protected the Fort and also wrapped around much of the lowland area. Additional seawall construction continued on the lake side of the Fort in the 1960's.[12] Map 18, by C. H. Stone, shows the lowland in 1926 before the erosion control work was conducted. The 1938 map by Carl F. Kolloff, Map 19, shows the cove area and lowland after this construction. The shaded area in the 1938 map labeled "a", represents landfill used to form the docking area. The figure eight shaped pier (labeled "b") forms the end of the cove area. The cove shoreline leading away from the pier had by this time eroded back towards the Fort near to its present location.



Map 18. Stone Map 1926.

Courtesy, Old Fort Niagara Association, Fort Niagara Collection.



Map 19. Kolloff Map 1938.

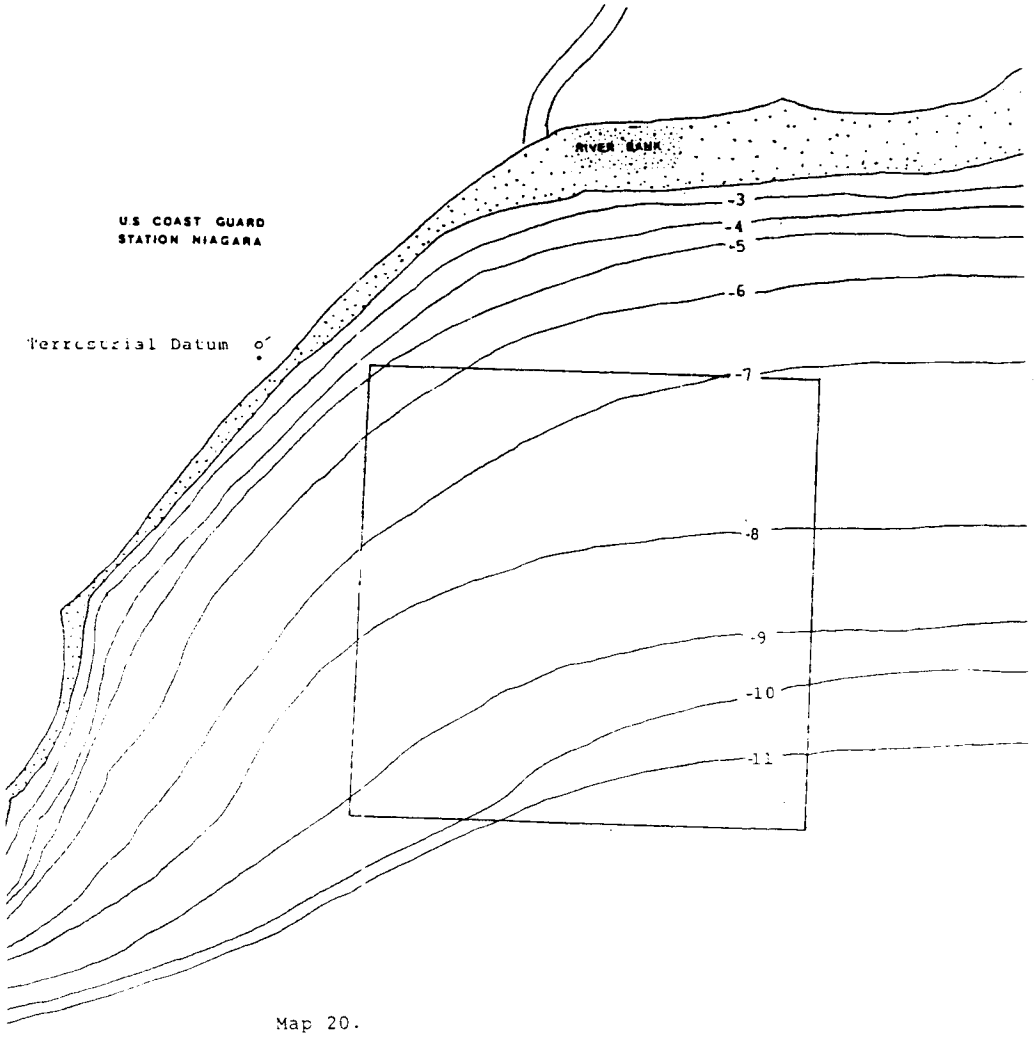
Courtesy, U.S. Army Corps of Engineers.

Summary

Throughout the history of Fort Niagara the lowland had been subject to the forces of the Niagara River and Lake Ontario. As the area became more important for trade and defense during the British period, attempts were made to control the rate of erosion. During an eighteen year period between 1762 and 1780 the shape of the cove area remained fairly stable. This was due to a basin which deflected the main current away from the shore, and several crib structures which had capped the corner of the lowland bordering the cove. The loss of these two structures in the late 1770's corresponded with increased changes in the shorelines. The configuration of the cove then fluctuated throughout the nineteenth century. Construction in the 1930's, erosion, and subsequent reinforcements gave the cove its present shape.

The Cove Area Today

The area of Fort Niagara's cove examined in the 1989 survey is shallow, ranging from three to eight feet in depth (See Map 20). The depth of water in the cove is the product of two factors. The first factor is the level of the Great Lakes, which is determined by the amount of rain fall in the Great Lakes drainage basin. The second factor involves the hydroelectric power plants located in Canada and the United States at Niagara Falls. The diversion of



Map 20.

Readings are feet below terrestrial datum.

water to the power plants can drastically reduce or increase the level of water in the Niagara River. The 1989 crew observed a one to two foot increase in water depth from the 1988 field season. This was thought to be due to the dry summer of 1988. Visibility in the fresh water cove ranges on average between zero to eight feet. Any disturbance of bottom sediments that might affect visibility is eventually carried away by the currents which are usually under one knot.

The bottom surface of the cove changes from a rocky shoreline to light brown silts containing an occasional large rock. Beyond the silt the bottom becomes rocky again in the deepest area near the figure eight pier. Testing of the subsurface sediments revealed many different stratigraphic layers. Although a more detailed discussion of these layers is provided in the analysis section (Chapter 4), a sample of the more typical sediments is shown in Figure 2.

A light brown silt, typically five one-hundredths of a foot thick, formed the surface level of the cove bottom. The next one-tenth of a foot was composed of dark organic matter. Below that was usually six-tenths of a foot of coarse dark steel blue-grey sand. Beneath the sand was a variety of sediments composed of dark gravel, large rocks, light clay, and sand produced by the deterioration of red Queenston shale.

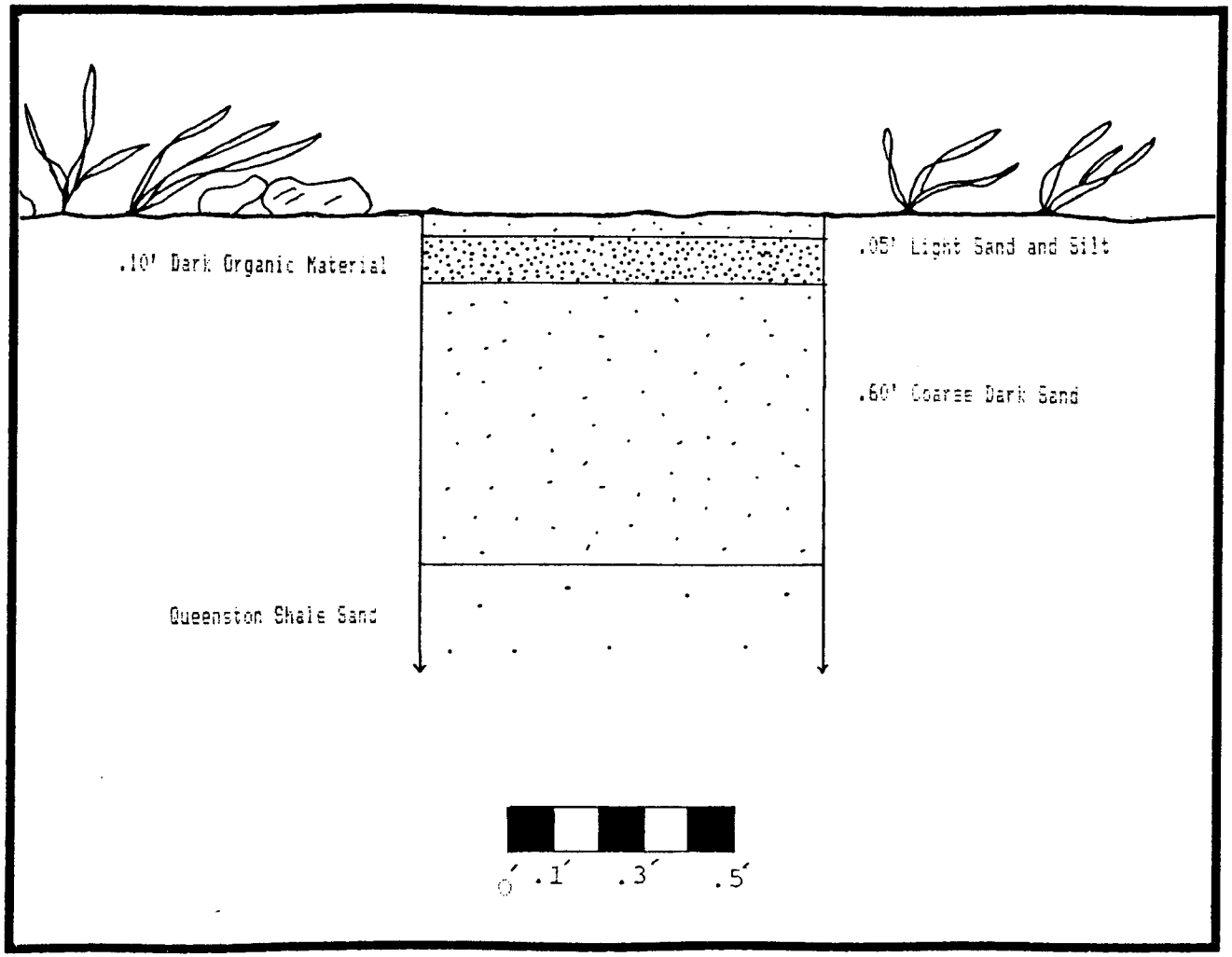


Figure 2. Stratigraphy Sample.

The river current, which both deposits and erodes sediments, influenced the formation of these stratigraphic layers. The occasional release of water from the massive hydroelectric plants in the Niagara gorge make it impossible to distinguish between stratigraphic layers deposited by natural currents and those affected by the power plant. The sudden release of stored water also can strip away many years' worth of sediment. This phenomenon was considered in the analysis of stratigraphic information discussed in Chapter 4.

Biology

At the beginning of the 1989 field season, in early June, there were few fish and no plants in the cove. By the end of July aquatic grasses had grown to six feet in length which made it difficult to maneuver or see. Disturbance of the grass caused great clouds of silt. An additional nuisance encountered in removing the grass came in the form of large and agressive eels which make the long grass their home during the summer. By early fall, as the water temperature drops, the long grass dies off. Throughout the winter the cove is usually filled with ice. The ice flows typically clear the cove by late spring. Thus, the best period to examine the cove occurs in late spring and early fall.

Pollution

The Niagara River region is unfortunately known for its serious toxic chemical pollution problems. The highly publicized Love Canal residential area of Niagara Falls, N.Y., which was found to be the location of a hazardous waste dump, and other polluted areas, drain into the Niagara River. While the Great Lakes are reportedly recovering from a long period of abuse, the proximity of the above toxic areas causes concern for those who wish to spend extended periods of time in the Niagara River. The affect of these pollutants on the cove area's formation, or its artifact assemblage is unknown.

NOTES

1
Father Louis Hennepin quoted in Frank Severance, An Old Frontier of France (New York, 1917), 42.

2
Stuart D. and Patricia K. Scott, James W. F. Smith, and James MacLeay, "Reorientation of Historical Maps of Old Fort Niagara Using Computer-Assisted Cartography," Journal of Field Archaeology, XIIV (1991), 319-343.

3
Brian Dunnigan, Old Fort Niagara Map Catalog (Youngstown, N.Y., n.d.).

4
Lt. Thomas Sower, n.t. Plan of Fort Niagara, Paper manuscript, colored. Public Record Office, M.P.G. 342, London, copy in Old Fort Niagara Association Library.

5
George Demler to Jeffrey Amherst, 5 May 1761, MSS: Jeffrey Amherst Papers, W.O. 34, Public Record Office, London, quoted in Stuart D. and Patricia Kay Scott, Coast Guard Station Niagara: Archaeological and Historical Survey, (Youngstown, N.Y., 1983), 11.

6
Matthews to Bolton, 25 March 1779, British Museum 21760, London, quoted in Stuart D. and Patricia Kay Scott, Archaeology for Seawall Repairs (Youngstown, N.Y., 1986), 2.

7
John Collins, Extract from Report of John Collins, 6 December 1788, (Niagara Historical Society Publications, n.d.), IL 58,

8
Rivardi to Hamilton, 2 Oct. 1799, The Papers of Alexander Hamilton ed., Harold C. Syrett (New York, 1961-1979), XXIII 489.

9 Letter to Quebec Mercury, in Documentary History of the Campaign upon the Niagara Frontier ed., E. Cruikshank (Welland, Ontario, 1902-1908), IV 277.

10 Ibid., 19.

11 Niagara Gazette, 20 Mar. 1893, quoted in ibid., 20.

12 Ibid., 21.

CHAPTER 3

METHODOLOGY

In 1988 a preliminary systematic survey of the cove area revealed what seemed to be a pattern to where artifacts were found. The goal of the 1989 work was to test the hypothesis that the artifacts discovered during 1988 were not randomly deposited throughout the cove, but were aligned in such a manner as to deliniate an eighteenth-century shoreline. Furthermore, the 1989 project was designed to assess the archaeological potential of Old Fort Niagara's cove area for future research. This chapter will examine the 1989 research design and outline the planning, research, funding, procedures, equipment, and personnel involved.

The comprehensive research design for the 1989 underwater work was organized into three specific tasks. The first objective involved stratigraphic testing of the cove area with the philosophy in mind that spatial distribution of artifacts at a site provides information concerning the site's date and how the site was formed.[1] Testing the stratigraphy necessitated the recovery of artifacts. Therefore, the second task of the research design involved the preparation of an artifact database

for analysis. In the analysis phase of the research, artifacts found during the on-going terrestrial archaeology conducted inside the Fort and on the adjacent Coast Guard Station were compared to the assemblages from the cove. This comparison was done to ellicit information, where possible, about trade, buildings, human social status, and the functional use of the cove. Since the cove area was an intricate part of Fort Niagara's military activities, it was assumed that the collected artifacts would be similar in most cases to those found inside the Fort. Of course, since the cove was a loading and unloading area for ships and canoes, more items related to cargo were expected. On the other hand, since the Bottoms, an area used by merchants, traders, visitors, and off duty military personnel, was adjacent to the cove, it was thought that there would be some differences in the artifact assemblages that would reflect the use of this lowland for non-military purposes.

The research design's final objective involved experimentation with underwater excavation methods. In the field of underwater archaeology, the vast majority of investigations have been shipwreck sites. Naturally, such preoccupation with vessel excavation yielded ever-changing and improving methodologies for exploring ships. Conversely, with inundated sites, the development of universal methodologies has been comparatively slow, and

techniques used at inundated sites are typically site specific.

At Fort Niagara's cove, the loose sandy nature of the bottom sediments cast doubt on the likelihood of conducting controlled excavations. There was even some doubt as to whether geologic or artifactual integrity existed. The research design was greatly concerned with developing an excavation technique that would keep the sides of the test units from collapsing. Testing procedures were devised to provide fast, accurate, non-destructive, and inexpensive underwater field methods that would give data comparable to archaeological land surveys.

Previous Work

The Archaeology in Progress Project at Old Fort Niagara has been conducting terrestrial excavations on site since 1979. The archaeological studies have addressed over thirty research questions that are generally aimed to recover information about the daily activities of seventeenth, eighteenth, and nineteenth-century life that were seldom discussed in contemporary documents. In the land-based work the researchers have also focused on land usage and topographical changes through time. Another emphasis has been on experimenting with new methodologies. The Old Fort Niagara archaeologists have studied selected

areas of the Bottoms and other sites along the historic portage route, but the primary work has been within the walls of the Fort.[2] Much of this work was done in response to new construction. The data recovered from these projects have been assimilated into other research on the Fort's structural and cultural history.

Historical research at Old Fort Niagara has primarily been conducted by Brian Leigh Dunnigan, Executive Director of the Old Fort Niagara Association.[3] Some of his research topics include military campaigns, architecture, and the Fort's general history. Despite the impressive amount that has been learned about the Fort by both historians and archaeologists, little is known about the civilian area located on the Bottoms adjacent to the cove. This area housed not only the traders and soldiers that worked at the Fort but the artisans, merchants, Indians, tourists, and bureaucrats as well. It was the only civilian development associated with Old Fort Niagara until after 1796.

In the 1960's Harry Havens, a local amateur archaeologist, collected artifacts from the shore of the cove area during a period of low water. His collection, housed at the Rochester Science Museum, contains many artifacts thought to be from the British period of occupation. Unfortunately little provenience data and few

notes related to Haven's work are available. While this is unfortunate, the collection demonstrated the potential for submerged cultural resources in the cove area.[4]

In 1981 Stuart D. and Patricia K. Scott directed historical and archaeological research on the Bottoms, now the site of a small U.S. Coast Guard station, in response to planned construction.[5] The report from that project demonstrated the area's rich potential for continued archaeological research. It identified the more sensitive areas that warranted exploration, such as the cove area.[6]

In 1982 Dr. David Switzer and Dr. Stuart D. Scott conducted a Fisher proton magnetometer survey in the waters surrounding Old Fort Niagara. Numerous metallic objects, both modern and historic, were noted, along with a large strand of rocks in the Niagara River. In 1985 and 1986 divers from the New York State Police and an ordnance team from the United States Navy noted and removed many rounds of three inch MKI Stokes practice rounds. These groups noticed many artifacts of historic interest.[7] These discoveries, along with the results from the magnetometer survey, prompted further research.

In 1987 and again in 1988, limited surface surveys were conducted in the waters around Old Fort Niagara to determine the nature and extent of any submerged cultural resources. The 1987 team, from Basin Harbor Maritime Museum, surveyed five areas in the Niagara River and Lake

Ontario. The team reported their survey of the cove area to be:

> ...a rather unsatisfactory enterprise, due to the tremendous amount of weed growth. However, the relatively protected nature of the river bank indentation, its history as a landing area, the cobble strand, and the shot and ceramic finds during the 1987 survey all suggest that more surveys in this location may be productive.(8)

Based upon the recommendations of that report, and unanswered questions regarding the nature of the cove's bottom, a new team of archaeologists from Old Fort Niagara and East Carolina University inspected the cove in 1988. After ten days of visual survey work the team concluded that the cove bottom had a high frequency of artifacts. But more importantly, researchers noticed a pattern in the artifact distribution that seemed, "to suggest an earlier shoreline, showing where the river might have been in the late 1770's."[9] The team leaders spent the winter of 1988-1989 formulating a research design for the following summer. In June of 1989, the research team entered the cove and began six weeks of excavation and testing.

Planning

Methodological planning for the cove area began in September of 1988. Techniques and theories from other inundated sites were examined as well as historic and prehistoric sites in lakes, rivers and oceans. A survey of

inundated site literature suggests that no general rules can take precedence. Each site must be evaluated individually as site conditions can vary tremendously.

James Robert Moriarty III states in his paper, "Marine Geology in the Solution of Problems in a Submerged Early Prehistoric Site," "The investigation of a submerged site necessitates the use of techniques far beyond ordinary archaeological methods...normal stratigraphic sequences do not exist..."[10] In contrast, Reynold J. Ruppe argues in his paper, "Sea Level Change as a Variable in Colonial American Archaeology," that it is possible to excavate underwater with the same precision as on land.[11] Kenneth Cassavoy suggests in his "Initial Report on the Charleston Lake Prehistoric Portage Site," that while you can get stratigraphic information it must be carefully assessed. Test excavations are difficult to conduct in sediments other than clay, and "the inability to establish firm sided walls, is of course, usually the case in an underwater environment."[12] The common denominator in these differing statements is that the physical environment dictates the use of unusual archaeological field methods.

To aid in planning the field methodology for the 1989 season it was important to examine sites whose physical characteristics are most similar to the cove area. Perhaps the best example of this is presented in "The

Mulberry Site and Adjacent Portions of the Wateree River," a discussion of a site excavated by Chester DePratter and Cristopher Amer of the South Carolina Institute of Archaeology and Anthropology. The goal of their operation was to examine the creek and river beds near three Cofitachequi Indian mounds. The Cofitachequi had occupied the site from A.D. 1300 to 1700.[13] The mounds are now at the water's edge and have lost much of their material to erosion. The survey and excavation of nearby Big Pine Tree Creek and Wateree River involved swim searches and water induction dredge excavations in an attempt to understand where artifacts were located and how they had gotten there.

The authors, not surprisingly, concluded that there was evidence of artifact deposition caused by erosion of the mounds.[14] Artifacts had collected in sand bars and in the roots of fallen trees at the water's edge. There was also evidence, however, that artifacts may have been thrown into the river as trash. This "trash" was still in its location of primary deposit.[15] As the environmental conditions of the freshwater creek and river are similar to the cove, their method of excavation was carefully examined. Keeping in mind Cassovoy's warnings about the inability of a trench wall to be made rigid, a plan was devised that would test the cove area's stratigraphy and

its artifact concentrations in such a way as to minimize cost while maximizing the amount of data generated.

Permits

Before the field work began many preparations had to be made, the most important of which involved obtaining the legal authority to conduct archaeological research in a state park area. Fortunately, the permit obtained through the New York State Education Department that allowed the 1988 underwater excavations to take place, extended into August of 1989. The permit (Application No. 883-A) authorized survey and minimal artifact recovery (See Appendix A).

Historical Research

The historical research conducted for the 1988 season was continued during the following winter and spring. The Old Fort Niagara Library was the major location for primary and secondary sources. The Fort's Executive Director, Brian Leigh Dunnigan, has collected various published and unpublished papers, manuscripts, ledgers, journals, articles, diaries, maps, paintings, and notes relating to over three hundred years of the Fort's history. These were made available to researchers. Other local libraries and institutions consulted include the Buffalo and Erie County Historical Society, The State University of New York at Buffalo's Lockwood Library, and the collections of

the Lower Lakes Maritime History Society. The collections of the National Archives in Washington D.C., the Joyner Library at East Carolina University, Cooper Library at the University of South Carolina at Columbia, and the library of the South Carolina Institute of Archaeology and Anthropology were also consulted.

Funding

Equipment costs were kept to a minimum by reusing supplies from the 1988 underwater survey which were paid for by the Old Fort Niagara Association and through donations. New equipment needed for the more extensive 1989 work was obtained in part from donations. All SCUBA equipment used was loaned by private individuals. The excavation buckets which kept the sides of test units from collapsing were fabricated from plastic pickle containers donated by a local restaurant. Underwater bag tags, used to label recovered artifacts, were created from cut up plastic bleach bottles. Dip-N-Dive SCUBA store, located in Buffalo, New York, contributed reduced prices on air supplies and underwater camera rentals. Wilson Sales and Service of Wilson, New York, loaned the project a boat motor. More expensive equipment such as theodolites, boats, motors, pumps, trowels and measuring tapes were supplied by the Archaeology in Progress Project at Old

Fort Niagara, East Carolina University, and private individuals.

Project personnel included many of the Old Fort Niagara Archaeology in Progress Project's regular volunteers. Others were recruited from the local sport diving public. East Carolina University provided the services of their staff archaeologist and graduate students for two days of field work. Typically, on each day of field work, there were two to three divers supported by several land support volunteers and two conservation personnel. Old Fort Niagara also took responsibility for conserving, cataloging, curating the collection.

While costs differ from project to project, the expenditures for the 1989 underwater work were consistent with other six week excavations at Old Fort Niagara. Table 3 shows an approximate account of cash actually spent. The figure of $11,746.25 had to cover the excavation from the planning stage through the excavation, conservation, and finally the production of the report and the continued curation of the artifacts. A rough outline of the market value of donated services seen in Table 4, details an additional cost of $9,302.00. This amount is conservative when one considers the potential costs listed under items not covered.

Equipment

During the winter of 1988-1989 an inventory was made of the equipment used in the 1988 underwater season. This included a 100 foot by 100 foot steel cable grid, five SCUBA tanks, other SCUBA equipment for at least three divers, artifact screens, trowels, measuring tape, two four foot by four foot PVC excavation guides, underwater slates, first aid kits, a theodolite and other archaeological supplies. In preparation for the coming summer season, a two foot by four foot excavation guide, a water dredge, and plastic buckets were added to the inventory.

Dive Safety

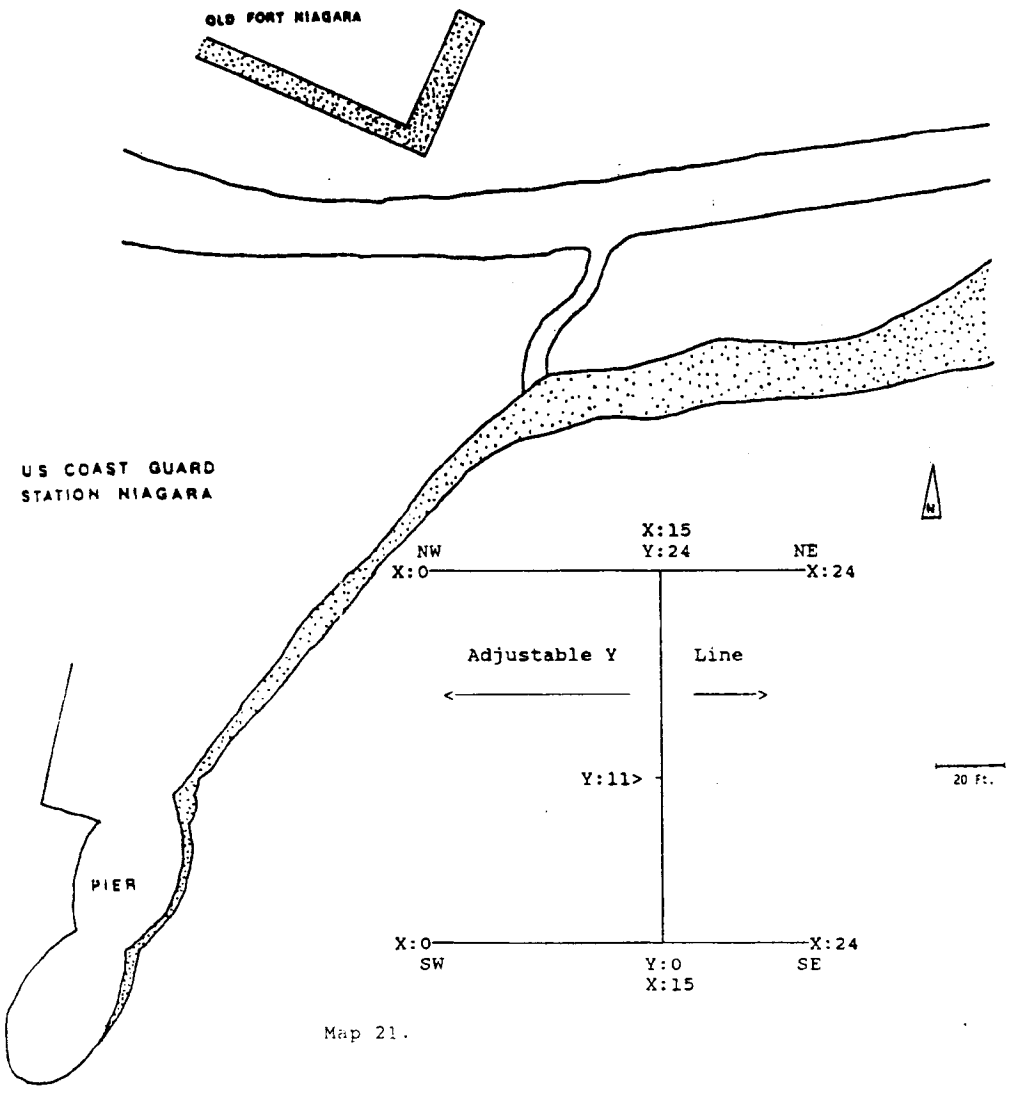
Much of the field work was conducted by a two man team of certified divers, working no more than eight feet apart. The safety officer recorded their air pressure, locations and bottom times and maintained the first aid equipment. The presence of the Coast Guard Station offered immediate response in case of a diver injury.

Description of the Work

A grid comprised of 625 test squares, four feet by four feet in size, totaling 1000 square feet, was used to maintain control and accuracy over the testing. To place an entire grid on the cove bottom would have required

twenty-five cables to represent the X axes and twenty-five to represent the Y axes, each 100 feet in length. Such a grid would not only have been expensive but in even slight currents might have become dangerous for divers. Only the portion of the grid necessary to locate a test unit was placed in the cove.

Two steel cables, representing the northern and southernmost X axes (the top and bottom of the grid), were placed on the cove bottom with cinder blocks and anchor weights. These two X cables ran west to east, were marked off every four feet, and indicated X points zero through twenty-four. Zero was at the west end and twenty-four at the east end (See Map 21). A theodolite was used to assure correct, consistent positioning. Small metal rings were attached at each X point. A third cable that represented the Y axis ran south to north from the southern, or bottom, X cable to the northern, or top, X cable and was clipped to the metal rings. The Y cable was also marked off every four feet. To find any particular point in the grid area, (X15:Y11 for example), a diver connected the northern end of the Y cable to the point on the northern X line marked X15 and attached the southern end of the Y cable to the point on the southern X line marked X15. To find Y11 divers simply swam along the Y cable until they reached the point marked Y11. Because each end of the cable was attached to X15 the divers would


OLD FORT NIAGARA
US COAST GUARD
STATION NIAGARA
PIER
X:15
Y:24
NW
X:0
NE
X:24
Adjustable Y
Line
Y:11>
20 Ft.
X:0
SW
Y:0
X:15
X:24
SE

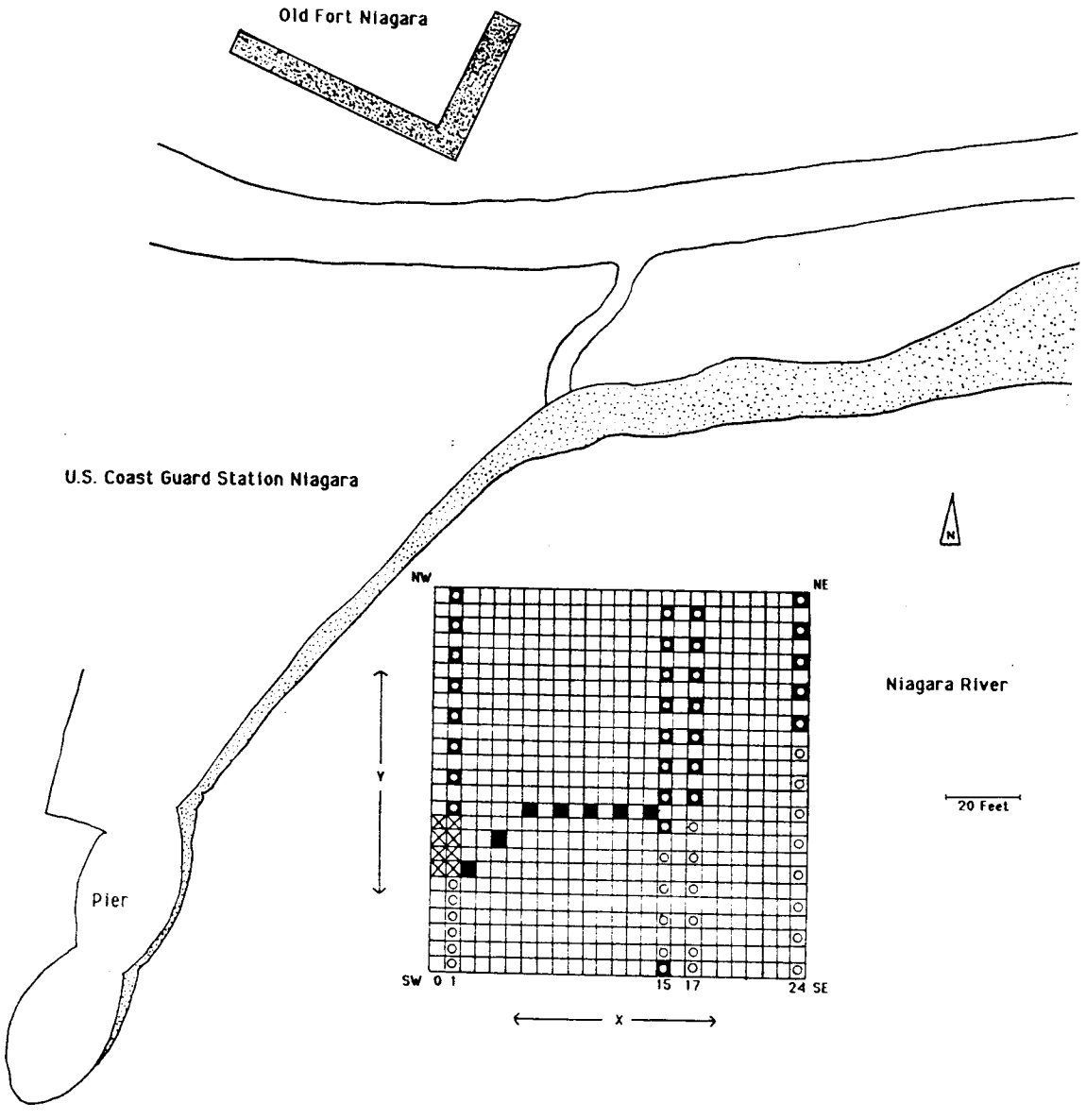
Map 21.

know their position in the grid to be X15:Y11. To work in an area other than X15, the divers simply moved the Y cable to the appropriate X position.

The X0:Y0 point was located at the southwest corner of the grid. Each square was identified from its southwest corner. This method of demarkation followed the land mapping procedures of Old Fort Niagara and provided for all data to be easily related to previous or future land finds.

To arbitrarily sample the cove's stratigraphy, three rows of test units were excavated along lines X15, X17, and X24. This area of the grid was not disturbed during the 1988 survey and provided a view of geologic layers with integrity. The units were placed in every other square, thus reducing the area examined by half while providing consistent sampling. Odd numbered coordinates were examined on lines X15 and X17 while even coordinates were examined on X24 (See Map 22). This systematic sampling technique best suited the site environment and research-specific design. In addition, it is desirable at any archaeology site to leave a portion of the site undisturbed for future researchers with more advanced methodologies.

Different size test units were experimented with to find the most reliable and cost efficient excavation method. A four foot by four foot unit (TU X15:Y13), was



- Bucket test, Few to no Artifacts Found
- Bucket test, High Concentration of Artifacts Found
- 4' x 4' unit excavated
- Possible Historic Shoreline as Suggested by 1988 Survey

Map 22.

tested which provided reliable information about stratigraphy but resulted in lengthy excavation time and the recovery of so many artifacts that researchers felt both time and money for conservation would run short. Thus the size of the test unit was reduced by half. The resulting two foot by four foot unit (TU X15:Y15), proved only slightly less expensive and time consuming. In the early phase of the excavation, a suction dredge was placed in a small boat anchored above the unit being tested. The dredge was used inside the two foot by four foot units. Mechanical failure and an inability to obtain parts for the pump's engine forced excavators to work by hand. This further necessitated reducing the test units to roughly nine inches in diameter. To keep the sides of such a small test unit from collapsing upon itself, the aforementioned plastic buckets were used. Each bucket had its bottom removed and was placed over the area to be tested. The presence of marine grasses and their sediment holding roots allowed excavators to dig without the bucket for the first two inches. After that depth the buckets were inserted and firmly driven into the sediment.

The experience gained in 1988 acquainted the excavators with the sediment types present in the cove bottom's stratigraphy. When the buckets were placed in the sediment, the excavators slowly skimmed the material out of the bucket and placed it immediately into another

whole bucket. As each stratigraphic layer was uncovered, the excavators measured the depth and recorded the strata color and texture. Occasional soil samples were taken of unusual layers or deposits. The thin lens of leaves found in test unit X17:Y3 is an example of such a deposit.

When artifacts were encountered, their corresponding stratigraphic layer was recorded. The artifacts were then placed in a marked bag and sent to the surface crew for immediate cleaning, conservation and cataloging. Each bucket of removed sediment was also sent to the surface and water screened through fine mesh screens. To assess the stratigraphy and ensure the collection of all artifacts in a particular test unit, each unit was dug an average of one foot depth below the last noted level containing artifacts. In some instances units were dug to a depth of nearly two feet. This depth was sufficient to find sterile levels in every unit tested.

In conjunction with the test excavations a bathymetric map of the cove area was completed. Team members set up a transit on a preestablished terrestrial datum point and took elevation readings on the Y24 and X16 lines. Team members were unable, however, to take readings at X16:Y5 through X16:Y0 due to the water depth. Divers used depth gauge readings, taken on the remaining coordinates, to gather the data needed to complete the bathymetric map seen in Chapter 2.

Conservation

Immediately after their retrieval, artifacts were taken to the conservation facility located at Old Fort Niagara. Each bag of artifacts from a test unit was then opened. An inventory of the contents was taken and each artifact was manually cleaned and given a preliminary identification where possible. A sample from this inventory is shown in Figure 3. Artifacts such as ceramics and glass, which could be safely dried were placed on open air racks, while organic and metal materials, that needed to stay wet until treatment, were placed in bags or buckets of fresh water. The conservation of metals involved an initial manual cleaning.

Iron objects were then placed in electrolytic solution comprised of two pounds bicarbonate soda and five gallons of deionized water.[16] Electrolysis was conducted until corrosion on the artifacts had been removed. The length of time spent in electrolysis depended on the condition, size, and density of the artifact. When electrolysis was complete the object was placed in boiling deionized water to further rinse harmful chloride ions. The level of chlorides and other conductors present in the water was measured with a conductivity meter. When the meter registered a conductor content of 10 parts per million (ppm) or less, the artifact was removed. In a few

DATE 07-21-89 QUAD. SIEOD

BEGINNING DEPTH 0.32 TU 4.8

ENDINIG DEPTH 0.62 COOR x 15 y 17

LEVEL III DATUM

EXCAVATOR Keller-Clark Bucket Cut

SOIL (Munsell No., color, description)

Grey sand

SOIL INCLUSIONS

Gravel

FEATUKES

ARTIFACTS

1 kaolin pipe stem frag
4 brass straight pins
5 square nails
2 iron wire frags
1 iron frag

Figure 3. Artifact Inventory Sheet.

cases, in which extremely large or dense artifacts were undergoing treatment, 10 ppm could not be reached. The objects were considered complete when conductor levels became constant. After this stage the artifacts were soaked in alcohol to remove excess moisture. To seal the artifact from further moisture damage they were coated in a solution of fifty percent microcrystalline and fifty percent carnauba wax.

All recovered artifacts are stored in acid free boxes in a climate controlled room at Old Fort Niagara. Conservation of all materials was conducted under the supervision of Douglas Knight, the Director of the Archaeology in Progress Project at Old Fort Niagara since 1990, following guidelines from the conservation department of the New York State Department of Parks, Recreation, and Historic Preservation, Peebles Island, Waterford, New York.

Preparation for Analysis

Although the collected artifacts were listed on field sheets, a more precise cataloging was done by Marbud Prozeller, Laboratory Coordinator at Old Fort Niagara. The collection from the cove was designated as TU 418 in the Old Fort Niagara system. Appendix C lists the cataloged items along with descriptions and dating information. Beyond this normal computer cataloging, the

artifacts were separated into categories and prepared for computer analysis using Minark software package which was specifically designed to handle data from archaeological sites. The test unit, the depth at which the artifact was found, and the corresponding soil level were recorded for each object. Specific artifact categories such as glass, ceramics, and nails each had different attributes that were noted. For example when examining glass artifacts, attributes such as color, body shape and suspected function were recorded. Body type, shape, and decoration were examined for ceramics. Information about nails such as head and point types, fiber direction, length, and width were recorded.

These sub-assemblage observations were standardized for computer coding. Coding samples for glass, ceramic, and nails are shown in Table 5. This information was used to help date each individual diagnostic artifact. Entering these data into a computer allowed a comparison between different sub-assemblages of cultural material found in the cove. For example, comparisons of certain artifact deposits might suggest the location of a structure. Computer analysis results might also suggest that certain activities had taken place near the cove such as recreation or trade. Of course, the reliability of these comparisons rests on the quality of the coded

information. For this reason as many attributes as possible were examined for each artifact.

The resulting accuracy of the data gathered during the 1989 test season was a product of the effective research design. The excavation method selected provided reliable stratigraphic data. This information, when combined with data from the recovered artifact assemblages, yielded a comprehensive, unprecedented analysis of the cove area. When coupled with historical documents and terrestrial archaeological data from Old Fort Niagara, this research successfully evaluates the cove's potential as an area that can add to the historical knowledge of the Fort.

TABLE 3.

Actual Cash Expenditures for the 1989
Underwater Excavation Season.

Salaries:	
Lab Coordinator..$6.50 per hr. for 6 months...	8,550.00
Conservation Technician.....$7.00 per hr. for 8.5 weeks..	2,850.00
Supplies:	
Underwater Equipment.....	136.35
Office.....	144.90
Conservation.....	50.00
Film / Developing.....	15.00
Total.....	$11,746.25

TABLE 4.

Market Value of Donated Services

Salaries:	
Director..$16.75 per hr for 8 weeks.....	6,110.00
Assistant Arch...12.50 per hr for 2 weeks....	1,140.00
Assistant Diver..8.50 per hr for 6 weeks.....	1,163.00
Field Crew..6.50 per hr for 6 weeks.....	889.00
Total.....	$9,302.00
Actual Cash Expenditures.....	$11,746.25
Grand Total of Actual and Donated costs.....	$21,048.25

Items Not Covered:

* Cost of Boat and Motor
* Supplies purchased in 1988
* East Carolina University Staff and Students for 2 Days
* Misc. Office Supplies
* Computer Time and Supplies
* Cost of Conservation Services and Supplies
* Cost of Curation Services Supplies

TABLE 5.

Sample of Information Recorded for Data Entry Forms

GLASS

TEST UNIT:	TU 418 (X15: Y11)
DEPTH:	0.00 - 0.10
LEVEL:	1
COLOR:	Olive
SPECIFIC FORM:	Bottle
ID 1:	Wine Bottle
ID 2:	Shoulder
DATE RANGE:	
Known:	
Probable:	Late 18th early 19th century
Guess:	
COMMENTS:	Coated and Water Worn

CERAMICS

TEST UNIT:	TU 418 (X15:Y11)
DEPTH:	0.10 - 0.70
LEVEL:	2
ID 1	Refined, Earthenware
ID 2	Creamware
ID 3	Molded, Queen's Pattern
DATE RANGE:	
Known:	
Probable:	1765-66 - 1820 (1793)
Guess:	
COMMENTS:	

NAILS

TEST UNIT:	TU 418 (X15:Y9)
DEPTH:	0.00 - 0.10
LEVEL:	1

WHOLE * FRAG
TYPE: WROUGHT * WIRE CUT
HEAD: ROSE * FLAT T L HEADLESS
POINT: FLAT * SHARP UNKOWN
FIBER DIRECTION: Vertical
SHAPE: STRAIGHT CLINCHED CURVED * BENT
LENGTH: .14 WIDTH: .025 CONCRETION: No
COMMENTS: Measurements made hundredths of feet
DATE RANGE: Late 18th early 19th century

NOTES

1
James Deetz, In Small Things Forgotten: The Archaeology of Early American Life (New York, 1977), 16.

2
See the following publications by Stuart D. Scott and Patricia K. Scott, Old Fort Niagara - Proposed Sewage System Archaeological Test Survey, 1979 (1979), An Archaeological Survey of Artpark and the Lower Landing, Lewiston, New York (1993), and "A Fort Called Niagara," Archaeology XL (1990). See also the following reports on file at the New York State Office of Parks, Recreation, and Historical Preservation, Peebles Island, Waterford, New York, or on microfiche in the New York State Library, Albany, New York: "Fort Niagara State Park - An Archaeological - Historical Resource Study in the Area of Proposed Sanitary Sewer Construction, 1981" (1981), "The Niagara Reservation: Archaeological and Historical Resource Survey, 1983" (1983), "United States Coast Guard Station Niagara: Archaeological and Historical Survey, 1983" (1983), "Archaeology for Seawall Repairs, Old Fort Niagara" (1986), "State Funded Archaeological Work at Old Fort Niagara, July - August 1988" (1989), Supplement to the 1983 United States Coast Guard Station Niagara, Archaeological and Historical Survey" (1990).

3
See the following works by Brian Leigh Dunnigan: History and Development of Old Fort Niagara (Youngstown, N.Y., 1985), Siege - 1759; The Campaign Against Niagara (Youngstown, N.Y., 1986), Glorious Old Relic; The French Castle and Old Fort Niagara (Youngstown, N.Y., 1987), Forts within a Fort: Niagara's Redoubts (Youngstown, N.Y., 1989), Dunnigan and Patricia K. Scott, Old Fort Niagara in Four Centuries: A History of its Development (Youngstown, N.Y., 1991).

4
Stuart D. Scott and Patricia K. Scott, Coast Guard Station Niagara: Archaeological and Historical Survey (Youngstown, N.Y., 1983), 23-24.

5
Ibid., 1.

6 Ibid., 36-37.

7 William Utley, Stuart D. Scott and Patricia K. Scott, The 1988 Underwater Archaeological Survey: Old Fort Niagara (Youngstown, N.Y., 1988), 8-9.

8 Arthur Cohn and Kevin Crisman, "The 1987 Fort Niagara Waterfront Survey," Unpublished report submitted to the Old Fort Niagara Association. (1988), 11.

9 Utley, Scott, and Scott, 1988 Underwater Survey 34.

10 James Robert Moriarty III, "Marine Geology in the Solution of Problems in a Submerged Early Prehistoric Site" in Underwater Archaeology: The Challenge Before Us: The Proceedings of the Twelfth Conference on Underwater Archaeology (San Marino, Ca., 1981), II, 278.

11 Reynold J. Ruppe, "The Archaeology of Drowned Terrestrial Sites: A Preliminary Report," Bulletin No. 6, Bureau of Historic Sites and Properties, Department of State, 1979, quoted in "Seal Level Change as a Variable in Colonial American Archaeology," in In the Realms of Gold: The Proceedings of the Tenth Conference on Underwater Archaeology (San Marino, Ca., 1981), I, 199.

12 Kenneth Cassavoy, "Initial Report on the Charleston Lake Prehistoric Portage Site", ibid., I, 175.

13 Chester Depratter and Christopher Amer, The Mulberry Site (38KE12) and Adjacent Portions of the Wateree River (Columbia. S.C., 1988), 1.

14 Ibid., 20.

15 Ibid

16

The ratios of treatment substances are specific to this project. These measurements change depending on the specific treatment goals. In general, however, most procedures follow those detailed in Katherine Singley's The Conservation of Archaeological Artifacts From Freshwater Environments (South Haven, Mich., 1988).

CHAPTER 4

ANALYSIS AND CONCLUSIONS

The 1989 field season tested the hypothesis that the artifacts discovered during the 1988 underwater survey were not randomly deposited throughout the cove. A combination of experimental excavation methods, stratigraphic testing, and artifact analysis accomplished this task. It also answered additional questions that arose while conducting the research.

Experimentation with excavation methods, as described in Chapter 3, demonstrated bucket-sized test units were the most efficient and economical way to investigate the cove area. The bucket tests, which were nine inches in diameter, detected the same artifact pattern found by the four foot by four foot units used in 1988. The bucket tests revealed few to no artifacts in the deepest area of the cove, but as they were moved toward the shore a point was reached where the presence of many artifacts became constant. This change was not gradual but immediate. Figure 4 displays the change in artifact density as it occurred on the three X lines tested in this study: X15, X17, and X24.

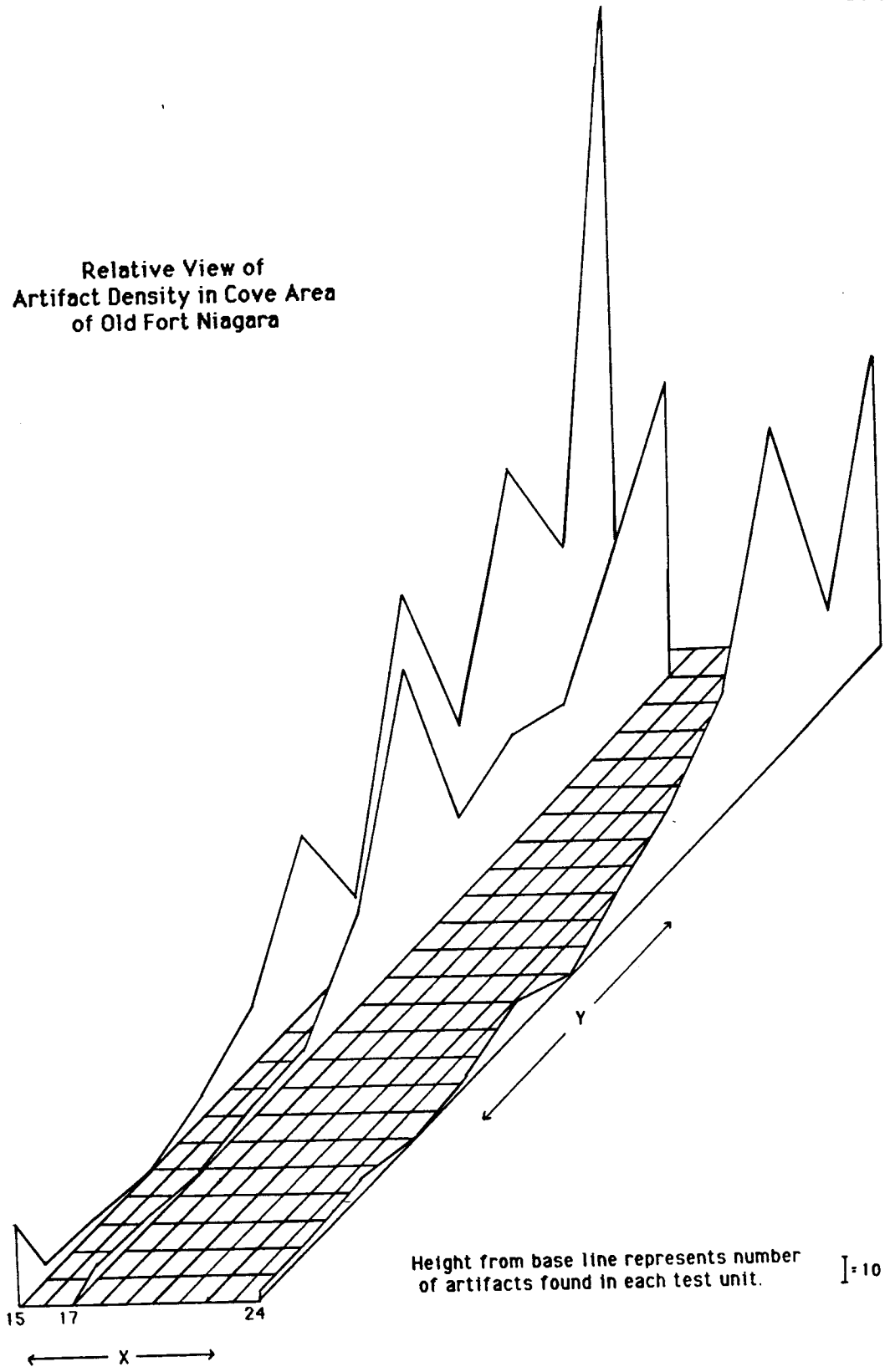
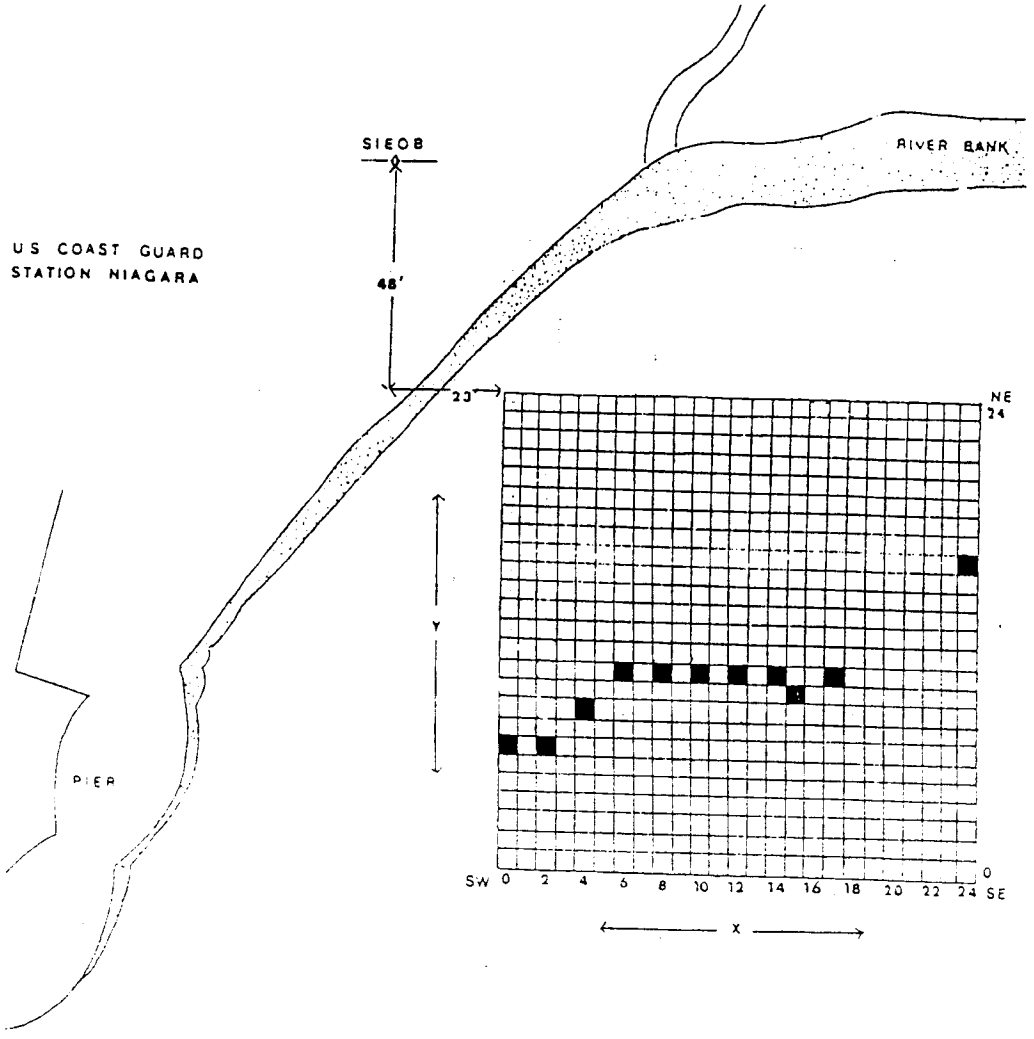

Relative View of
Artifact Density in Cove Area
of Old Fort Niagara
Y
Height from base line represents number
of artifacts found in each test unit.
I=10
15
17
24
X

Figure 4.

The consistent presence of artifacts was first encountered at X15:Y9. A similar pattern for X17 and X24 occurs at Y10 and Y15 respectively. When these units are examined together with the high density units discovered in 1988, the event marks are clearly aligned across the midsection of the test area in a manner that parallels the modern shoreline (See Map 23).

The mere presence of the clearly defined artifact pattern could not, by itself, explain its formation process. The two most likely scenarios were examined. One explanation suggests strong currents cut through the deeper area of the cove and carried away artifacts leaving the present artifact pattern. The second possibility states that the event mark represents an historic shoreline, as marked by trash deposits. Analysis of the stratigraphic data, provided by the bucket tests, strongly supported the shoreline hypothesis over an erosive current.

Had the current been strong enough to remove artifacts, including those made of iron weighing several pounds, it would have also cut into the stratigraphic levels which contained them. Over time new sedimentation should have formed and become visible in the stratigraphy. Yet the bucket tests revealed no substantial changes in the stratigraphy where the high density artifact deposits were first encountered. Changes occurred only in the



Map 23.

Event Mark Location.

deepest end of the cove roughly twenty to thirty feet from the artifact pattern where the current is considerably stronger.

The artifacts' spatial orientation had an additional attribute that also cast doubt on the strong current theory. Had currents carried away virtually all artifacts in the deeper area of the cove, one might expect the those deposited in stratigraphic levels closer to the surface to be swept away before those found in deeper sediments, leaving at least some of the deeper artifacts in place. If this were true, bucket tests should have revealed not only changes in stratigraphy, but residual artifacts that were, perhaps, too heavy or too deeply buried to be carried away. As the buckets were moved closer to the shore, where currents were slower and less erosive, artifacts from the upper stratigraphic levels should then have appeared. This, however, was not the case.

The artifacts were indeed stratified. There were 1593 artifacts found in thirty-nine test units. Table 6 lists the numbers of artifacts that occurred at each level from the surface down to sterile lenses and water-screened material. The artifacts were primarily distributed in levels two and three. Although the sudden appearance of artifacts was not as dramatic when the levels were examined separately, the pattern persisted.

The consistent appearance of artifacts for level three occurs roughly sixteen feet closer to shore than for level two (See Tables 7 and 8). Currents could not have removed deeper artifacts before removing those found in levels closer to the surface. Even if the currents were strong enough to cut through all stratigraphic levels at the same time there should still have been a fairly equal distribution of artifacts regardless of their depth in the sediments.

Stratigraphic testing and artifact analysis supported the shoreline hypothesis. Artifacts deposited along an historic shoreline, either through purposeful trash dumping or by accident, would not have disrupted sediment lenses that were present at the time. Fluctuating water levels and continuing sedimentation could account for the artifacts from level two appearing further out in the cove than those in level three.

If the artifact event marks in the cove represent an historic shoreline from a relatively distinct time period, the artifacts must also date closely to the same period. With the assistance of the archaeology staff at Old Fort Niagara, the State University of New York at Buffalo, and the State University of New York College at Buffalo, the assemblage was dated to the early 1760's through the mid 1780's. Ceramic and button dates were assigned based on

Stanley South, Ivor Noel Hume, Brian Leigh Dunnigan and Stanley J. Olsen's work.[1]

While most of the artifacts such as hand wrought nails and olive colored wine glass can be dated to the late eighteenth and early nineteenth century, a more specific date was calculated through those artifacts with more precise time periods of use. This included military buttons, ceramics, and a cut glass decanter stopper - a total of sixty-two artifacts. The theory behind the dating technique employed on the cove area assemblage is that the beginning date of the latest artifact use period is the earliest possible date for the assemblage. For example, if a group of artifacts contains buttons with a date range of 1760 -1780, ceramics dating 1765-1785, and a second ceramic type dating 1763 to 1782, then the earliest possible date for the site is 1765. This assumes that the other artifacts deposited in the same level are associated with each other. If that is true, and most archaeological theory is based on this assumption, then the 1765 artifacts could not possibly have been deposited in 1760 or 1763.

To find the latest date for the cove area assemblage the earliest date in a missing artifact type can be used. For example many forms of creamware have a date range of 1762 to 1820.[2] Creamware, however, was slowly replaced in many areas by pearlware starting in the early 1780's and

became dominant by 1820.[3] Therefore if a site contains creamware without any pearlware the site may date before 1780. A site that contains a small percentage of plain undecorated pearlware, but none of the later more decorative pearlware types, might date to the early 1780's.

The datable cove area artifacts were divided into their originating stratigraphic levels and the corresponding X lines. Table 9 lists the datable artifact types found in X15, including the number of occurrences at each level, and their corresponding date range. The date ranges of the military buttons may appear different in other published sources. Button dates in this report were adjusted for known occupations of Old Fort Niagara. One such case is the plain British infantry buttons found on Line X15 in levels two and three. While this type of button predates 1759, the British did not occupy the fort until after the siege of that year.

The calculation of each level's probable date range is below the artifact chart. In the case of X15 level one, only one type of datable artifact was found, two pieces of plain undecorated Creamware dating to 1762-1820. Using the techniques described above, the absence of pearlware would shorten the range to 1762-1780. This level contains too few artifacts, however, to establish a firm date.

Level two of X15 contained lead glazed coarse redwares with date ranges beginning as early as 1678 at Fort Niagara, however, since the various plain undecorated lead glazed redwares are impossible to date, they have not been considered in sequencing levels. Level two of line X15 contained a ceramic assemblage of chinese procelain (1660-1800), unidentified porcelain, plain undecorated creamware (1762-1820), ribbed molded creamware (1762-1820), and royal molded creamware (1765/66-1820). There was no pearlware in level two, thus the ceramics suggested a date range from 1765/66-1780. Two pewter British enlisted men's buttons dating to 1759-1770, at Fort Niagara were also in this level. A third button found in level two is problematic in terms of dating. This plain face, one piece, button is classified by Olsen as Type G and dated 1785-1800. The same type button is classified by South as a type 9 and dated to 1726-1776 or possibly 1760-1860's. At Old Fort Niagara this type is considered to possibly be a U.S. Regiment of Artillerist's button dating to 1796-1802. Since civilian buttons of Olsen's type G and South's type 9 are identical with the early American military buttons, it is impossible to clearly impose a firm date on this third button found in level two. Based primarily on the ceramic assemblage and the two tightly datable buttons, level two of X15 has a probable date range of 1765/66-1780.

Level three of line X15 contained many of the same artifact types found in level two. The ceramic assemblage again spans the date range from 1765/66-1780, but there is one 8th Regiment of Foot button that dates to 1774-1785 at Niagara. This possibly dates level three to 1765/66-1774/85, however, since there is no pearlware in the assemblage, level three probably predates 1780.

Table 10 is a tabulation of the datable items from line X17. Level one does not contain any of the artifacts used in the dating analysis. Level two has no buttons and differs slightly from X15's level two due to the presence of four pieces of very early pearlware (plain undecorated and chinoiseries types, 1783-1830). A date range of the mid 1760's to the early or mid-1780's is suggested due to the relative abundance of creamware, the early type of pearlware, and the lack of later types of decorated pearlwares of the 1790's. The third level of line X17 contains only four pieces of plain undecorated creamware. The sparsity of artifacts made definitive dating impossible, however, a tentative range would also be 1762 -1780.

The only artifacts on line X24 that could be dated were found in level two (See Table 11). The ceramics consisted of creamware (1762-1820) and white salt glazed stoneware (1720/1740-1805). A 5th Regiment of Foot button from units stationed in Canada from 1787 to 1797 and at

Fort Niagara from 1792 to 1796 was in this level. A second button in level two of line X24 was one that could be a civilian Olsen type D (1760-1785) or South type 7 (1726-1776). It might also be a U.S. Regiment of Artillerists and Engineer's button dating to 1796-1802. The two buttons extend the upper date range of level two into the 1790's to early 1800's, but the lack of any pearlwares associated with the 1780-1800 period make it possible that both these buttons, if they represent occupants of Fort Niagara, may be intrusive into level two. Here again, there was a lack of sufficient numbers of artifacts to formulate a firm date.

To achieve a more reliable date for the site all X lines were joined together. When the corresponding levels from lines X15, X17, and X24 were joined, the date ranges for individual artifacts from level two date predominantly from the 1760's through the mid 1780's and possibly into the 1790's (See Table 12). Although level three contained many of the same artifact types, the lack of pearlware or other later period buttons produced a slightly earlier date range of 1765 to the early 1780's. This unusually tight date range suggests a relatively quick formation period of approximately twenty years.

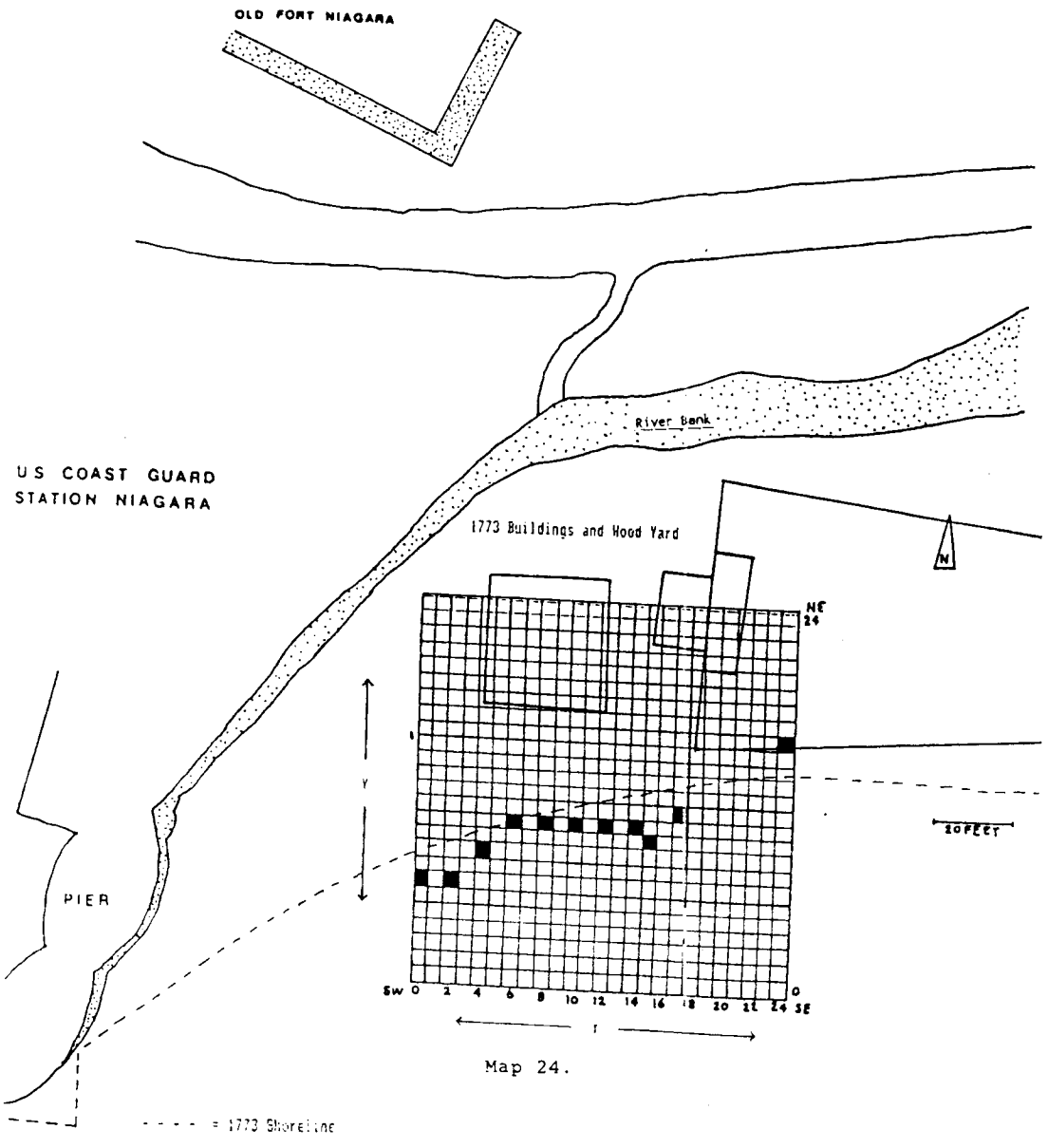
A comparison of the artifact pattern with an historic map from 1773, roughly the middle of the artifact date

range, can be seen in Map 24. The shoreline as represented in 1773 matches almost perfectly with the artifacts deposited in the cove. Computer analysis showed this map to be quite accurate.[4] The artifact date range also corresponds to the map analysis discussed in Chapter 2, which demonstrated the cove shoreline may have been stabilized by seawall and basin construction in the cove that occurred from 1762 to roughly the early 1780's. All of this information is supported by the cove's stratigraphy leaving little doubt that the artifact pattern in the cove indicates an historic shoreline.

Site Formation

No evidence of any other definitive shorelines were present in the area of the cove investigated in 1988 and 1989. The circumstances involved in the creation of this pattern were probably unique to it. The following formation process scenario is based on the analysis of the cove's stratigraphy and the artifact deposits.

In the early 1760's the British began their use of the bottom lands adjacent to the cove. Trading houses were constructed along with taverns and warehouses. It was also at this time that the cribbing structures and basin, located in the cove, were constructed. As was suggested in chapter two, the cove area shoreline began a unique period of stabilization. At this time the practice


OLD FORT NIAGARA
River Bank
U S COAST GUARD
STATION NIAGARA
1773 Buildings and Wood Yard
N
NE
24
Y
10 FEET
PIER
SW 0 2 4 6 8 10 12 14 16 18 20 22 24 SE
X
= 1773 Shoreline
= Event Mark Location

Map 24.

of depositing trash from the lowland structures into the cove may have begun. This first period of dumping occurred at the location of the event marks seen in level three. It is possible that slowly rising water levels covered the first deposits of artifacts. Major erosion was controlled because of the cribbing and basin. Sediments covered the artifacts and provided protection from degradation.

As the water level rose the area of dumping moved farther inland, thereby widening the area covered with trash. Sometime during the 1770's the water level began to retreat, depositing further sediments on previously dumped trash. Throughout this time the bottom land was increasingly utilized, resulting in increased deposits into the cove. By the early 1780's the water level had retreated past the original point where trash was first deposited. As the crib and basin structures were lost by 1780, the period of erosion stabilization came to an end and shoreline fluctuation resumed. After the 1780's silting and vegitation growth may have provided protective layers over the deposited trash.

The construction of the Niagara Gorge power plants produces occasional water flows that can strip away many year's worth of sedimentation over a short period of time in some areas of the river. After more than two hundred years, the protective layers may have been stripped

leaving the current artifact deposits close to the surface.

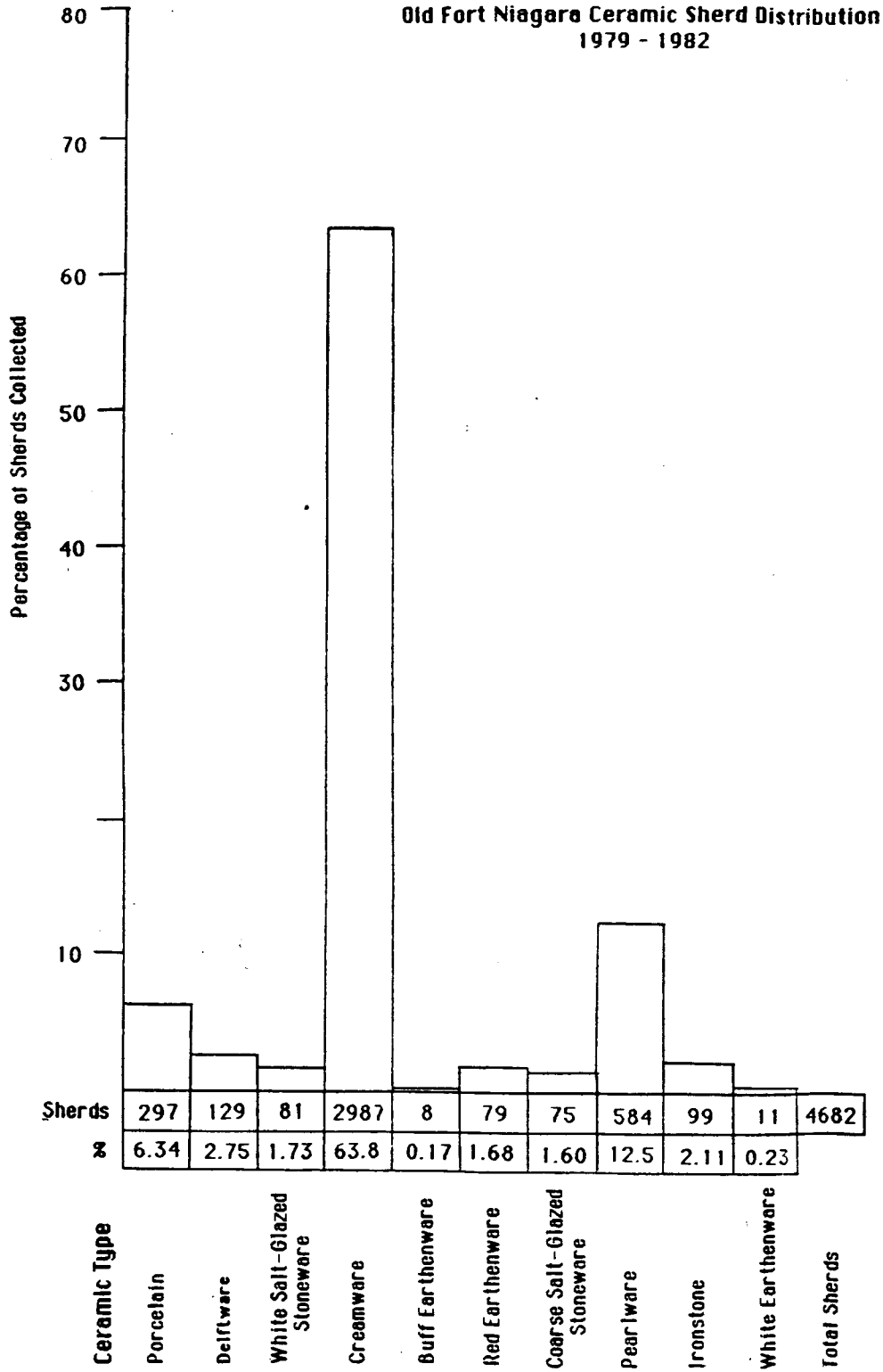
While the above theory helps explain why this particular shoreline has been preserved, it does not explain why there is almost no evidence of later shorelines. This raises several questions. For example, the British began to move across the Niagara River during the 1780's in preparation for the eventual United States take over in 1796. The Indian Department, once located on the cove's bank, transferred across by the late 1780's. Is this why no later shoreline is seen? How did changing British rules regarding cleanliness and trash disposal during their later occupation period affect artifact deposition in the cove? Does this account in part for the reduced artifact deposits in the cove since trash dumping may have been moved to other parts of the river? The American army that arrived in 1796 did not make as much use of the Bottoms as earlier occupants. This may be why no later shoreline is discernable through the archaeological record. Further research on the cove and the adjacent lowland may shed light on the missing artifacts.

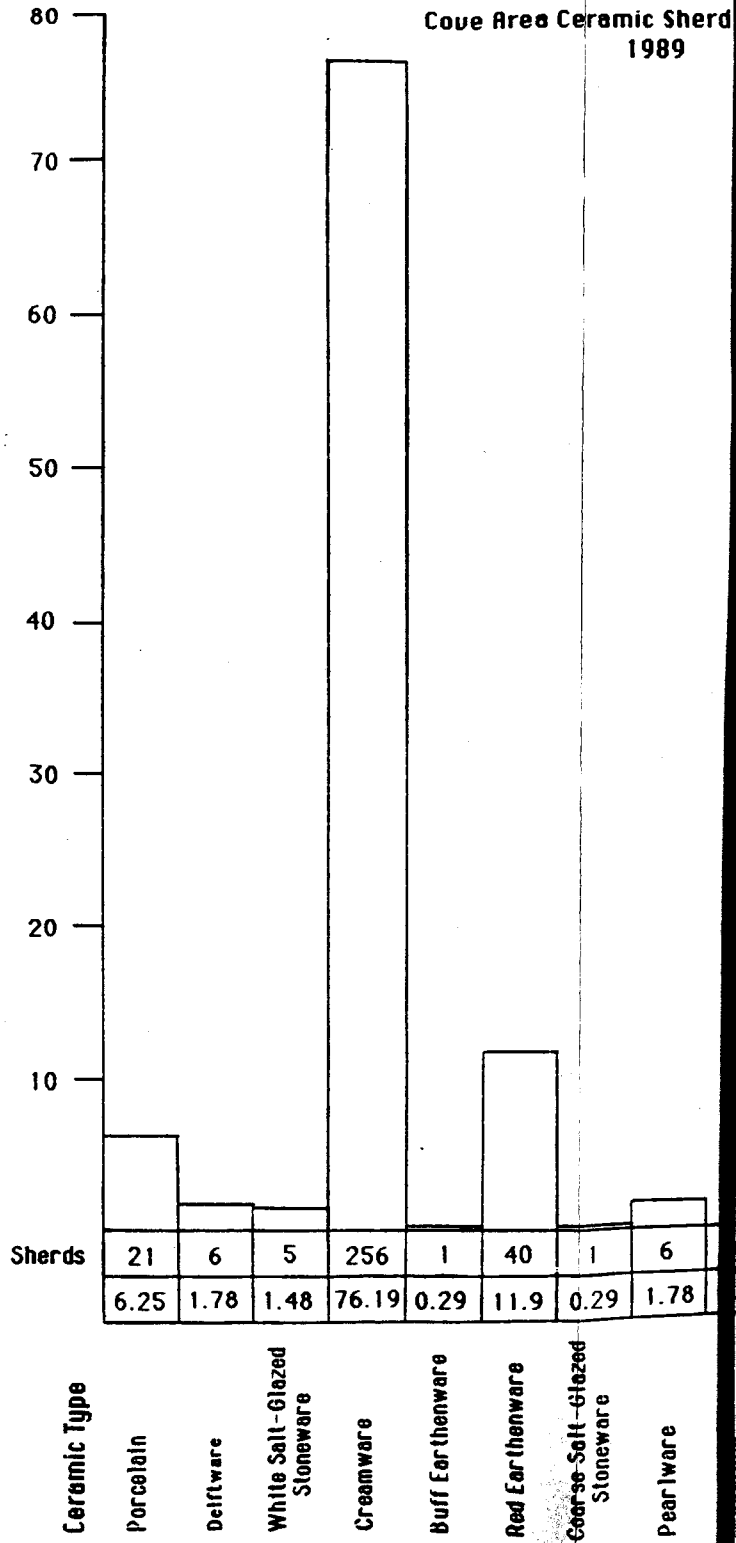
An important consequence of the discovery of an organized non-random data base is the potential for analysis. The 1989 excavation has provided a collection

of artifacts which if interpreted correctly can yield information about the use of the cove, the bottom lands, and the Fort during a very specific time period from the mid-1760's into the 1780's. Many aspects of life are represented in the cove artifacts. By comparing the cove assemblage with those from inside the Fort, differences in land use and eighteenth-century life may be better understood.

Although much analysis has yet to be conducted on the data, some preliminary results have been achieved that demonstrate what may yet be learned. The best example of the early analysis involves a comparison of cove ceramics with those from inside the Fort.[5] Terrestrial archaeology conducted inside Old Fort Niagara from 1979 to 1982 resulted in the recovery of 4682 ceramic sherds.[6] The sherds were compared with the ceramic patterns for New York state British Military sites described by archaeologist Paul Huey.[7] The distribution of each type of sherd is shown in Figure 5. According to Huey's concepts, the collection shown fits closely into the civilian pattern for eighteenth century sites in New York State. The cove ceramics follow a similar pattern but with a few meaningful differences.[8]

The most striking differences occur in the percentages of pearlware and red earthenware. Pearlware represents 12.5 percent of the total terrestrial sherd


Old Fort Niagara Ceramic Sherd Distribution
1979 - 1982
Percentage of Sherds Collected
80
70
60
50
40
30
10
Sherds 297 129 81 2987 8 79 75 584 99 11 4682
% 6.34 2.75 1.73 63.8 0.17 1.68 1.60 12.5 2.11 0.23
Ceramic Type
Porcelain
Delftware
White Salt-Glazed Stoneware
Creamware
Buff Earthenware
Red Earthenware
Coarse Salt-Glazed Stoneware
Pearlware
Ironstone
White Earthenware
Total Sherds


Cove Area Ceramic Sherd
1989
80
70
60
50
40
30
20
10
Sherds 21 6 5 256 1 40 1 6
% 6.25 1.78 1.48 76.19 0.29 11.9 0.29 1.78
Ceramic Type
Porcelain
Delftware
White Salt-Glazed Stoneware
Creamware
Buff Earthenware
Red Earthenware
Coarse Salt-Glazed Stoneware
Pearlware

distribution. In contrast the pearlware from the cove only accounts for 1.78 percent. The most obvious reason for this difference is the limited date of the cove assemblage. If the shoreline does in fact date from the mid-1760's to the 1780's, then the percentage of pearlware would necessarily be low. The date also explains the absence of the ironstone and whiteware, which came into use after pearlware. Red earthenwares account for 1.68 percent of the terrestrial distribution. They represent 11.9 percent of the cove assemblage. A likely reason for this, is the nature of the adjacent lowland.

As an area for civilian pursuits such as trade, and relaxation from Fort duties, the types of ceramics used may have differed. Taverns and public houses were more likely to have used utilitarian ceramics such as redwares than fancier creamwares and porcelains or the copper and iron pots used by soldiers and officers within the Fort. A difference in land use between the Fort and the Bottoms is also perhaps reflected in a ratio of olive wine bottle glass to structural flat glass of over five to one. The ratio for the inside of the Fort is almost the complete opposite. Glass stemware, tumblers, and kaolin pipestems, other indicators of tavern or public house activity, were also found in greater percentages in the cove than in the Fort, indicating the different social activities engaged in on the Bottoms.

The higher percentage of creamware in the distribution is due again to the limited date range. Ceramics such as delftware and white salt glazed stoneware were more popular before the shoreline date. This, in addition to the lack of later wares, increased the relative percentage of creamwares. The ceramic analysis has demonstrated that the specific percentages of types is indicative of both the tight date range and the civilian activities of the Bottoms. To test this assumption other sites that are similar in time and use should be compared with the cove.

Other areas of artifact analysis that need to be investigated include the trade items. Preliminary examinations indicate that lead bale seals, used to identify a particular merchant's bundles of furs, cloth, etc., were found in greater percentages in the cove as compared to finds on land. The excellent state of preservation offers the opportunity to study specific trading companies whose bale seals are clearly legible. Such is the case with Alexander Davison whose agents operated at Fort Niagara in the late eighteenth-century (See Figure 6). A larger percentage of barrel straps, another item involved in trade and provisioning, was found in the cove as compared to the Fort. These items along with trade beads offer an excellent opportunity to study trade at Niagara.

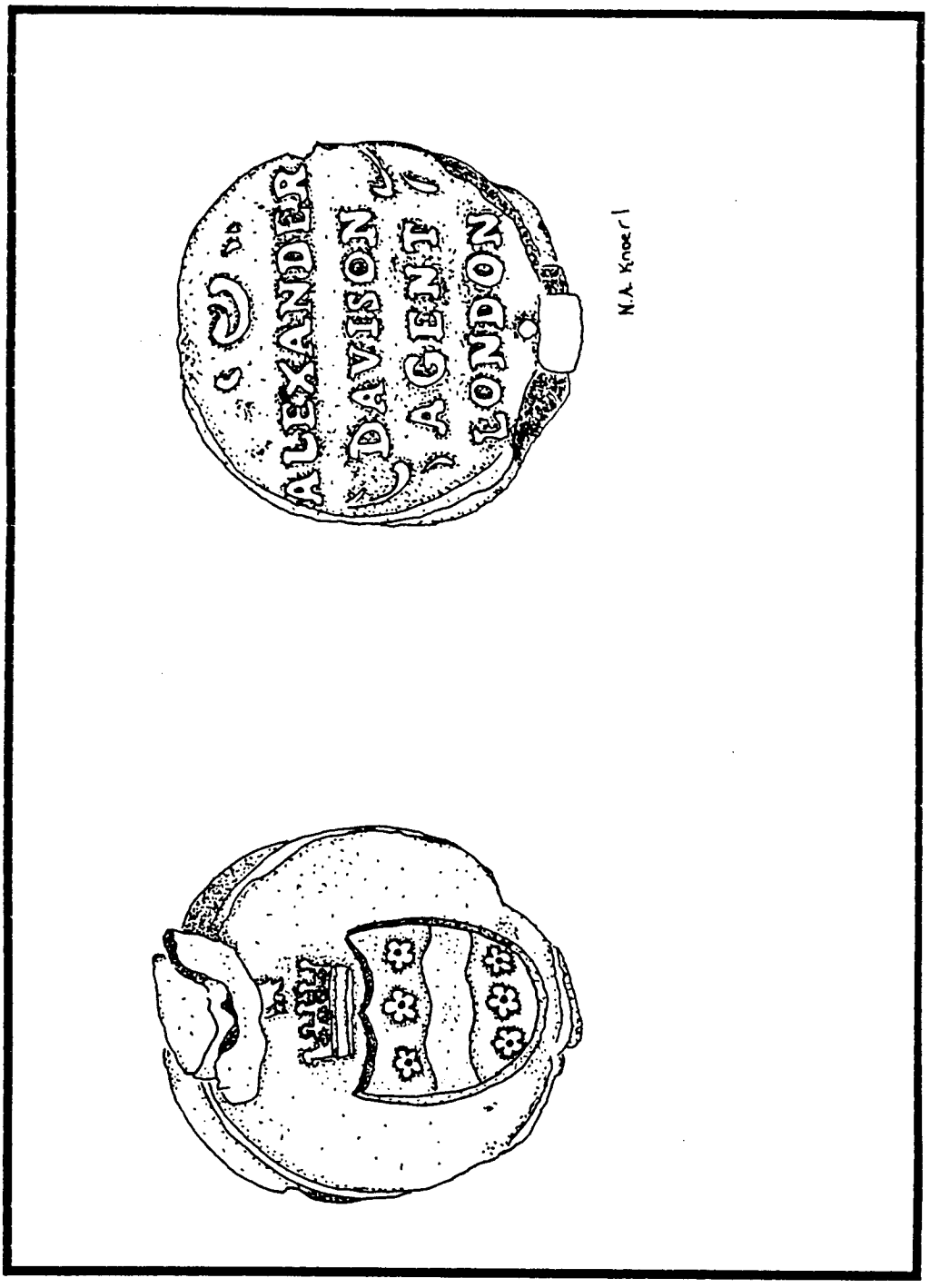


Figure 6. Bale Seal

The collection of nails from the cove are in an excellent state of preservation. When the wrought nails from the cove were analyzed to determine the extent of corrosion, less then 50 percent had any corrosion at all. Many near perfect examples of several wrought nail types were found (See Table 13). As such they may be able to answer more questions about the type of nails used on the frontier during the eighteenth century.

It was discovered that rose headed nails suffered from corrosion to a much greater percentage than any other type suggesting a different composition of iron. This may indicate a different source of supply for some nails. How common nail production was at Fort Niagara and how often nails were imported is not known. Detailed analysis might shed light on the dependence on outside sources for items such as nails at frontier posts.

Conclusions

The 1989 cove area investigation demonstrated that dynamic underwater environments would not necessarily destroy meaningful associations between artifacts and the cultures that created them. The sandy bottom of Old Fort Niagara's cove in the Niagara River had, despite swift currents, winter ice flows, changing water levels, and fluctuations of water flow from modern hydroelectric power

plant runoff, preserved the remains of an historic shoreline dating from 1762 to the early 1780's.

The methodology used in the excavation, limited stratigraphic testing through the use of bucket tests, was sensitive enough to obtain data while minimizing disturbance to the site and the costs of excavation and conservation. From these tests it was learned that the artifact distribution was not random and therefore provides insight into many aspects of Fort Niagara's history. Preliminary analysis confirmed the contrasting use of land within the Fort and outside on the Bottoms. Other aspects of life including trade and social behavior will be the subject of future study utilizing the database retrieved from the cove.

Of perhaps even greater importance is the potential for research at other sites. Early surface surveys indicated that Old Fort Niagara's cove appeared barren and of little historical or archaeological significance. This study has shown that surface surveys, at least in areas with known terrestrial sites nearby, may be inadequate. Of the 1593 artifacts found, only two were from the surface. Only twenty-four were located in level one. Ninety-eight percent of the artifacts and the shoreline they represent would have been missed by a surface survey alone. Considering the potential contributions to site histories, researchers cannot ignore the inundated

portions of their sites, for in doing so they may cause their conclusions to be inaccurate or at best incomplete.

Recommendations

The Old Fort Niagara Archaeology in Progress Project has recognized the potential for underwater archaeological research. Data gathered from the cove during the 1989 underwater survey continue to be analyzed. The 1593 artifact database offers the opportunity for additional statistical analysis. The scope of this initial excavation could be broadened to include additional small scale testing in the cove both in and around the 100 ft. x 100 ft. study area used in 1988 and 1989. The hypothesis that level two dates to the late 1770's into the 1780's while level three dates to the 1760's and 1770's could be just one line of further study.

Although not analyzed in this site report, the 1988 test season and the experiments on test unit size conducted in 1989 revealed what may be a trash midden from a late eighteenth-century tavern. It was found along X lines 0 and 1. The location of the midden conforms to the location of the inundated shoreline and as such does not contradict the findings of this report. It is recommended that this area be tested further and incorporated into the 1989 database.

Regional Recommendations

The Lake Ontario shoreline possesses artifact deposits that should be investigated by methods similar to the bucket tests used in the 1989 cove study. The Archaeology in Progress Project is currently working to map an inundated elliptical bastion found on the lake side of the Fort that dates to 1816.[9] While there have been some artifacts recovered on the high energy environment surface, many more relating to the bastion may be located beneath the extremely hard packed clay surface. Four Mile Creek, the landing site of the British siege force that captured the fort in 1759, may be an excellent area to test the methodology used in the cove to see if it is of value in other environments.

The Niagara River region was the scene of much British activity during the colonial period. Five different posts were established along the route between Lakes Ontario and Erie. Testing along the thirty mile portage route, especially at the site of the lower landing at Lewiston, New York, could provide information about the movement of trade goods and supplies through the Great Lakes during the eighteenth century. Researchers must keep in mind, however, that much of the Niagara River is considered dangerous due to swift currents and pollutants, such as toxins and heavy metals. At present no major underwater excavations have been conducted in the

Lake Ontario area on the United States side of the river, other than at Old Fort Niagara. Interest in the use of underwater historical resources in the region, however, has risen with the growth of local maritime societies, naval parks, and individual professional research projects.[10]

The research techniques and questions posed at Old Fort Niagara could be applied to many other inundated sites. In addition, this project is of special significance to other Great Lakes British colonial sites which may contain valuable historical data hidden beneath apparently barren sands. Hopefully, researchers will avail themselves of this untapped resource.

TABLE 6.
ARTIFACT DISTRIBUTION BY LEVEL

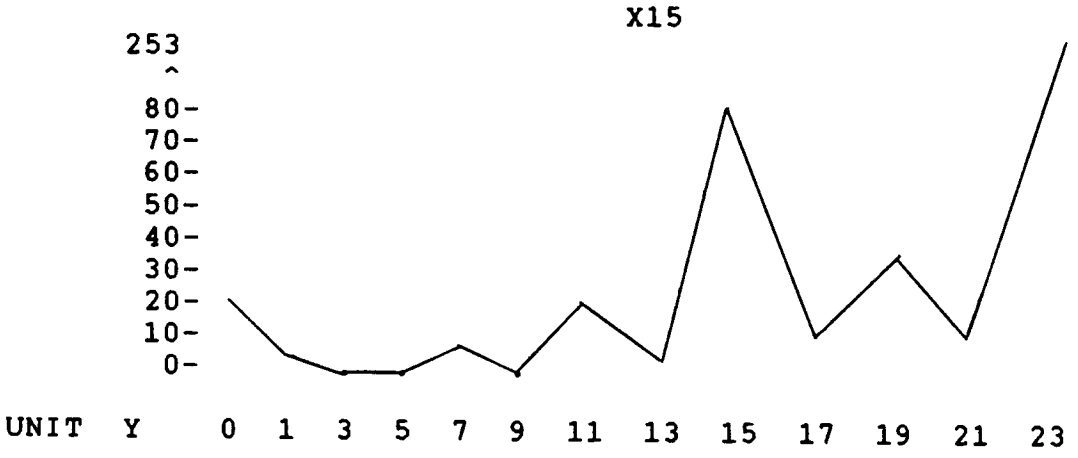
Level	No.#	Percent of Whole
Surface	2	.16
Level 1	24	1.50
Level 2	910	57.01
Level 3	346	21.72
Level 4	5	.41
Level 5	0	0.00
Waterscreen*	306	19.20
TOTAL	1593	100.00

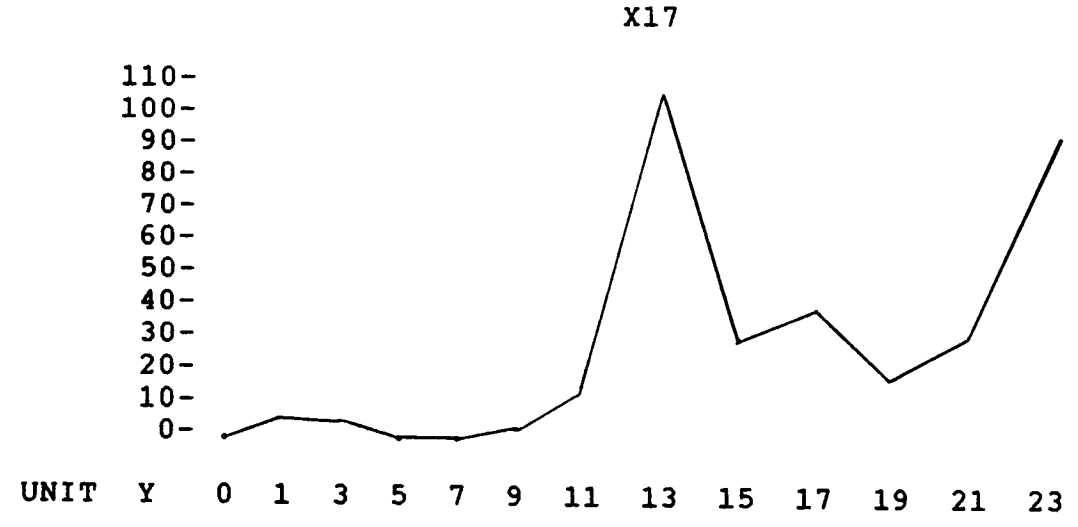
* The waterscreen material included overburden from many different stratigraphic levels and was therefore not included in the analysis for any soil level

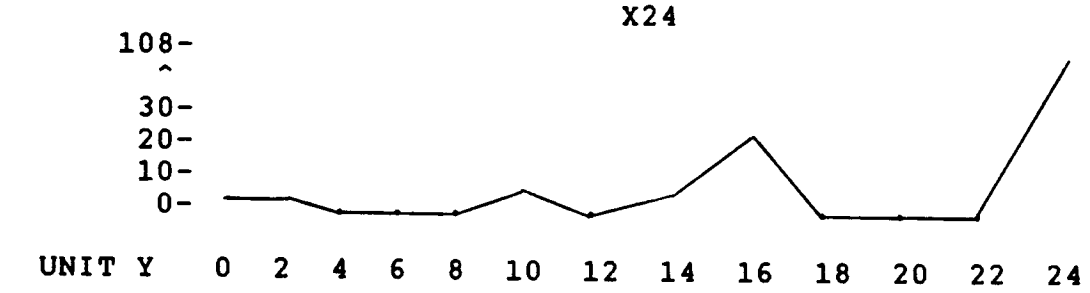
Source: Artifact Inventory, Appendix C

TABLE 7.

ARTIFACT DISTRIBUTIONS FOR LEVEL 2





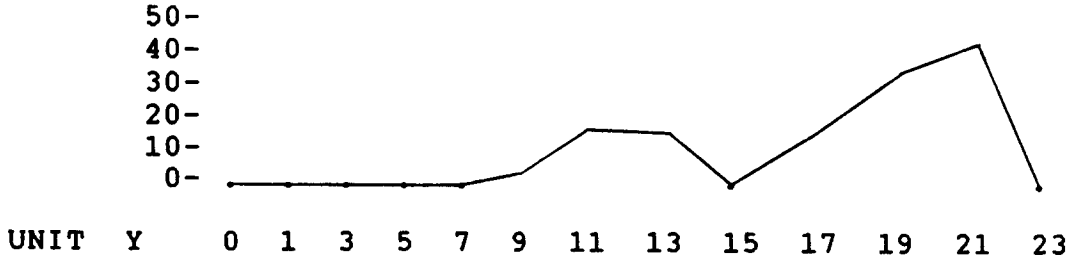


Source: Artifact Inventory, Appendix C

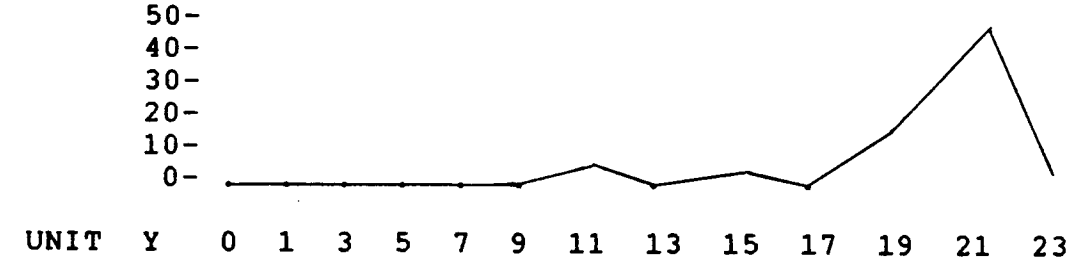
TABLE 8.

ARTIFACT DISTRIBUTIONS FOR LEVEL 3

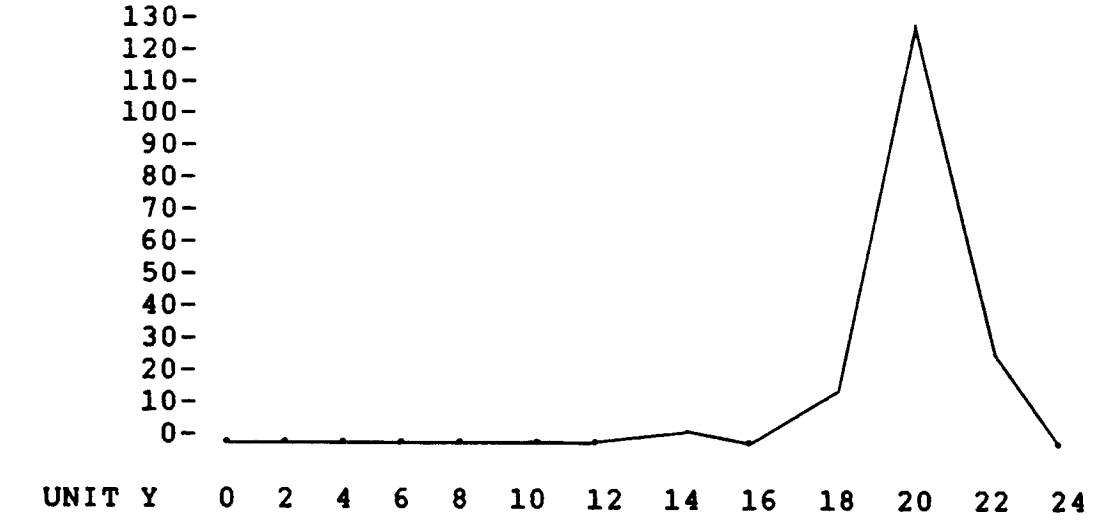
X15



X17



X24



Source: Artifact Inventory, Appendix C

TABLE 9.

DATE TABLE FOR LINE X15

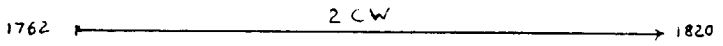
ARTIFACT TYPE	LEVELS 1	2	3	DATE RANGES
Buttons				
Olsen Type G Button	0	1	0	1785-1800*
British Infantry Button	0	2	1	1759-1770
British 8th Regt. of Foot	0	0	1	1774-1785
Creamwares = CW				
Plain Undecorated CW	2	8	10	1762-1820
Molded CW	0	2	1	1762-1820
Ribbed Molded CW	0	0	2	1762-1820
Queen's Pattern Molded CW	0	0	1	1765-1820
Royal Pattern Molded CW	0	1	0	1765-1820
Porcelains = P				
Chinese P	0	0	1	1678-1800
Unknown P	0	1	0	1678-1800
Redware	0	1	1	1678-1800
Unidentified Red Bodied Ceramics	0	1	1	1678-1800
Decanter Stopper	0	0	1	1745-1780

* This could be U.S. Regt. of Artillerists (1796-1802), or South type 9 (1726-1776 or 1760-1860), therefore dating is problematic.

TABLE 9.
(Continued)

Level 1 1762-1780

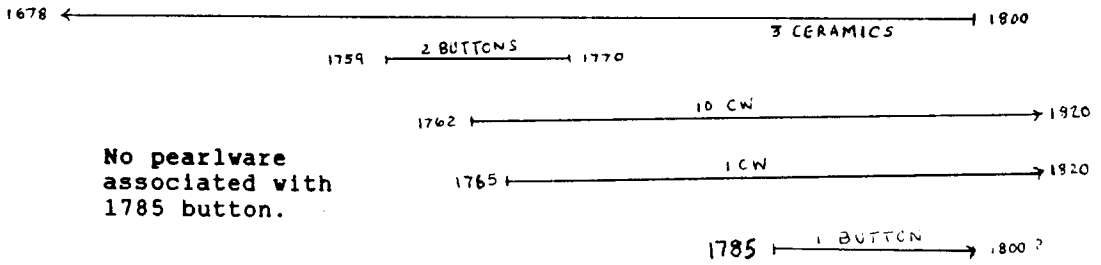
1740 1750 1760 1770 1780 1790 1800



No Pearlware c 1780.

Level 2 1765-1785

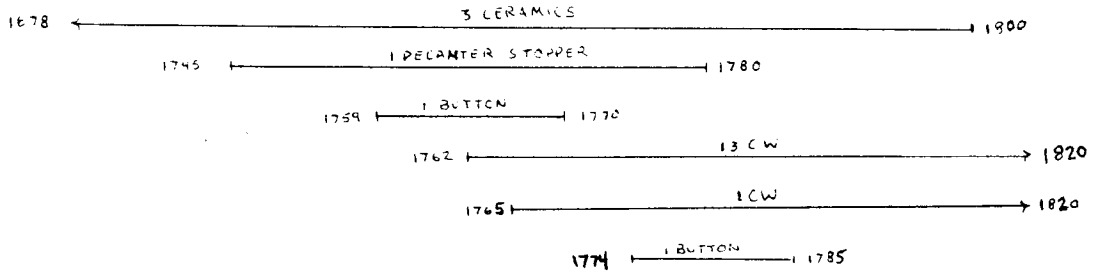
1740 1750 1760 1770 1780 1790 1800



No pearlware associated with 1785 button.

Level 3 1765-1780

1740 1750 1760 1770 1780 1790 1800



No pearlware c 1780.

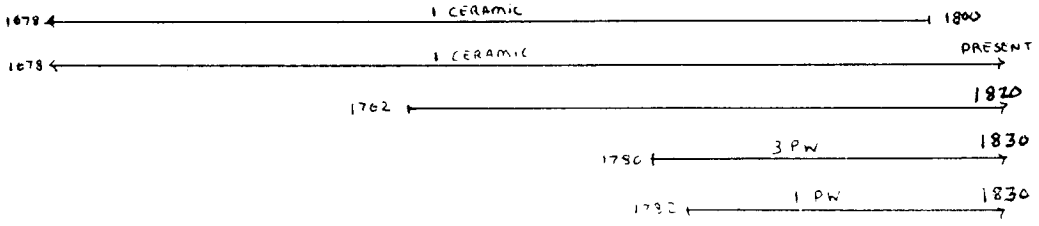
TABLE 10.

DATE TABLE FOR LINE X17

ARTIFACT	LEVELS 1	2	3	DATE RANGE
Creamwares = CW				
Plain Undecorated CW	0	8	4	1762-1820
Ribbed Molded CW	0	1	0	1762-1820
Pearlwares = PW				
Plain Undecorated	0	3	0	1780-1830
Blue Chinoiseries PW	0	1	0	1782-1830
Hand Decorated Chinese Porcelain	0	1	0	1679-1800
Redware	0	1	0	1678-Present

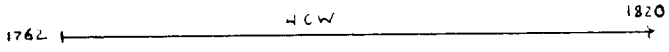
Level 2 Early 1780's

1740 1750 1760 1770 1780 1790 1800



Level 3 1762-1780

1740 1750 1760 1770 1780 1790 1800



No pearlware c 1780

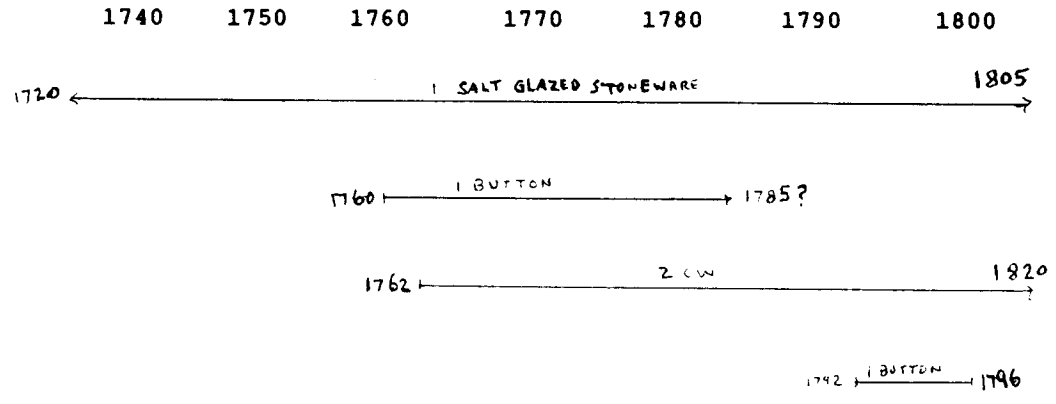
TABLE 11.

DATE TABLE FOR LINE X24

ARTIFACT TYPE	LEVELS 1	2	3	DATE RANGE
Plain Undecorated Creamware	0	2	0	1762-1820
White Saltglazed Stoneware	0	1	0	1720-1805
Olsen Type D Button	0	1	0	1760-1785*
5th Regt. of Foot Button	0	1	0	1792-1796

* This could be U.S. Regt. of Artillerits and Engineer's variety 2 button (1787-1802 or 1796-1802), or Olsen Type D (1760-1785), or South Type 7 (1726-1776). Dating is therefore problematic.

Level 2 1762-1780

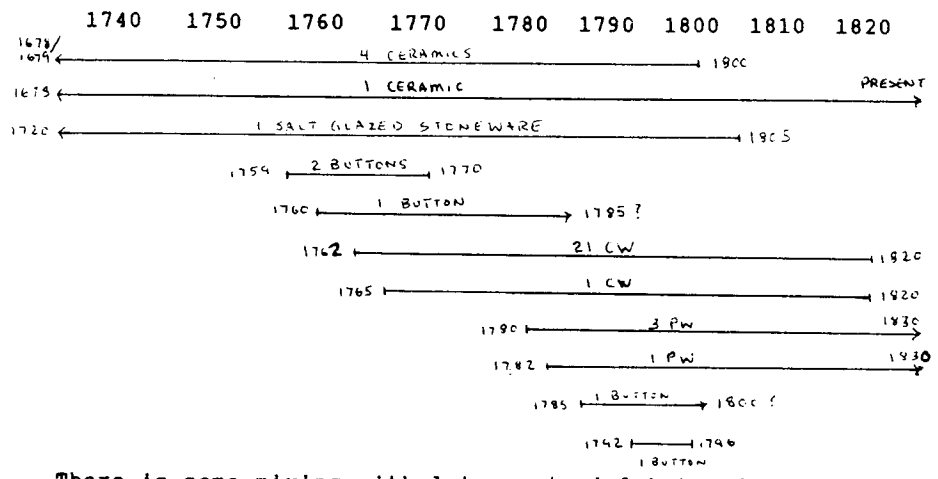


No pearlware associated with later button.

TABLE 12.

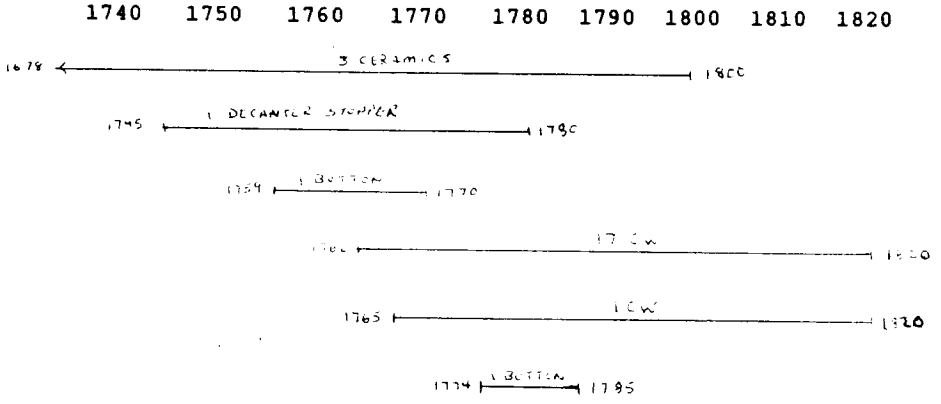
DATE TABLE FOR ALL X LINES

LEVEL 2 1762-1785



There is some mixing with later material but majority is early.

LEVEL 3 1762/1765-1780



No pearlware c 1780.

TABLE 13.

WROUGHT NAIL ATTRIBUTES

Wrought Nail Total: 447

Nail Shape Variations

Straight	258	*Clinched	52
*Curved	28	*Bent	105
Unknown	4		

*Curved indicates deliberate shaping of the nail.
*Clinched indicates L shape from pounding over tip.
*Bent indicates apparent accidental bending

Head Type

Rose	148	Flat	64
T	73	L	5
Headless	157		

Point Type

Sharp	227	Unknown	190
Flat	30		

Metal Fiber Direction

Vertical	441	Horizontal	0
Unknown	6		

Corrosion

Yes	163	No	284

Source: Artifact Inventory, Appendix C

NOTES

1
The following books are excellent sources for artifact dates: Ivor Noel Hume, A Guide to Artifacts of Colonial America (New York, 1970), Stanley J. Olsen, "Uniform Buttons as Interpretive Aids for Military Sites," Curator, V (1962) and Stanley South, Method and Theory in Historical Archaeology (New York, 1977). Local experts that were consulted include: Dr. Elaine Herold, Dr. Stuart D., and Patricia K. Scott (State University of New York at Buffalo); Dr. Paul R. Huey (Senior Scientist, New York State Department of Parks, Recreation and Historic Preservation); Brian Leigh Dunnigan (Executive Director of Old Fort Niagara); and Douglas Knight and Marbud Prozeller (Old Fort Niagara Archaeology in Progress Project).

2
Stuart D. and Patricia K. Scott, Coast Guard Station Niagara: Archaeological and Historical Survey (Youngstown, N.Y., 1983), 74.

3
Ibid.

4
Stuart D. and Patricia K. Scott, "Reorientation of Historical Maps of Old Fort Niagara Using Computer-Assisted Cartography," Journal of Field Archaeology, XIIIV (1991).

5
To provide a more significant sample for this analysis, the ceramics found on line X0 and X1 in the cove were added to those from X15, 17, and 24.

6
Stuart D. Scott and Patricia K. Scott, Old Fort Niagara Archaeology for Seawall Repairs (Youngstown, N.Y., 1986), Figure 42.

7
Scott and Scott, Coast Guard, 72.

8
Ibid.

9

William E. Utley and Patricia K. and Stuart D. Scott, 1988 Underwater Archaeology Survey: Old Fort Niagara (Youngstown, N.Y., 1988), 31.

10

A few examples of this are the Lower Lakes Maritime Historical Society, the Buffalo and Erie County Naval and Servicemen's Park, the Buffalo Maritime Society, the Center for Small Watercraft Studies at State University of New York, College at Buffalo, and the underwater division of the Old Fort Niagara Archaeology in Progress Project.

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APPENDIX A

NIAGARA FRONTIER STATE PARK and RECREATION COMMISSION Prospect Park-Niagara Reservation, Niagara Falls, New York 14303 716-278-1770
George M. Martin, Commission Chairman
Mario J. Pirastru, Regional Administrator

SPECIAL USE PERMIT

TO: Brian L. Dunnigan
Executive Director
Old Fort Niagara
P. O. Box 169
Youngstown, N.Y. 14174

DATE: May 8, 1989

PERMISSION IS HEREBY GRANTED FOR THE BELOW DESCRIBED FUNCTION:

PURPOSE: Underwater survey

PARK: Fort Niagara State Park PARK AREA: in river immediately upstream from the Coast Guard station.

DATE: June 1 - November 1, 1989 TIME: Daytime

NUMBER ATTENDING: Kurt Knoerl under the direction of Stuart and Pat Scott

FACILITIES RESERVED: None

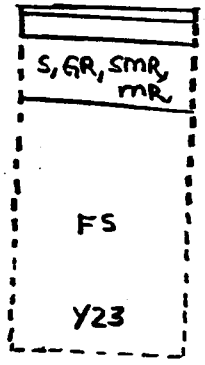
Mario J. Pirastru
Regional Director

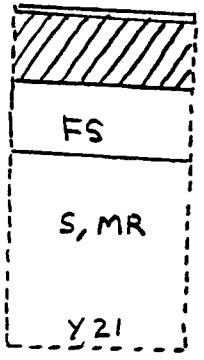
by George F. Watson
George Watson
Supervisor of Park Operations

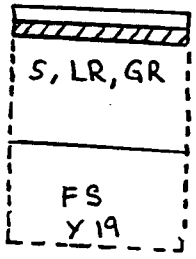
cc: Ass't. Supv. Pk. Op.
Pk. Mgr.
Police (2)

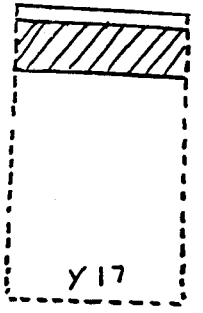
STRATIGRAPHY PROFILES FOR LINE X15

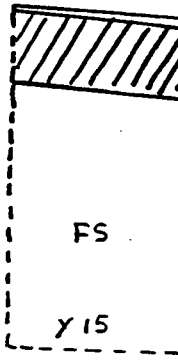
Test units were located eight feet apart. Unit X15:Y23 is 7.19
below the terrestrial datum point. Unit X15:Y1 is 10.74 feet below
terrestrial datum point.









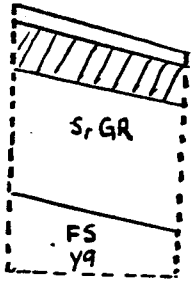


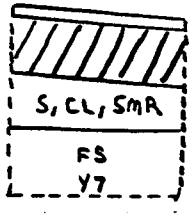
KEY COVE STRATIGRAPHY PROFILES

Top Soil Level Uniformly Silt and Light Brown Sand

Black Organic Material

S	Sand	CL	Clay
FS	Fine Grey Sand	GCL	Grey Clay
GR	Gravel	RCL	Red Clay
LR	Large Rocks	COS	Course Sand
MR	Medium Rocks		
SMR	Small Rocks		Layer of Rocks





STRATIGRAPHY PROFILES FOR LINE X17

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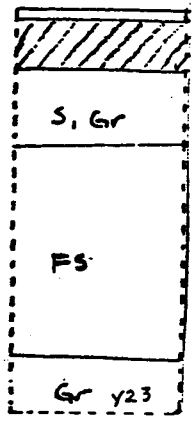
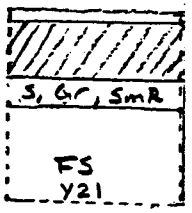
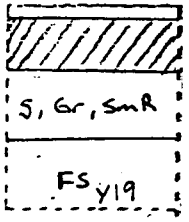
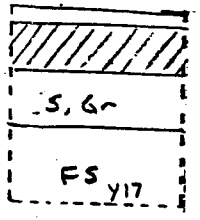
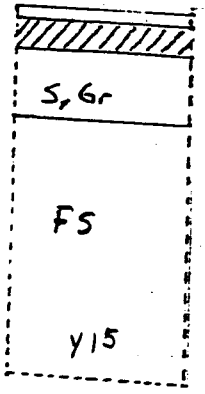








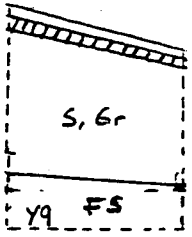


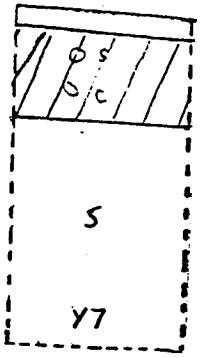
KEY COVE STRATIGRAPHY PROFILES

Top Soil Level Uniformly Silt and Light Brown Sand

Black Organic Material

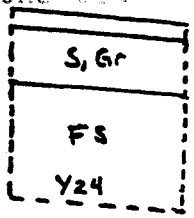
S	Sand	CL	Clay
FS	Fine Grey Sand	GCL	Grey Clay
GR	Gravel	RCL	Red Clay
LR	Large Rocks	COS	Course Sand
MR	Medium Rocks		
SMR	Small Rocks		Layer of Rocks

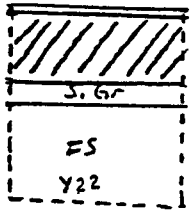


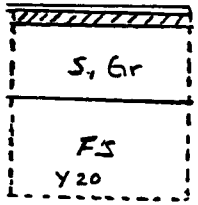


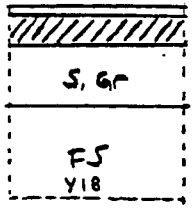
STRATIGRAPHY PROFILES FOR LINE X24

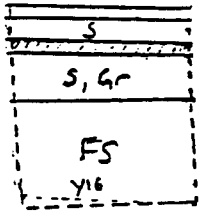
Test units were located eight feet apart. Unit X24:Y24 is 6.61 fe
below the terrestrial datum point. Unit X24:Y0 is 10.71 feet below the
terrestrial datum point.

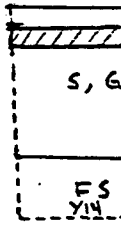










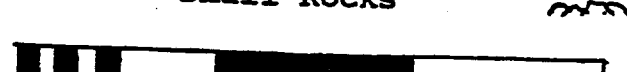


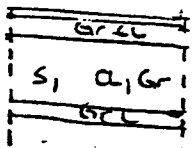
KEY **COVE STRATIGRAPHY PROFILES**

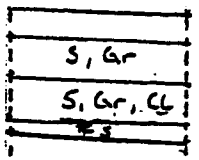
Top Soil Level Uniformly Silt and Light Brown Sand

Black Organic Material

S	Sand	**CL**	Clay
FS	Fine Grey Sand	**GCL**	Grey Clay
GR	Gravel	**RCL**	Red Clay
LR	Large Rocks	**COS**	Course Sand
MR	Medium Rocks		
SMR	Small Rocks		Layer of Rocks







APPENDIX C

ARTIFACT INVENTORY

The following inventory includes all artifacts found in lines X15, X17, and X24. While other areas of the cove were also excavated, they did not fall under the scope of this research project. A complete listing of all artifacts excavated from the cove area in 1988 and 1989 is on file at the Old Fort Niagara conservation laboratory.

TU 418 I 0.00-0.05 S1E0D x15y0
(89.00/01476)-(89.00/0147901)

gun flint (1) [honey colored French gun flint] (89.00/01476)
lead fish line weight (1)
gun ammunition (1) [.410" musket ball] (89.00/01478)
gun ammunition (4) [.110" lead shot] (89.00/01479)
gun ammunition (1) [.140" lead shot] (47901)

TU 418 II 0.05-0.45 S1E0D x15y0
(89.00/01480)-(89.00/01488)

animal bone (1)
wood (3/3) [could be a branch]
charred wood (2)
lead fish line weight (1)
gun ammunition (5) [.100" lead shot] (89.00/01480)
gun ammunition (2) [.100" lead shot] (89.00/01487)
gun ammunition (2) [.110" lead shot] (89.00/0148701)
gun ammunition (1) [.110" lead shot] (89.00/0148001)
gun ammunition (2) [.130" lead shot] (89.00/0148002)
gun ammunition (4) [.140" lead shot] (89.00/0148003)
gun ammunition (1) [.150" lead shot] (89.00/0148004)
unidentifiable iron button? (1) (89.00/01488)
olive green wine bottle glass (1/1) 1760-1780

olive green wine bottle glass (1/1) L18-E19

TU 418 IV 1.45-1.45 S1E0D x15y1
(89.00/01489)
soil sample

TU 418 I 0.05-0.10 S1E0D x15y3
(89.00/01490)-(89.00/01495)
animal bone (1)
wood (1)
flint/chert debitage (1)
square nail (1)
iron knife blade (1/1) [cutlery knife] (89.00/01492)
clear vessel glass (1/1)

TU 418 II 0.10-0.35 S1E0D x15y7
(89.00/01496)-(89.00/01502)
animal bone (1)
animal tooth (1)
flint/chert debitage (1)
brass tack (1)
unidentified iron (2/?)
gun ammunition (1) [lead shot] (89.00/01500)
clear case? bottle glass (1/1) L18-E19

TU 418 F1 III 0.10-0.70 S1E0D x15y9
(89.00/01503)-(89.00/01508)
wrought nail (3)
iron file (1)
iron strap (1/1)
gun ammunition (1) [.680" musket ball]
amber bottle glass (1/1) L19-20?
molded creamware - ribbed pattern (1/1) 1762-1820 (1791)

TU 418 F2 III 0.10-0.70 S1E0D x15y9
(89.00/01509)-(89.00/01515)
animal bone (1)
wrought nail (6)
iron bolt (1)
iron strap (1/1)
unidentified iron (2/?)
olive green wine? bottle glass (6/1-6) L18-E19
kaolin pipe stem (1/1) [4.0 stem hole diameter]

TU 418 F3 III 0.10-0.70 S1E0D x15y9
(89.00/01516)
clear decanter glass stopper (1) (89.00/01516)

TU 418	F4 II?	0.10-0.70	S1E0D X15Y9	
	NOTE: this is probably Level III			
(89.00/01517)-(89.00/01524)				
	brick (1)			
	nail (1)			
	square nail (3)			
	iron bracket (1)			
	blue green window glass (1.1)			
	olive green wine? bottle glass (2/2)			L18-E19
	olive green wine? bottle glass (3/1-2)			
	pu lead glazed coarse redware - reddish brown glazed (1/1)			
TU 418	Many	0.00-0.70	S1E0D x15y9	
(89.00/01525)-(89.00/01535)				
	burned animal bone (2)			
	square nail (1)			
	brass straight pin (1) (89.00/01527)			
	gun ammunition (1) [.170" lead shot](89.00/01528)			
	light blue green window glass (1/1)			
	blue green window glass (1/1)			
	olive green wine bottle glass (4/1-4)			L18-E19
	very light green rectangular sectioned vessel glass (2/1-2)			19
	(Note: this may not be kitchen glass)			
	redwood simple cane "seed" bead (1) (89.00/01533)			
	[Kidd IIa2 L=1.82mm/ W=3.46mm]			
	pu creamware (4/2-3)			1762-1820 (1791)
	kaolin pipe stem (2/1-2)			
TU 418	F1 III	0.10-0.70	S1E0D x15y11	
(89.00/01536)-(89.00/01543)				
	unidentified iron furniture hardware (1) (89.00/01536)			
	iron strap (1/1)			
	iron nut (1)			
	unidentified iron (2/?)			
	olive green wine bottle glass (8/1-8)			L18-E19?
	olive green case bottle glass (2/2)			L18-E19?
	clear bottle glass (1/1)			L19?
	clear vessel glass (2/1-2)			L18-E19?
TU 418	F2 III	0.10-0.70	S1E0D x15y11	
(89.00/01544)-(89.00/01553)				
	square nail (12)			
	wire nail (1)			
	iron strap (5/?)			
	iron pin (1/1)			
	unidentified iron (5/?)			
	pewter one piece flat button (1) (89.00/01549)			1774-1785
	[British Infantry OFN Type 3 - 8th Regiment of Foot Variety - used in N. America 1768-1785]			
	olive green case bottle glass (1/1)			L18-E19
	polychrome hand decorated Chinese porcelain (1/1)			1660-1800 (1730)
	molded creamware - queen's? pattern (1/1)			1765-1820 (1793)
	kaolin pipe stem (1/1) [5.0 /64" stem hole diameter]			

TU 418 F3 III 0.10-0.70 S1E0D x15y11
(89.00/01554)-(89.00/0156301)

brick (2)	
square nail (20)	
iron strap (1/1)	
brass straight pin (1)	
olive green wine? bottle glass (4/1-2)	L18-E19
clear vessel glass (1/1)	L18-E19
oyster white/light gray compound cane "seed" bead (1) (89.00/01561) [Kidd IVa13 L=2.12mm W=3.64mm]	
pu creamware (4/1)	1762-1820 (1791)
kaolin pipe stem (1/1) [5.0/64" stem hole diameter]	
kaolin pipe stem (1/1) [5.5/64" stem hole diameter]	

TU 418 F4 III 0.10-0.70 S1E0D x15y11
(89.00/01564)-(89.00/01572)

coal	
square nail (3)	
iron spike (1)	
unidentified lead (1/1)	
light green window glass (1/1)	
olive green wine bottle glass (1/1)	1757-1790
olive green case bottle glass (4/1-2)	L18-E19
clear wine glass stemware (1/1)	1760-1770
oyster white/light gray compound cane "seed" bead (1)(89.00/01572] [Kidd IVa13? L=3.01 W=3.76]	

TU 418 Many 0.00-0.70 S1E0D x15y11 (water screened)
(89.00/01573)-(89.00/01582)

square nail (4)	
brass straight pin (4) (89.00/01575)	
light green window glass (1/1)	
olive green bottle glass (10/4-5)	L18-E19?
light green vessel glass (1/1)	L18-E19?
clear wine glass stemware (1/1)	1760-1770
blue glass gemstone for jewelry (1) (89.00/01579)	
blue hand decorated Chinese porcelain - blue pattern on interior and blue pattern on exterior (1/1)	1660-1800 (1730)
pu unglazed coarse redware (1/1)	
pu creamware (6/?)	1762-1820 (1791)

TU 418 F1 I 0.00-0.00 S1E0D x15y12
(89.00/01583)-(89.00/01584)

unidentified lead item (1)	
olive green wine bottle glass (1/1)	

TU 418 F1 I 0.00-0.05 S1E0D x15y13
(89.00/01585)

black walnut see (1)	

TU 418	F1 III	0.10-0.60	S1E0D x15y13	
(89.00/01586)-(89.00/01591)				
	brick (1/1)			
	square nail (5)			
	unidentified iron (2/1-2)			
	olive green wine bottle glass (7/3-4)			L18-E19
	clear vessel glass (1/1)			
	pu creamware (1/1)			1762-1820 (1791)
TU 418	F2 III	0.10-0.60	S1E0D x15y13	
(89.00/01592)-(89.00/01601)				
	animal bone (1)			
	wood (1)			
	square nail (4)			
	iron kettle? (1/1)			
	iron strap (1/1)			
	brass straight pin (1) (89.00/01597)			
	olive green wine? bottle glass (1/1)			L18-E19
	clear wine glass stemware (1/1)			1760-1770
	pu creamware (1/1)			1762-1820 (1791)
	molded creamware - ribbed pattern (1/1)			1762-1820 (1791)
TU 418	F3 I	0.00-0.10	S1E0D x15y13	
(89.00/01602)-(89.00/01604)				
	animal bone (1)			
	clear wine glass stemware (1/1)			L18-E19
	kaolin pipe stem (1/1)			
TU 418	F3 III	0.10-0.60	S1E0D x15y13	
(89.00/01605)-(89.00/01612)				
	animal bone (1)			
	square nail (5,2/6-7)			
	iron gun trigger guard (1) [French?] (89.00/01607)			
	very light aqua window? glass (1/1)			
	olive green wine bottle (1/1)			L18-E19
	clear wine glass stemware (1/1)			L18-E19
	pu creamware (2/2)			1762-1820 (1791)
	kaolin pipe stem (1/1) [5.5/64" stem hole diameter]			
TU 418	F4 III	0.10-0.60	S1E0D x15y13	
(89.00/01613)-(89.00/01616)				
	animal bone (1)			
	brick (1/1)			
	olive green wine bottle glass (1/1)			L18-E19
	light blue green bottle glass (1/1)			L18-E19
TU 418	Many	0.00-1.00	S1E0D x15y13	
(89.00/01617)-(89.00/01618)				
	brass straight pin (2) (89.00/01617)			
	molded creamware - feather edged? (1/1)			1762-1820 (1791)

TU 418 I 0.00-0.00 S1E0D x15y15?
(Note: this may be x15y13?)
(89.00/01619)-(89.00/01622)
iron strap (1/1)
olive green wine bottle glass (2/1) L18-E19
pu creamware (1/1) 1762-1820 (1791)
[bowl?]
pu creamware (1/1) 1762-1820 (1791)

TU 418 F1 I 0.05-0.20 S1E0D x15y15
(89.00/01623)-(89.00/01640)
charred wood (1)
brick (2)
nail (45)
nail (1)
iron strap (1/1)
iron wire (2/1)
unidentified iron (3/?)
iron knife blade (1/1) [cutlery knife]
brass straight pin (7) (89.00/01631)
brass scale weight (1)(89.00/01632)
gun ammunition (1) [brass .22 bullet] (89.00/01633)
gun ammunition (2) [.100" lead shot] (89.00/01634)
gun ammunition (1) [.110" lead shot] (89.00/0163401)
gun ammunition (2) [.120" lead shot] (89.00/0163402)
gun ammunition (1) [.140" lead shot] (89.00/0163403)
gun ammunition (4) [.240" lead shot] (89.00/0163404)
gun ammunition (2) [.250" lead shot] (89.00/0163405)
gun ammunition (2) [.260" lead shot] (89.00/0163406)
gun ammunition (4) [.280" lead shot] (89.00/0163407)
olive green wine" bottle glass (3/1) L18-E19
olive green wine bottle glass - string close to lip (1/1) 1760-1820?
clear vessel glass (1/1) L18-E19
pu lead glazed coarse redware - reddish brown glazed (1/1)
pu creamware (1/1) 1762-1820 (1791)
kaolin pipe stem (1/1) [4.5 /64" stem hole diameter]

TU 418 F 2 II 0.05-0.20 S1E0D x15y15
(89.00/01641)-(89.00/01651)
soil sample
nail (28)
iron strap (2/1-2)
gun ammunition (2) [.240" lead shot] (89.00/01645)
gun ammunition (8) [.250" lead shot] (89.00/0164501)
gun ammunition (3) [.280" lead shot] (89.00/0164502)
gun ammunition (2) [.540" musket? ball] (89.00/0164503)
brass straight pin (6) (89.00/01644)
dark blue green case bottle glass (1/1) L18
amber vessel glass (1/1) L19-20
clear vessel glass (1/1) L18-E19
clear vessel glass (1/1) M18-L19
pu creamware (1/1) 1762-1820 (1791)
molded creamware - ribbed (1/1) 1762-1820 (1791)

TU 418 F3 III 0.05-0.20 S1E0D x15y15
(89.00/01652)-(89.00/01667)

animal bone (1)
brick (1)
nail (14)
iron awl? (89.00/01655)
iron strap (1/1)
iron? wire (1/1)
unidentified iron (3/?)
gun ammunition (2) [.140" lead shot] (89.00/01662)
brass straight pin (1/1) (89.00/01660)
brass two piece hollow button (1/1) (89.00/01661) 1759-1770/1780?
[British Royal Regiment of Artillery? OFN Type 1 Variety 1 & 2 in use in N. America 1750-1767]
olive green wine bottle glass (1/1) L18-E19
amber vessel glass (1/1) L19-E20
molded creamware - royal pattern (1/1) 1765-1820 (1793)
kaolin pipe stem (1/1) [4.5/64" stem hole diameter]
kaolin pipe bowl (1/1) (89.00/01667)

TU 418 F4 II 0.05-0.20 S1E0D x15y15
(89.00/01668)-(89.00/01696)

animal bone (2)
wood (1)
brick (1)
nail (104)
nail head? 91/1)
iron tack (2)
brass tack (1/1)
iron strap (3/?)
iron awl? (1/1)
unidentified iron (6/3-?)
lead washer (1)
unidentified copper (1/1)
pewter handle (1/1) [cutlery handle] (89.00/01684)
gun ammunition (1) [.680" musket ball] (89.00/01685)
gun ammunition (9) [.100" lead shot] (89.00/0186)
gun ammunition (8) [.120" lead shot] (89.00/018601)
gun ammunition (3) [.130" lead shot] (89.00/018602)
gun ammunition (9) [.250" lead shot] (89.00/018603)
gun ammunition (9) [.270" lead shot] (89.00/018604)
gun ammunition (9) [.280" lead shot] (89.00/018605)
pewter two piece hollow button (1)(89.00/01680) 1759-1770
[British Infantry? OFN Type 1, Varieties 1 & 2 - Enlisted - in use in N. America 1750?-1767]
pewter two piece hollow button (1) (89.00/01681) 1759-1770
[British Infantry? OFN Type 1, Varieties 1 & 2 - Enlisted -in use in N. America 1750?-1767]
brass straight pin (1) (89.00/01682)
light blue green window glass (1/1)
olive green vessel glass (2/2) L18-E19
amber vessel glass (1/1) L19-E20
clear vessel glass (3/2-3) L18-E19
porcelain of unknown origin (1/1)

unidentifiable red bodied? ceramic/ (1/1)
pu creamware (4/2-3) 1762-1820 (1791)
kaolin pipe stem (1/1)

TU 418 Many 0.00-1.90 S1E0D x15y15
(89.00/01697)-(89.00/01703)
flint/chert debitage (1)
nail (6)
unidentified iron (2)
gun ammunition (1) [.240" lead shot] (89.00/01701)
brass straight pin (12)
amber vessel glass (1/1) L19-E20
clear vessel glass (2/1-2) L18-E19

TU 418 II 0.05-0.20 S1E0D x15y15
(89.00/01704)-(89.00/01713)
square nail (30)
iron wire (1/1)
unidentified iron (5/?)
gun ammunition (2) [.100" lead shot] (89.00/01708)
gun ammunition (1) [.170" lead shot] (89.00/01709)
brass straight pin (37,7/38-?) (89.00/01710)
light blue window glass (1/1)
olive green wine bottle glass (1.1) L18-E19
pu creamware (1/1) 1762-1820 (1791)

TU 418 F3 many 0.00-1.90 S1E0D x15y15 (water screened)
(89.00/01714)-(89.00/01718)
square? nail (1/1)
wire nail (1/1)
unidentified iron (2/1-2)
gun ammunition (1) [.250" lead shot] (89.00/01717)
brass straight pin (5,1/6) (89.00/01718)

TU 418 II 0.07-0.32 S1E0D x15y17
(89.00/01719)-(89.00/01721)
square nail (8)
iron strap (1/1)
olive green wine bottle glass (1/1) L18-E19

TU 418 III 0.32-0.62 S1E0D x15y17
(89.00/01722)-(89.00/01726)
square nail (5)
iron wire (2/1-2)
unidentified iron (2/?)
brass straight pin (4) (89.00/01725)
kaolin pipe stem (1/1)[4.5 /64" stem hole diameter]

TU 418 Many 0.00-0.62 S1E0D x15y17 (water screened)
(89.00/01727)-(89.00/01732)
animal bone (1)
square nail (4)
unidentified iron (1/1)
gun ammunition (1) [.110" lead shot] (89.00/01730)
gun ammunition (1) [.120" lead shot] (89.00/0173001)
gun ammunition (2) [.130" lead shot (89.00/0173002)
light green flat glass (1/1)
black simple cane "seed" bead (1) (89.00/01732)
[Kidd IIa7 L=2.25mm W=2.89mm]

TU 418 II 0.06-0.32 S1E0D x15y19
(89.00/01733)-(89.00/01744)
coal (1)
square nail (19)
iron strap (1/1)
unidentified iron (1./1)
flat cloths iron (1/1)
iron sledge hammer (1/1)
blue green window glass (1./1)
light blue green bottle glass (3/1)
clear vessel glass (1/1) L19-E20?
pu creamware (1/1) 1762-1820 (1791)

TU 418 III 0.32-0.70 S1E0D x15y19
(89.00/01745)-(89.00/01751)
slag
square nail (10, 8/11-?)
iron strap (1/1)
olive green wine bottle glass (1/1) L18-E19
amber vessel glass (2/1-2) L19-E20
pu creamware (2/1-2) 1762-1820 (1791)
molded creamware - ribbed pattern (1/1) 1762-1820 (1791)

TU 418 Many 0.00-1.05 S1E0D x15y19 (water screened)
(89.00/01752)-(89.00/01764)
coal (1)
flint/chert debitage (1)
slag (1)
square nail (18)
iron tack (1)
brass tack? (1/1)
unidentified iron (6/?)
unidentified lead (1/1)
unidentified metal (2/?)
iron buckle (1/1) (89.00/01757)
gun ammunition (6) [.100" lead shot] (89.00/01762)
gun ammunition (4) [.110" lead shot] (89.00/0176201)
gun ammunition (8) [.130" lead shot] (89.00/0176202)
gun ammunition (1) [.150" lead shot] (89.00/0176203)
gun ammunition (3) [.170" lead shot] (89.00/0176204)
gun ammunition (1) [.180" lead shot] (89.00/0176205)

gun ammunition (61 [.220" lead shot] (89.00/0176206)
brass straight pin (6) (89.00/01760)
amber vessel glass (3/1) L19-E20

TU 418 I 0.00-0.05 S1E0D x15y21
(89.00/01765)-(89.00/01767)
brick (1)
square nail (1)
iron staple (1)

TU 418 II 0.05-0.35 S1E0D x15y21
(89.00/0168)-(89.00/01771)
animal bone (1)
square nail (4)
unidentified iron (2/?)
amber vessel glass (1/1) L19-E20

TU 418 III 0.35-0.50 S1E0D x15y21
(89.00/01772)-(89.00/01785)
square nail (14,14/15-?)
spike or long bolt (1)
iron strap (3/2-3)
unidentified lead (1/1)
unidentified brass? (1/1)
iron buckle (1/1) (89.00/01776)
two piece pewter button (1) (89.00/01780) 1759-1770
[British Infantry? Type 1 Varieties 1 & 2 - Enlisted - in use in N. America 1750?-1767]
brass straight pin (1/1) (89.00/01778)
7up green bottle glass (1/1) 20
olive green bottle glass (3/1-2) L18-E19
amber vessel glass (2/1) L19-E20?
clear vessel glass (2/2) L18-E19

TU 418 IV 0.50-1.00 S1E0D x15y21
(89.00/01786)
wood (1)

TU 418 Many 0.00-1.00 S1E0D x15y21 (water screened)
(89.00/01787)-(89.00/01792)
animal bone (1)
square nail (4)
iron wire (3/?)
gun ammunition (1) [.110" lead shot] (89.00/01791)
gun ammunition (2) [.120" lead shot] (89.00/0179101)
gun ammunition (1) [.160" lead shot] (89.00/0179102)
brass straight pin (5) (89.00/01790)
cobalt blue vessel glass (1/1)

TU 418	II	0.03-0.30	S1E0D x15y23	

gun ammunition (1) [.110" lead shot] (89.00/01791)
animal bone (1)
brick (2)
square nail (23, 18/24-?)
nail (1)
unidentified iron (4/?)
waste lead (5/?)
copper (1/1)
iron awl? (1) (89.00/01797)
iron buckle (1/1) (89.00/01798)
iron artillery ammunition (1) (89.00/01799)
gun ammunition (1) [.430" musket ball] (89.00/01804)
gun ammunition (1) [.560" musket ball] (89.00/01805)
gun ammunition (1) [.640" musket ball] (89.00/01806)
gun ammunition (94) [.100" lead shot] (89.00/01805)
gun ammunition (27) [.110" lead shot] (89.00/0180501)
gun ammunition (20) [.120" lead shot] (89.00/0180502)
gun ammunition (20) [.130" lead shot] (89.00/0180503)
gun ammunition (9) [.140" lead shot] (89.00/0180504)
gun ammunition (1) [.150" lead shot] (89.00/0180505)
gun ammunition (4) [.170" lead shot] (89.00/0180506)
gun ammunition (11) [.180" lead shot] (89.00/0180507)
gun ammunition (2) [.190" lead shot] (89.00/0180508)
brass one piece flat button (1) (89.00/01801)
[Either a civilian button similar to Olsen Type G (1785-1800) or South Type 9 (1726-1776 or 1760s-1780s or U.S. Regiment of Artillerist and Engineers? Variety 1 in use in N. America 1787-1802 but at OFN 1796-1802] — 1796-1802?
brass straight pin (4,1/5) (89.00/01802)
lead bale seal (1/1) (89.00/01803)
["4452/1y" scratched into the lead]
light green window glass (1/1)
olive green wine bottle glass (4/2-3) — L18-E19
amber vessel glass (1/.1) — L19-E20?
light blue vessel glass (1/1) — 19?
clear wine glass stemware (1/1) — L18-E19
clear vessel glass (1/1) — L18-E19

TU 418	Many	0.00-1.50	S1E0D x15y23	

(89.00/01814)-(89.00/01819)
nail (2/?)
iron tack (1)
unidentified lead (2/2)
gun ammunition (6) [.100" lead shot] (89.00/01816)
gun ammunition (3) [.110" lead shot] (89.00/0181601)
gun ammunition (2) [.120" lead shot] (89.00/0181602)
gun ammunition (1) [.130" lead shot] (89.00/0181603)
gun ammunition (2) [.140" lead shot] (89.00/0181604)
gun ammunition (2) [.180" lead shot] (89.00/0181605)
brass straight pin (1, 2/2-3) (89.00/018819)

TU 418 II 0.08-0.45 S1E0D x17y1
(89.00/01820)-(89.00/01822)
charred wood (1)
flint/chert debitage (1)
gun ammunition (1) [.170" lead shot] (89.00/01822)

TU 418 II 0.10-0.20 S1E0D x17y3
(89.00/01824)-(89.00/01826)
animal bone (1)
gun ammunition (1) [.130" lead shot] (89.00/01825)
pu pearlware? (1/1) 1780-1830 (1805)

TU 418 II 0.05-0.35 S1E0D x17y7
(89.00/01827)-(89.00/01829)
light green window glass (1/1)
olive green vessel glass (1/1)

TU 418 Many 0.00-0.57 S1E0D x17y7
(89.00/01829)
gun ammunition (1) [.130" lead shot] (89.00/01829)

TU 418 II 0.09-0.15 S1E0D x17y11
(89.00/01830)-(89.00/01838)
animal bone (1)
square nail (1)
amber bottle glass (3/1) 20?
clear flask? glass (1.1) L19?
clear wine? glass stemware? (2/1) L18-E19
pu porcelain of unknown origin (1.1)
polychrome hand decorated Chinese porcelain (1/1) 1660-1800 (1730)
ceramic? electrical accessory? (1/1) 20

TU 418 III 0.15-0.45 S1E0D x17y11
(89.00/01839)-(89.00/01840)
iron strap (2/1)
olive green wine bottle glass (1.1) L18

TU 418 IV 0.45-0.55 S1E0D x17y11
(89.00/01841)-(89.00/01843)
brick (1)
square nail (1.1)
unidentified iron (1.1)

TU 418 Many 0.00-1.30 S1E0D x17y11
(89.00/01844)-(89.00/01852)
animal bone (2)
brick (1)
square nail (1, 1/2)
brass straight pin (2) (89.00/01847)
gun ammunition (1) [.100" lead shot) (89.00/01848)
gun ammunition (3) [.110" lead shot) (89.00/0184801)
gun ammunition (2) [.120" lead shot) (89.00/0184802)
gun ammunition (1) [.140" lead shot) (89.00/0184803)
clear window glass (1/1)

light blue window glass (1/1)
olive green wine bottle glass (2/2) L18-E19
amber vessel glass (1/1) 20

TU 418 II 0.10-0.30 S1E0D x17y13
(89.00/01853)-(89.00/01871)
animal bone (1)
animal tooth (7)
brick (3)
nail (31, 11/32-?)
nail (1)
unidentified lead (1/1)
unidentified iron (10/2-?)
iron carriage bolt (1)
iron screw (1)
iron scrap (4/?)
iron wire (1/1)
gun ammunition (1) [.100" lead shot] (89.00/01863)
gun ammunition (1) [.150" lead shot] (89.00/0186301)
brass straight pin (7, 3/8-10) (89.00/01865)
brass wire (6/?)
unidentified brass (1/1)
unidentified copper (1/1)
olive green wine? bottle L18-E19
white simple cane "seed" bead (1) (89.00/01870)
[Kidd IIa14 L=2.24mm W=2.93mm]
pu creamware (5/1-5) 1762-1820 (1791)

TU 418 Many 0.00-1.00 S1E0D x17y13
(89.00/01872)
square nail (1)

TU 418 II 0.01-0.40 S1E)D x17y15
(89.00/01873)- (89.00/01884)
coal
gun flint (1) [dark gray with gray spots] 89.00/01873
mortar?
nail (13)
iron strap (1/1)
unidentified iron (2/?)
knife blade (1/1) [cutlery knife] 989.00/01876)
brass straight pin (4)
unidentified brass? (1/1)
olive green wine bottle glass (1/1) L18-E19
clear vessel glass (1/1) L18-E19
pu creamware (1/1) 1762-1820 (1791)

TU 418 II 0.40-1.70 S1E0D x17y15
(89.00/01885)
nail (1/1)

TU 418 many 0.00-1.70 S1E0D x17y15
(89.00/01886)-(89.00/01887)
gun ammunition (1) [1.00" lead shot] (89.00/01886) (89.00/01886)
clear vessel glass (1/1) L18-E19

TU 418 I 0.00-0.30 S1E0D x17y17
(89.00/01888)-(89.00/01902)
animal bone (1)
fish scale (1)
black walnut seed (1/1)
brick (3)
slag
square nail (3,4/4-?)
iron knife blade (2/1) [cutlery knife](89.00/01894)
iron strap (1/1)
iron? corkscrew? (1/1) (89.00/01896)
unidentified iron (11/?)
brass straight pin (1) (89.00/01898)
blue green window glass (1/1)
olive green wine bottle glass (4/1-4) L18-E19
amber vessel glass (1/1) L19-E20
clear glass stemware (2/1) (89.00/01899) 1780-1805

TU 418 many 0.00-1.50 S1E0D x17y17 (water screened)
(89.00/01903)-(89.00/01904)
brass straight pin (1) (89.00/01903)
clear glassware? (1/1)

TU 418 I 0.00-0.10 S1E0D X17y19
(89.00/01905)-(89.00/01907)
iron hinge (1/1) (89.00/01905)
iron strap (1/1)
brass straight pin (1) (89.00/01907)

TU 418 II 0.10-0.15 S1E0D x17y19
(89.00/01908)-(89.00/01912)
animal bone (1)
coal (1)
square nail (5,3/6-?)
light green window glass (3/3)
blue chinoiseries pearlware (1/1) 1782-1830 (1806)

TU 418 III 0.15-0.70 S1E0D x17y19
(89.00/01913)
square nail (12,2/13-14)

TU 418 II 0.05-0.15 S1E0D x17y21
(89.00/01914)-(89.00/01924)
animal bone (2)
black walnut seed (1)
brick (2)
gun ammunition (1) [.22 brass cartridge case] (89.00/01917)
olive green wine bottle glass (8/3-4) L18-E19

amber vessel glass (3/1-2) L18-E19
light green vessel glass (2/2)
clear vessel glass (5/1-5)
pu creamware (2/1-2) 1762-1820 (1791)
molded creamware? - ribbed pattern (1/1) 1762-1820 (1791)
pu pearlware? (2/1) 1780-1830 (1805)

TU 418 III 0.15-0.50 S1E0D x17y21
(89.00/01925)-(89.00/01939)
coal
slag
square nail (11,9/12-?)
iron tack (3)
iron strap (1/1)
unidentified iron (3/?)
unidentified lead (1/1)
gun ammunition (2) [lead shot] (89.00/01932)
brass straight pin (8,1/9) (89.00/01934)
light green wine bottle glass (2/1-2) L18-E19
light green window glass (1/1)
olive green wine bottle glass (2/1-2) L18-E19
clear vessel glass (5/1-5) L18-E19
clear stemware glass (2/1-2) L18-E19?
pu creamware (4/1) 1762-1820 (1791)

TU 418 many).00-1.80 S1E0d x17y21
(89.00/01940)-(89.00/019)
coal
brass straight pin (3)

TU 418 II 0.02-0.40 S130D x17y21
(89.00/01942)-(89.00/01960)
animal bone (2)
black walnut seed (1)
coal
brick
mortar
square nail (17,4/18-?)
iron hinge (1/1) (89.00/01949)
iron strap
unidentified iron (12/?)
waste lead (3/3)
wood knife handle (1/1) [cutlery? handle] (89.00/01944)
brass pin (part of knife handle) (4) (89.00/0194401)
gun ammunition (1) [.100" lead shot] (89.00/01953)
brass straight pin (5, 2/6/7) (89.00/01952)
light green window glass (1/1)
blue green window glass (1/1)
olive green wine bottle glass (2/2) L18-E19
amber beer? bottle glass (1/1) 20
vessel glass (1/1) 20
pu lead glazed coarse redware - orange glazed (1/1)

TU 418 III 0.40-0.75 S1E0D x17y23
(89.00/01961)
square nail (1/1)

TU 418 many 0.00-1.75 S1E0D x17y23 (water screened)
(89.00/01962)-(89.00/01968)
square nail (2)
unidentified iron (1/1)
unidentified brass (2/1-2)
gun ammunition (2) [.100" lead shot] (89.00/01964)
gun ammunition (2) [.120" lead shot] (89.00/0196401)
gun ammunition (2) [.100" lead shot] (89.00/01964)
gun ammunition (1) [.130" lead shot] (89.00/0196402)
gun ammunition (1) [.180" lead shot] (89.00/0196403)
brass straight pin (6) (89.00/01965)
black medium oval simple wound? bead (1/1) (89.00/01966)
[Kidd W1c-a L=7.24mm W=4.90mm]
white simple cane "seed" bead (1) (89.00/01968)
[Kidd IIa12 or IIa 11 L=1.79mm W=2.48mm]

TU 418 II 0.10-0.30 S1E0D x18Y9
(89.00/01969)-(89.00/01970)
gun ammunition (1) [.45/70 lead bullet] (89.00/01969) 1873-1892
iron grape/canister shot (1) (89.00/01970)

TU 418 II 0.11-0.30 S1E0D x18y11
(89.00/01971)-(89.00/01973)
amber vessel glass (1/1) 20?
molded creamware - beaded pattern (1/1) 1762-1820 (1791)
kaolin pipe stem (1/1) [5.0/64 stem hole diameter]

TU 418 II 0.02-0.20 S1E0D x24y0
(89.00/01974)-(89.00/01975)
olive green wine bottle glass (1/1) L18-E19
pu creamware (1/1) 1762-1820 1791)

TU 418 II 0.05-0.14 S1E0D x24y2
(89.00/01976)-(89.00/01977)
animal bone (1)
olive green wine bottle glass (1/1) L18-E19

TU 418 I 0.00-0.02 S1E0D x24y4
(89.00/01978)-(89.00/01979)
coal (3)
unidentified iron (1)

TU 418 many 0.00-1.10 S1E0D x24y8
(89.00/01980)-(89.00/01981)
flint/chert debitage (1/1)
gun ammunition (1) [.160" lead shot] (89.00/01981)

TU 418 II 0.02-0.45 S1E0D x24y10
(89.00/01982)-(89.00/01986)
brick
square nail (1,1/2)
unidentified iron (1/1)
brass straight pin (1) (89.00/01985)
olive green wine bottle (1/1) L18-E19

TU 418 Many 0.00-1.60 S1E0D x24y10 (water screened)
(89.00/01987)-(89.00/01989)
brick
square nail (1)
gun ammunition (1) [.100" lead shot] (89.00/01989)

TU 418 II 0.10-0.15 S1E0D x24y14
(89.00/01990)-(89.00/01993)
coal
iron strap (2.2)
cast iron kettle? (1/1)

TU 418 III 0.15 -0.75 S1E0D x24y14
(89.00/01994)-(89.00/01997)
square nail (1)
unidentified iron (1/1)
gun ammunition (2) [.160" lead shot] (89.00/01998)
brass straight pin (2,1/2)

TU 418 Many 0.00-1.10 S1E0D x24y14
(89.00/01998)-(89.00/01999)
olive green wine bottle glass (1/1) L18-E19
black simple short tubular can bead with jagged ends (1) (89.00/01999)
[Kidd 1a2 L=5.10mm W=3.33mm]

TU 418 II 0.05-0.20 S1E0D x24y16
(89.00/02000)-(89.00/02013)
animal bone (2)
brick
square nail (4,2/5-6)
iron spike (1)
iron tack (1)
iron ferrule? (2/1)
iron strap (2/1)
gun ammunition (1) [.170" lead shot)
brass straight pin (3) (89.00/02008)
copper U.S. penny (1)(89.00/02009) 1976
olive green wine bottle glass (1/1) L18-E19
clear vessel glass (1/1) L18-E19
pu white salt glazed fine stoneware (2/1) 1720-1805 (1763)
kaolin pipe stem (1/1) [4.0/64" stem hole diameter]

TU 418 Many 0.00-1.00 S1E0D x24y16 (water screened)
(89.00/02014)
clear vessel glass (1/1) L18-E19

TU 418 II 0.22-0.50 S1E0D x24y18
(89.00/02015)-(89.00/02019)
square nail (4,1)
iron hook (1) (89.00/02016)
unidentified iron (2/?)
waste lead (2/?)
brass electrical terminal end? (1) 20

TU 418 IV 0.50-1.00 S1E0D x24y18
(89.00/02020)-(89.00/02021)
slag
unidentified iron (1/1)

TU 418 Many 0.00-1.00 S1E0D x24y18 (water screened)
(89.00/02022)-(89.00/02033)
animal bone (4)
coal
brick
square nail (6,6/7-?)
iron strap (1/1)
iron wire (1/1)
unidentified iron (1/1)
gun ammunition (1) [.120" lead shot] (89.00/02029)
unidentified brass (1/1)
gun ammunition (1) [.130" lead shot] (89.00/0202901)
brass straight (1,2/2-?) (89.00/02030)
olive green wine bottle glass (2/1-2) L18-E19
light blue vessel glass (1/1) L18-E19

TU 418 III 0.10-0.50 S1E0D x24y20
(89.00/02034)-(89.00/02052)
animal bone (2)
brick
coal
asphalt (1) 20
iron spike (1)
square nail (10,3/11-?)
unidentified iron (6/2-?)
waste lead (8/?)
gun ammunition (26) [.100" lead shot] (89.00/02043)
gun ammunition (10) [.110" lead shot] (89.00/0204301)
gun ammunition (17) [.120" lead shot] (89.00/0204302)
gun ammunition (6) [.130" lead shot] (89.00/0204303)
gun ammunition (5) [.140" lead shot] (89.00/0204304)
gun ammunition (1) [.150" lead shot] (89.00/0204305)
gun ammunition (2) [.180" lead shot] (89.00/0204306)
gun ammunition (3) [.280" lead shot] (89.00/0204307)
brass straight pin (2,1/3) (89.00/02045)
blue green window glass (1/1)
olive green wine bottle glass (6/1-2) L18-E19
clear vessel glass (1/1) 19-20
clear vessel glass (1/1) L18-E19

very light blue vessel glass (2/1-2)
kaolin pipe stem (1/1) (89.00/02052)

TU 418 I 0.00-0.02 S1E0D x24y22
(89.00/02053)
olive green wine bottle glass (1/1) L18-E19

TU 418 III 0.40-0.55 S1E0D x24y22
(89.00/02054)-(89.00/02060)
animal bone (1)
charred wood
cinder (3)
square nail (9,6/10-?)
flat iron for clothes (1) (89.00/02058)
unidentified iron (2/?)
olive green wine bottle glass (1/1) L18-E19

TU 418 Many 0.00-1.05 S1E0D x24y22 (water screened)
(89.00/02062)-(89.00/02064)
nail (1,2/2-3)
gun ammunition (1) [.100" lead shot] (89.00/02062)
gun ammunition (2) [.140" lead shot] (89.00/0206201)
brass straight pin (3) (89.00/02063)
olive green wine bottle glass (1/1) L18-E19

TU 418 II 0.10-0.40 S1E0D x24y24
(89.00/02065)-(89.00/02089)
coal
slag
brick
square nail (29,16/30-?)
wire nail (3)
iron wire (1/1)
iron strap (1/1)
unidentified iron (1/1)
iron construction pipe (1/1)
unidentified iron (3/1)
unidentified lead (12/?)
unidentified brass? (1/1)
copper strap? (1/1)
gun ammunition (9) [.100" lead shot] (89.00/02075)
gun ammunition (6) [.110" lead shot] (89.00/0207501)
gun ammunition (5) [.120" lead shot] (89.00/0207502)
gun ammunition (1) [.140" lead shot] (89.00/0207503
gun ammunition (1) [.150" lead shot] (89.00/0207504))
gun ammunition (1) [.160" lead shot] (89.00/0207505)
gun ammunition (1) [.170" lead shot] (89.00/0207506)
gun ammunition (1) [.690" musket ball] (89.00/02076)
pewter one piece flat button (1) (89.00/02078) 1792-1796
[British Infantry OFN Type 3 - 5th Regiment of Foot Variety - Enlisted - in use in N. America 1787-1796]

brass one piece flat button (1) (89.00/02079) 1796-1802?
[Either a civilian Olsen Type D (1760-1785) or a South Type 7 (1726-1776 or 1760s-1860s) or U.S. Regiment of Artillerists and Engineers? Variety 2 used in N. America 1787-1802? and at OFN 1796-1802?]
brass straight pin (2,6/3-?) (89.00/02080)
blue green window glass (1./1)
olive green wine? bottle glass (9/1-4) L18-E19
7up green bottle? glass 20
clear vessel glass (1/1)
clear stemware glass (1/1) L18-E19
pu creamware (1/1) 1762-1820 (1791)
kaolin pipe stem (2/2)

TU 418 Many 0.00-1.00 S1E0D x24y24 (water screened)
(89.00/02090)-(89.00/02094)
nail (1)
iron wire (2/2)
gun ammunition (2) [.100" lead shot] (89.00/02092)
brass straight pin (3/?) (89.00/02093)
amber vessel glass (1/1) 20