

SEVENTEENTH-CENTURY STONE CONSTRUCTION
AT FERRYLAND, NEWFOUNDLAND
(AREA C)

CENTRE FOR NEWFOUNDLAND STUDIES

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BARRY GAULTON



**SEVENTEENTH-CENTURY STONE CONSTRUCTION
AT FERRYLAND, NEWFOUNDLAND
(AREA C)**

by

Barry Gaulton

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Abstract

Very little documentation exists on the architecture and construction techniques employed at early colonial establishments in seventeenth-century Newfoundland. In those cases when records have been kept, descriptions are often only from the fledgling years of the colonial venture or are vague and hence, open to broad interpretation. It is for these reasons that archaeological excavation is vital to our understanding of how colonists constructed their buildings, which tools they used and from where the raw materials originated.

This thesis focuses on seventeenth-century stone construction as reflected in the archaeological remains excavated at Ferryland, Newfoundland (site Area C). The main points of investigation centre on the location of quarry sites used by early colonists, the dates to which Area C's structures were constructed, the functions of the buildings, the various construction techniques used in building these structures, the use of slate for roofing, possible Welsh or Devon construction influences and several aspects of colonial planning and economics. All of these topics were researched using a combination of geologic survey, artifact analysis, excavation, fieldwork in Britain, the recording of construction techniques and study of historical documents.

The results show that Area C's stone structures were constructed in two separate phases, one in the 1620s and the second in the fourth quarter of the seventeenth century. A massive stone seawall, privy and slate-roofed storehouse constituted the first series of structures which were in use until the Dutch raid of 1673. Soon after this raid, a second structure was erected at Area C and served

as a cowhouse-storage shed. This building, like many of the others at Ferryland, was destroyed as a result of the French attack in 1696.

Both building phases involved the construction of thick slate-stone walls and flagstone or cobblestone floors. The raw materials for which were obtained from nearby slate/shale outcrops and a cobblestone beach. Thousands of roof slate fragments were also found in association with the storehouse destruction. From these remains it was possible to ascertain the slate sizes used at Area C and the various steps involved in the construction of a slate roof.

The historical records and archaeological remains demonstrate that craftsmen from either Wales or Devon could have been involved in the first construction phase at Area C. By studying these stone structures it was also determined why Area C's waterfront buildings were constructed entirely of stone, how they played an integral role in the economics and operations of the early colony and how the changing lives of Ferryland's colonists are reflected in the two different construction phases.

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Chapter One

Introduction

1.1 Excavations at Area C

In the small fishing community of Ferryland, Newfoundland, excavations along the south shore of a sheltered inner harbour known as "The Pool" have unearthed the remnants of several stone structures in association with a broad range of seventeenth-century material culture. This site (Area C) contains various structural remains including stone walls, flagstone and cobblestone floors, thousands of roof slates, a covered drain, privy and seawall. For such a substantial group of stone features, it is surprising that they are not represented in seventeenth-century maps of Ferryland (James Yonge-1663: Map 3). Nor are any stone waterfront structures mentioned in the early letters from Ferryland's first governor, Captain Edward Wynne, who began construction on George Calvert's "Colony of Avalon" in 1621. Because there is no direct documentary reference to this part of the colony or succeeding establishments, archaeology is the primary tool to assist us in its understanding and interpretation.

The stone structures in Area C were built in two separate phases. The first phase started with the construction of a lengthy stone seawall that served as the colony's quayside. A massive deposit of fill was added directly south of the seawall on which a long slate-roofed structure situated parallel to the harbourside

was built. Immediately west of this structure was a stone privy that drained through the seawall. After the destruction of these first stone features, a second construction phase focused on a two-bayed outbuilding with a cobblestone floor immediately south of the previous slate-roofed structure. Both construction episodes were built with slate and shale from several nearby quarry sites.

Area C's stone structures are an archaeological anomaly. Nowhere else in Canada, or even British North America, have such substantial and well-preserved seventeenth-century waterfront structures been found. The same applies to the massive stone construction. Even the practice of quarrying and slate roofing is significant when viewed in an early seventeenth-century context. All these factors give archaeologists a unique opportunity to study several aspects of colonial architecture that have until now, only been interpreted through historic records. From the stone remains at Area C, we can fully comprehend how Ferryland's early British colonists constructed some of their buildings, which tools they used and from where the raw materials originated. Likewise, the structures themselves played an integral part in the life of this colony and have an important story to tell as to its occupation and function(s).

1.2 Research Questions and Methodology

Seven primary questions have been formulated to assist in the complete analysis of Area C's stone features. Each question comprises a specific chapter dealing with the individual circumstances of which it is composed.

The first main chapter (Chapter 4) encompasses a search for the locations of quarry sites that were used for the construction at Area C. This requires an understanding of the geology in the Ferryland area and the physical properties of slate and shale. A ground search along Ferryland's shoreline identified several possible quarry sites. Samples were taken from each site and compared with the raw material used to build the walls, flagstone floors and slate roof at Area C. Both archaeological evidence and clay tobacco pipe analysis show when these quarry sites were used and the extent to which the colonists relied upon them.

The next chapter (Chapter 5) develops a dated stratigraphic sequence to explain how Area C evolved from initial occupations and construction episodes to its complete destruction toward the end of the seventeenth century. It also determines whether Area C's occupation, fill and destruction layers fit into documented changes in Ferryland's history. Through a combination of profile maps and stratigraphic notes, each layer (Event) was identified and examined according to its deposition on the site. All applicable events were then dated

using clay tobacco pipe analysis. The collection of pipes used for this study included more than 5,500 pipe stems, 189 complete pipe bowls and 39 maker's marks and designed stems.

Chapter 6 identifies the function(s) of the buildings and stone features at Area C. The focus of this identification is on the distinct architectural features and artifact deposits from each structural unit. Once a general determination was made as to the function(s) of each structure, they were compared with contemporary examples in both Britain and colonial North America. This comparison was helpful in demonstrating many structural and architectural similarities, while also showing how Area C's unique construction may be attributed to particular areas in Britain.

Chapter 7 deals specifically with the techniques and tools involved in the stone construction at Area C. To understand the techniques employed by Ferryland's craftsmen, it was necessary to record and photograph all the visible construction techniques from Area C's stone remains. This information is used in conjunction with other sources on stone construction techniques so that a complete description can be provided for Area C's stone walls and both flagstone and cobblestone floors. These descriptions are followed by individual discussions on the construction of the covered drain, seawall and privy. Most of the tools

needed to build these structures could be identified in Ferryland's early documents, examples from the Area C iron tool collection and the *Academy of Armory*, published in 1688.

The practice of slate roofing and the characteristics of its construction is the main focus of Chapter 8. Excavations in several areas of The Pool have unearthed evidence of slate-roofed structures at Ferryland. Only the large-scale excavations at Area C have uncovered thousands of roof slates left in situ from a building collapse. These roofing remains were examined for clues to how the roof was constructed. The results show that the Area C slates were cut and shaped to specific length groupings, suggesting not only that the roof was constructed using common slate roofing techniques, but there was also a professional slater(s) working in Ferryland during the seventeenth century. The roof slates for this study were measured and recorded in inches rather than centimetres because this was the same unit of measurement used by the slaters in the seventeenth century.

Welsh and Devon connections to Ferryland are discussed in Chapter 9, along with the potential influences either region had on Area C's stone construction. Historic records indicate that both Welsh and Devon colonists resided at Ferryland during the Calvert proprietorship. Area C's first construction phase dates to this period and thus its buildings may have been

fashioned using Welsh or Devon construction styles. Research was conducted in Britain during the fall of 1996 and involved travelling to a variety of locations in both Wales and Devon, visiting contacts and reviewing published material. Most of the structural comparisons were conducted in Barmouth, the Welsh Slate Museum and Museum of Welsh Life in Wales, and Ludbrook, Clovelly and Exeter in Devon.

Chapter 10 incorporates historic records, archaeological evidence and research from previous chapters to answer questions dealing with the exclusive use of stone for Area C's construction, aspects of colonial economics and the changing lives of Ferryland's colonists. The waterfront structures at Area C were constructed under the direction of organised leadership. Whoever planned this construction had chosen local slate because it was more economical, durable and suited to the building's function(s). Artifactual remains found in these structures also enable archaeologists to determine that Ferryland's proprietors and/or colonists attempted to diversify the colony's economic base. The two separate construction phases at Area C even exhibit parallels between communal life at Ferryland during the early proprietary period and that of private ownership by individual planter families from the mid-seventeenth century on.

All the above chapters rely on Ferryland's early historic records to assist in the interpretation of Area C. Most of the documentary references to the colony, its structures and the surrounding environment come from six letters written in the early years of the 1620s by Edward Wynne, the colony's first governor; Captain Daniel Powell, who arrived with a second group of settlers in 1622; and Nicholas Hoskins, one of Ferryland's 1622 colonists. Peter Pope (1993) has compiled these documents as part of a larger database pertaining to seventeenth-century Ferryland. Since many chapters will quote frequently from two of Wynne's letters, they are reproduced fully in Appendix A.

Chapter 2

Background History

From early visitations by Beothuk Indians and European fishermen to the colonial exploits of the Calverts and Kirkes, the community of Ferryland boasts a varied and colourful past. Nowhere is this history more evident than in the sheltered inner harbour of The Pool, which is the location of numerous occupations extending for a period of almost 500 years. The following discussion is a brief sketch of Ferryland's early history from its first historical references and brief occupations, to its initial colonization in 1621 and complete destruction in 1696. Though Ferryland was resettled soon after, the 1696 destruction serves as a convenient endpoint for this thesis, since the substantial stone structures at Area C ceased to be used at this time.

Ferryland is situated on the east coast of the Avalon Peninsula approximately 80 kilometres south of St. John's (Map 1). By the early sixteenth century, the rich fishing grounds off the eastern Avalon attracted a sizable European contingent of migratory fishermen (Matthews 1973:69). It is around this time that the name Farilham (eventually corrupted into the English "Ferryland") first appears on a map drawn by Florentine navigator Giovanni

Verrazano (Tuck 1996:21). This early European fishery was conducted in a shore-based operation and therefore, crews would have camped near the coast so they could dry fish. Temporary campsites from a sixteenth century context have been found immediately atop an early undisturbed beach, indicating that some of these fishermen frequented Ferryland harbour. Ceramic evidence suggests that it could have been Spanish, Portuguese, Basque or even Norman and Breton fishermen (Tuck 1996:28).

In the same strata as the early European occupation, a series of native hearths was uncovered in association with stone tools and projectile points. Derived from locally obtainable chert, these projectile points are virtually identical to others found on Beothuk sites at Russell's Point on Dildo Pond and Boyd's Cove, Notre Dame Bay (Tuck 1996:27). The temporary nature of the hearths suggest that the Beothuks were here on a seasonal basis. It is not certain whether they came to exploit local resources, trade with the Europeans or pilfer abandoned fishing stations.

By the 1570s, English ships outnumbered the diminishing European fishing fleet. The growth of the English fishing fleet was due to both the collapse of Spain and Portugal's fleet in the late sixteenth century and internal conflicts within France (Matthews 1973:71-2). This in turn opened a vast overseas market

to enterprising English fishermen, most of whom originated from the West Country of England. Men from South Devon fished the northern part of the Avalon, from Old Perlican down to Cape Broyle, while those from Bideford and Barnstaple concentrated around the Southern Shore from Cape Broyle to Trepassey (Matthews 1973:231).

Between the years of 1610 and 1618, three different attempts were made to colonize the Avalon Peninsula, all with varying degrees of success. The first permanent settlement was in Cupids, Conception Bay, established in 1610 by the London and Bristol Company and governed by John Guy. The Welsh scholar and poet William Vaughan started a colony at Renews in 1617 as a cure for the economic ills of his homeland (Cell 1969:83). One year later, a third colony was set up by Bristol merchants in Harbour Grace and aptly named Bristol's Hope.

On August 4, 1621 Captain Edward Wynne, accompanied by 11 settlers, sailed into Ferryland harbour on behalf of George Calvert (later the first Lord Baltimore) to begin construction on Newfoundland's fourth colony. Calvert acquired this tract of land from William Vaughan in the belief that it would be a successful colonizing venture and later a new home for his family. The contemporary reports from governor Wynne and others who visited the colony were filled with praise for the land, its resources and prospects for success.

The first series of structures erected by Wynne and his crew included a "mansion house" (44 by 15ft) with an attached kitchen room, a tenement, forge, hen house, well and wharf. Expansion plans continued as Wynne prepared a plot of land for a brewhouse and other tenements, began fitting out a quarry, and requested from Calvert a group of masons, carpenters, quarrymen, slaters, strong maids and labourers (Wynne 7/28/1622, 8/17/1622). The arrival of a second group of settlers with Daniel Powell in 1622 brought the overwintering population to 32 (Pope 1993:19).

The first governorship of Ferryland did not last long, for it is believed that Captain Wynne left the colony after only four years (Vaughan 1626:Ccc 2). In the absence of a governor until at least 1625 and fearing that he would lose all he had invested, Calvert decided to visit Ferryland in 1627 (Cell 1969:93). This brief inspection of the colony must have pleased Calvert because in the following year he returned with his family and a party of 40 fellow Roman Catholic settlers (Lahey 1977:505). Their stay was short-lived, however, in part because of French military harassment and the bitterly cold winter of 1628-29. The Calverts decided to leave in 1629, but continued to be proprietors of Avalon and maintained a governor at the colony until 1638 (Tuck 1993:294).

It was at this time that David Kirke, having recently been granted the Island of Newfoundland by Charles I, claimed Ferryland as his new base of operations. Arriving with about 100 settlers, Kirke was quick to expel the Calverts' residing governor, Captain William Hill, and take up lodging at the principal residence (Prowse 1895:155-6). Kirke had many plans to profit from the Newfoundland fishery and soon began to levy a tax on foreign fishing ships, collect rents for fishing rooms and charge to issue tavern licenses (Pope 1986: 24-5). Not a great deal more is known about Kirke's activities after 1640 (Cell 1969:117); nevertheless, considering the success of the colony and growth of the resident fishery during his 13 years at Ferryland, the archaeological component should be well represented. According to Pope (1986:26), we may even expect to see some archaeological evidence for the reorganization of facilities shortly after his takeover.

The end of David Kirke's proprietorship was not due to Newfoundland's harsh climate or problems of military encroachment, but from political upheaval in England. The outbreak of the English Civil war in 1642 started a series of events that eventually led to the downfall of the royalist Kirke. In 1651, he was recalled to London for an official inquiry on the Newfoundland colony and its administration (Cell 1969:121). This led to Kirke's imprisonment and the forfeit of his lands and colonial possessions to the Commonwealth. To ensure that the

Newfoundland fishery and its resident colonists were sufficiently managed, the Interregnum government appointed John Treworgie as the sole commissioner in 1653 (Cell 1969:123). These years under Treworgie's leadership saw a great deal of trade with the American colonies because the regular English trade was crippled by war with Spain (Pope 1986:28).

After the restoration of Charles II in 1660, Ferryland was again back in the control of the Kirke family, in particular, Lady Sara Kirke and several of her sons. Although the Kirkes no longer had a legal hold on Ferryland and competing claims for the proprietorship came out in the Calverts favour, they refused to leave and eventually secured their place at Ferryland (Pope 1986:29).

Life at the colony remained uneventful until September of 1673, when four Dutch warships, under the command of Nicholas Boes, sailed into Ferryland harbour. The resulting raid "plundered, ruined, fired, and destroyed the commodities, cattle, household goods, and other stores" (Pope 1993:110). This attack could not have been a complete disaster since Dudley Lovelace, governor of New York and a prisoner on board one of the ships, made a claim in 1675 that the Dutch forced Ferryland's inhabitants to hand over goods in exchange for not destroying the entire settlement (Pope 1986:110).

A much more brutal and calculated attack took place in 1696. At the helm of this assault was the French commander Pierre Le Moyne D'Iberville, who set out on a campaign intent on destroying all the English settlements along the Newfoundland coastline. Ferryland was the first major community on the Avalon Peninsula from the staging point at Placentia. The French sailed into Ferryland harbour and landed about 700 troops to encircle and cut off the settlement (Pope 1993:151). With the ensuing surrender and failure of the colonists to take an oath to the French king, the raiders destroyed the settlement and burnt everything to the ground (Pope 1993:151). Those not taken to Placentia as prisoners were transported back to England until their return the following year. The year 1696 coincides with the destruction and disuse of the stone structures at Area C and therefore, marks an end to discussions on Ferryland's history.

Chapter 3

Excavation Background

Starting in the late nineteenth century, archaeological excavations have been conducted at Ferryland in search of the early colony. It was originally believed to have been situated on the mainland of Ferryland, yet the settlement's true location was not determined until a careful perusal of seventeenth-century documents pinpointed it to the south shore of The Pool (Plate 1). Subsequent excavations in this area produced rich artifactual and structural finds dating throughout the seventeenth century. As excavations continue into the 1990s, archaeologists are beginning to piece together the lives of people who settled Ferryland more than 350 years ago.

M. F. Howley was the first to report of excavations at Ferryland as far back as 1880 (1979:124). Though the excavators and excavation site remains unknown, the artifacts recovered included among other things, a silver snuff-spoon bearing the letters GK, presumably that of George Kirke (Howley 1979:124). In 1937 Dr. Stanley Brooks, an entomologist from the Carnegie Institute in Pittsburgh, Pennsylvania, tested some areas around The Pool and the adjacent mainland (Tuck 1996:24). Rough sketches of his fieldwork showed that Lord Baltimore's

mansion house was on the mainland of Ferryland (Brooks, unpublished report:1937). The opposite conclusions were reported by J.R. Harper in 1959, with the excavation of a 6 x 6 foot square near the south shore of The Pool. Artifact finds included mid-to late seventeenth-century pipe bowls, sgraffito ware, case bottle glass, deteriorated wood and wrought iron nails, convincing Harper that part of Calvert's mansion house had been discovered (Harper 1960:111).

Memorial University began test excavations at The Pool in 1968, under what it now the site of a restaurant. This exposed a slate drainage feature along with a scatter of seventeenth-century artifacts (Tuck 1996:24). During the 1970s, R.A. Barakat, also from Memorial University, carried out brief excavations to the east of Harper's test square (Tuck 1996:24).

Of all the small-scale excavations briefly described above, not one had provided conclusive evidence for the location of Ferryland's early colony. It was for this reason, along with assessing site potential, that Memorial University began a second series of excavations in the mid-1980s. Under the direction of Dr. James A. Tuck, excavations were carried out over three years (1984-6) and concentrated on four specific sites (Areas A-D). A broad range of seventeenth-century artifacts was found on all four sites, with structural features in Areas B and C. Encouraging as these finds were, the excellent preservation and complexity of the

site indicated that proper excavation would require a major effort in both time and funding (Tuck 1993:296). Therefore, the site was reluctantly backfilled in 1986.

During the 1984 field season, preliminary underwater excavations were conducted along the south shore of The Pool by Roy Skanes and Mark Deichmann. Their report documents several incidences of dredging over the past fifteen years to facilitate the mooring and docking of inshore fishing boats, thus resulting in seabed disturbance. The dredged sediment was used as fill to support a wooden retaining wall encircling the inner harbour (Skanes and Deichmann 1984:398). By adding fill behind the harbour's shoreline, the dredging crew inadvertently ensured the protection and integrity of the colony's original seawall, parts of which were to be uncovered during future excavations.

Several years later, salvage operations were conducted by M.P. Stopp at the eastern edge of The Pool road, directly in front of what is now Area F. A 4 x 1 metre trench revealed seventeenth and eighteenth-century occupation layers in association with two identifiable features. The first feature comprised a section of cobblestone pavement; the other, a disturbed stone wall of a nature similar to those at Area C (Stopp 1989:iii).

The spring of 1991 brought new opportunity in the form of a Canada-Newfoundland Tourism and Historic Resources Cooperation Agreement. This agreement provided enough funding to enable Memorial University to conduct a multi-year investigation of the Ferryland site and excavations were again undertaken in the summer of 1992. Since then excavations have continued every summer, revealing ever more evidence of Ferryland's early colonial period.

A total of seven different sites have been investigated since Memorial University began its first systematic excavations thirteen years ago (Map 2). The following discussion is a brief description and interpretation of these areas.

Area A: During the fall of 1984, a small test excavation was conducted at the western end of The Pool in an attempt to locate fortifications that could have been used to defend the settlement from attacks via the mainland. A deposit of seventeenth-century artifacts was discovered, but no evidence for any structural remains. Considering the depth at which later excavations revealed early colonial remains, it is possible that Area A was not excavated deep enough. This site is now being considered for additional excavation (Tuck 1996:27).

Area B: The same year that Area A was tested, another excavation unit was opened several metres to the east. Excavations at Area B uncovered part of

an early seventeenth-century blacksmith shop, which was most likely the same one mentioned by Wynne in 1622 as having "been finished these five weeks" (Wynne 7/28/1622). After 1984, Area B was not reopened until ten years later. The 1994 excavation concentrated on fully excavating the blacksmith shop to reveal structural features and associated work areas. The site contained a stone forge measuring 1.2 by 1.8 metres, a variety of blacksmith's tools and several post holes that once held the bellows, anvil and swage. A detailed analysis of the blacksmith shop is currently underway by Matthew Carter and is expected to be complete in 1997.

After the smithy itself had been excavated, excavations at Area B extended to the north, east and west in search of more early colonial remains. At the edge of the present asphalt roadway, and roughly parallel to it, a section of cobblestone road was uncovered. Portions of this road have been exposed for about 30 metres, including what may be its western end. The only reliable dating tool for this feature is a section of stone foundation built a foot or more over its southern edge. This foundation was part of a timber-framed structure built in the mid-seventeenth century which, therefore, postdates the construction of the cobblestone roadway. It is quite possible that this road is the partial remains of the "pretty street" described by Wynne in 1622.

Beneath these seventeenth-century colonial layers were earlier occupations by European migratory fishermen and Beothuk Indians. Both occupations were found in layers predating the advent of the clay tobacco pipe in the 1580s and therefore date sometime prior to this. Discussion on the European seasonal occupation and Beothuk presence at Ferryland can be found in the previous chapter or in Tuck 1996.

Area C: In 1986, several exploratory trenches were excavated inside a vacant lot adjacent to the southeast edge of The Pool. These initial excavations revealed an abundance of seventeenth-century artifacts, a substantial slate-stone wall and what was believed to be a cellar (Tuck 1989:298). Work was halted that same year and excavations did not resume until 1992. Over the next four years excavations expanded to encompass the entire lot and additional segments of town council land. Within this excavation area, many stone structural remains were uncovered, including several walls, flagstone and cobblestone floors, a rectangular privy and seawall (Figure 5; Plate 2). Analysis of the stone features and associated artifacts indicate that this area served a variety of functions throughout the seventeenth century. The first series of structures consisted of a slate-roofed storehouse, privy and seawall, all in use until the third quarter of the seventeenth century. As shown by the overlying destruction layers, these structures were levelled by violent means, likely the result of the Dutch raid in 1673.

A second construction phase began shortly thereafter and concentrated around a two-bayed outbuilding directly south of the early storehouse. The main structural feature of the new construction was a cobblestone-floored cowhouse or byre, complete with a drainage channel, tethering posts, and collecting box. A covered slate drain facilitated the transfer of waste from the cowhouse into the newly modified privy, which now served as a dungpit. This new structure was not occupied for very long. Pipe analysis of the occupation/destruction layers directly on the cobblestone floor provides conclusive evidence for an occupation confined to the fourth quarter of the seventeenth century. This second destruction coincides with the historical record of a French attack in 1696, which resulted in the razing of the entire settlement. The cowhouse destruction provides physical evidence of this attack.

In 1995-96, excavations to the west of Area C uncovered a section of cobblestone pavement and associated stone features first discovered during the previous summer. Still only partially excavated, the true nature of these features is still uncertain. All indications point to a late seventeenth to early eighteenth-century construction and occupation. Exploratory testing beneath these features revealed earlier occupation, likely from the Calvert/Kirke era.

Area D: The first solid evidence for a seventeenth-century domestic dwelling was discovered in 1993, on a vacant stretch of land to the eastern margin of the settlement. Previous field schools conducted by Memorial University in the 1980s had begun excavations at this location (assigned site Area D), but had concentrated on an overlying nineteenth-century dwelling. Returning to Area D in 1993, excavations continued downward through the overlying strata, exposing a level of burnt boards and planks in association with many seventeenth-century artifacts. Excavations in 1994 uncovered a substantial stone fireplace with cobble hearth measuring 5.25 metres wide. The building itself was timber-framed, likely one and a half or two stories high and measured roughly 11.7 by 5.25 metres (Tuck 1993:306). Clay pipe analysis indicates a range of construction and occupation from the mid-to late seventeenth century. This structure, like those in Area C, was also destroyed by violent means. Two William III coins (1694-1702) found in the destruction layers provide enough evidence to suggest that the house was burned down as a result of the French attack in 1696 rather than the earlier Dutch raid.

A stone-lined well was excavated south of this dwelling in 1994. Extending down nearly 7.5 metres, this carefully built slate well did not contain any conclusive evidence to help pinpoint its date of construction. Yet, the proximity of

both well and house features lead us to believe that they were contemporaneous (Tuck 1993:308).

Area E: In 1993, a small excavation was started atop a conspicuous mound of earth at the crest of a hill south of the other sites. Situated to provide a commanding view over the early settlement, this area could reveal some evidence for the colony's original defences. The most recent cultural layer consisted mainly of drinking vessels and tobacco pipes dating from the eighteenth century, suggesting the presence of a tavern or tippling house. Beneath this deposit was the remains of a substantial earthwork mound dating from the late seventeenth century. Such a defensive work is consistent with the 1694 fortification of Ferryland by Captain William Holman, who prepared the colony in case of a French attack.

Area F: The Historic Sites Division of the Department of Tourism and Culture purchased the Arch Williams property in 1995. Being the easternmost property in The Pool, and directly across from Area C, this location has excellent potential for containing early colonial remains. Work at Area F began at the start of the 1996 field season and will continue for several years. The most conspicuous feature uncovered during excavations is a section of cobblestone road, 3.9 metres wide and continuing 15 metres west before disappearing under

the asphalt roadway. This feature may be associated with a similar cobble feature uncovered by Stopp (1989), but cannot yet be stratigraphically joined because of waterline disturbance. A glass bottle seal bearing the name John Curtis-1695 is the only dated artifact found atop the road, placing the construction no later than this date. Though it is tempting to associate this seventeenth-century road with the one encountered at Area B, further work needs to be completed before any conclusive statements can be made. The cobblestone road at Area B may define the western limit of the settlement and this newly discovered road may indicate the eastern margin. If the two could be joined physically, then we would have a basic plan of the colony's layout. The first series of structures built in 1621/2 would be to the south of the cobble roadway. Another row of buildings on the side facing The Pool would likely consist of non-domestic structures such as those at Area C.

Area G: This site is located west of Area C on property owned by Mr. Ray Costello and north along a stretch of land parallel to the high tide mark. Excavations in 1996 concentrated on a 1 x 9 metre north-south trench on the Costello property. This task did not prove to be a long undertaking since a cobblestone feature was uncovered running along the entire trench at a depth of only 40cm. Artifacts on the cobble pavement display a date range from the late seventeenth to early eighteenth century. The artifact types, date range and depth

of deposit coincide with the cobblestone feature excavated in the west end of Area C in 1995-96. Several exploratory test pits were dug between Area C and G, establishing this cobble pavement as a single unit.

Closer to the waterside, several attempts were made at locating additional preserved segments of the colony's early seawall. Three small excavations were conducted along a stretch of sand fill parallel to the high tide mark and in line with the direction of Area C's seawall. All three pits exposed well-preserved sections of stone seawall. The two pits furthest west also revealed a series of vertical wooden posts attached with horizontal logs abutting against the seawall, likely serving as strouders for boats to moor on.

An undisturbed mid-eighteenth century refuse deposit was found above and to the south of the seawall remains. The deposit contained a concentrated layer of wood chips, brick, window glass, animal bone, saltglaze stoneware, creamware and wine glass fragments, all indicating that a nearby dwelling house was in use up to, but not long after the 1780s.

Chapter 4

Location of Quarry Sites

4.1 Introduction

"We stand also in need of . . . some lime and tiles for a beginning, whilst the slate-quarry is in fitting" (Captain Edward Wynne, August 17, 1622).

The above statement by the colony's governor Edward Wynne, confirms that local slate resources were used by Ferryland's settlers, but to what extent? When this letter was written, there was both a quarryman (Benjamin Hacker) and stone layer (James Beuell) resident at the colony. Wynne also made a further request for six masons, four carpenters, two or three quarrymen and a slater or two. Such an ambitious construction project, seemingly focused on utilizing the local slate resource, would require a large quarry site(s), preferably close to the colony.

The remains from Area C prove that more than one quarry was needed to obtain material for these structures. This is shown by the storehouse's two flagstone floors (Plate 18) and in the different raw material used to build walls and make roof slate. Determining the location of these quarries is the first step

in understanding the procurement patterns and construction techniques employed during Ferryland's early colonial period.

4.2 Geology of Ferryland

Within the Ferryland area there are three major geologic groupings: the Signal Hill, St. John's and Conception Groups (Map 5). Both the Signal Hill and Conception Groups can be eliminated from the search for quarry sites since they do not contain raw material consistent with the stone remains found at Area C. This leaves only the St. John's Group, which is concentrated along the coastline and consists of three separate formations. From these three, both the **Fermeuse** and **Renews Head** Formations contain shale and slate that are suitable for the kind of stone construction exhibited at Area C. As indicated on the map, the Fermeuse Formation outcrops along almost the entire shoreline of Ferryland, and it is within this formation that several possible quarry sites have been found. The Renews Head Formation, though confined to a small geological area, is also the site of one quarry. Both formations contain a variety of Pre-Cambrian microfossils that were used to identify quarry locations (Hodych and King 1989:26).

4.2.1 Slate

Slate is a metamorphic rock, meaning it is formed by great heat and/or pressure acting on existing rocks to change their nature and composition (Wright 1985:148). Most often, slate begins as a deposit of fine clay sediments, forming a mudstone. Increased deposition over time causes greater pressure and/or heat, resulting in a physical change in which the mudstone reforms in lines parallel to the way the rock lies-- the **bedding plane**. The deposit is now shale. Further pressure and great heat causes a chemical change where the original clay minerals break down into mica and feldspar, forming the main constituents of the new rock-- slate. The slate is now reformed along an entirely different plane from the bedding plane, called the **plane of cleavage** (Williams 1991:3). This natural cleavage allows slate to be split into long thin sections, making it popular for roofing, flooring and walling. When slate is used to construct walls, it is referred to as **slate-stone** (Wright 1985:148).

4.3 Field Survey and Site Identification

As mentioned above, the construction at Area C required the use of more than one stone quarry. My investigation focused on discovering possible quarry sites by first outlining a reasonable parameter for slate procurement in the surrounding area. A distance between 1 and 2 kilometres was chosen because of the proximity of many slate outcrops along Ferryland's coastline. A logistical

focus on suitable landing areas was also necessary because transport of stone from the shoreline outcrops to the colony could be achieved with much greater ease by water. Boats would be necessary to transport slate because Ferryland had no roads at this time. Colonists did have pack animals and suitable land transport vehicles, but to prepare land for even a rough trail to the quarry would be very labour intensive and unnecessary given a suitable alternative.

The next step was to begin a ground search, locate several sites, take samples from each site and then concentrate on the logistics of each location to narrow the possibilities down. During the 1995 field season, Memorial University geologist Dr. Art King, Dr. James Tuck, Cathy Mathias and I completed an initial ground search along Ferryland's shoreline. An expanded search was conducted in the fall of 1996 with Brent Murphy and Colleen O'Keefe. Map 6 identifies the locations revealed during the ground searches. The results are as follows:

Site One: Several hundred metres east of The Pool there are a few small outcrops along a stretch of beach parallel to the lighthouse road. Samples taken from the outcrops exhibit good cleavage properties but no recognisable bedding plane or fossil impressions. The quantity of slate in this area is also small compared with the other quarry sites. Site one has the advantage of proximity to the colony, but lacks a decent landing area.

Site Two: A few large outcrops are situated northwest of The Pool along a stretch of beach parallel to the main road (Plate 3). Most of the quarried samples from this area display numerous oval markings and depressions that coincide with examples of Pre-Cambrian micro-fossils representing ancient micro-planktonic organisms (Hodych and King 1989:26). These outcrops are more shale than slate because both fossil deposition and natural cleavage occur on the same bedding plane. A comparison with the walling material from Area C provides an excellent match, displaying identical bedding planes and fossil remains. (Plate 4). Considering its proximity to the colony, large supply of raw material and suitable beach for landing, this site would have been used for an early stone quarry.

Site Three: Located further north up the coastline from site two is a small sheltered cove with a cobble beach (Plate 5). Outcrops are situated to the north and south of this beach and are composed of greyish-blue slate with excellent cleavage properties. One outcrop, from which most of the samples were taken, appears to have been cut into terraces similar to large-scale open quarries in England and Wales (Plate 6). The slate samples have a bedding plane that is perpendicular to the plane of cleavage and no fossils are present. In fact, the colour, bedding plane and plane of cleavage are identical in both the quarried samples and roof slate collections from Area C, suggesting that this is the site from which the early colonists obtained their slate for roofing (and possibly

flooring, gravestones, etc.). Of all the sites surveyed, this one combined the best quality slate with comparable cleavage properties.

Site Four: Roughly one-half kilometre southwest of Area C is the fourth possible quarry site. This location has a sandy beach and a large shale/slate outcrop. The samples from this outcrop have poor cleavage properties and would have been suitable only for building walls. Still, it is very unlikely that this area was ever used by the builders at Area C. This is because the fossil remains that are so prevalent in the Area C stones are not present in this outcrop. Site four (and five) is also at a disadvantage owing to its southerly location. If quarrymen were working in this area, they would have had to unload their cargo somewhere along the southern edge of the tombolo beach that joins Ferryland Head with the rest of the mainland. Then, the stone would have been loaded on a cart or sled and transported to the work site. Slate from quarry sites one through three could have been unloaded right at the work site.

Site Five: South of site four is another cove with several large outcrops. This site does not have a good beach for landing boats, but the large outcrops contain a mixture of slate and shale, some of which are suitable for walling and roofing. However, samples from site five display a bedding plane on a 45-degree angle from its plane of cleavage. This is quite different from both the roof slate

collections and samples from quarry site three, in which the two planes are perpendicular.

4.4 Preparations for Ferryland's Quarry

The term **"quarry"** is used in the most basic sense to refer to an area in which a quantity of raw material was obtained for construction purposes. Whether slate was actually cut from outcrops or just collected from piles of slate scree is uncertain; both techniques were probably practiced. The colony had only one quarryman in 1622. Therefore, it is likely that prior to the major construction phase (including the seawall and waterfront structures) slate was cut from outcrops and collected from scree piles. Upon the arrival of the requested masons, slaters and quarrymen, a great deal more raw material was needed to accommodate the new construction and thus, slate procurement focused on quarrying directly from the outcrops.

Wynne's description of a **"quarry in fitting"** is a puzzling statement considering that the surrounding slate outcrops could be quarried with little difficulty. In old English, the word **fitting** means **"to make fit or suitable; to make ready, prepare"** (Oxford English Dictionary 1989:975). What work or preparation had to be completed before slate could be quarried and transported back to the colony? If slate was to be cut directly from the outcrop instead of

collected from the scree piles, then a quarryman may have found it necessary to remove some weathered material before beginning his work. Likewise, this reference to "fitting" may indicate that the quarry site was fitted with a crude wharf to load boats with slate. A wharf would have ensured that slate was loaded safely onto waiting boats without having to worry about damaging the vessel or losing cargo.

Another distinct possibility is the construction of a work site near the slate outcrop, especially if the slate was to be used for roofing and flooring. Open fronted, roofed structures are common in the older Welsh slate quarries, within which two or three men would work splitting and trimming slate (Roberts 1989:20). If the Ferryland quarry had such a building, large slate blocks could be brought to the site and then reduced to roof slates and flagstones. This would be much more efficient because all the cutting, shaping and trimming was done at the quarry and only the finished product was transported back to the colony. As stated previously, site three was the quarry used to obtain Area C's roof slate. Therefore, future testing in this area could uncover evidence for such a structure and the debris associated with it.

4.5 Quarries and Colonists

The proximity of many slate outcrops along Ferryland's coastline played an important role in the decision to use this construction material throughout the seventeenth century. The colonists and craftsmen involved in Ferryland's various construction projects needed stone of different properties according to the specified job. When building chimneys, cellars, foundations and wells, any kind of crude slate or shale was sufficient, while cut and squared blocks of good quality slate were necessary for making roof slates and flagstone floors. As a result, several different quarry sites had to be available if construction was to be completed in a professional manner.

The ground search described above identified two of these quarry sites. One contained large quantities of shale/slate suitable for constructing walls (site two). The other site had slate with cleavage properties ideal for roof slate production (site three). A comparison of samples from each site with the stone remains at Area C confirmed that both quarries were in use during the seventeenth century. In fact, these quarries can be directly associated with the first phase of construction at Area C, which Chapter 5 dates specifically to the 1620s. Quarry site two supplied stone for wall construction and facing for the quayside, whereas the storehouse roof was constructed using slate from quarry site three.

Site three may even be the location of governor Wynne's "quarry in fitting" described in 1622. Remember that Wynne stated a desire for lime and tiles (both materials for roofing) while the quarry was being prepared. This statement suggests that the quarry in fitting was to be used for roofing Ferryland's buildings. The presence of many roof slate fragments in early occupation layers from Areas B, C, F and G show a general trend toward slate roofing during the Calvert proprietorship (for further reference, see Chapter 8). Since slate from quarry three was used at Area C, it is reasonable to assume that slate from this site also roofed many of Ferryland's other early buildings.

This discussion on quarry sites also includes the storehouse's flagstone floors, which were constructed in two separate phases using different techniques and raw materials. The first floor was laid with natural-edged light blue stone, whereas the second adjoining floor is of darker square-cut slate. Obviously, the first floor was constructed at the time of the building's first construction, but to what date can we attribute the second? Slate used on this second floor is identical in physical appearance to the roof slate that covered the building. This suggests two possibilities. First, the construction of the storehouse and original floor was in progress before the arrival of the requested masons and slaters, who then used the different slate to add an extension to the floor and roof the

building. Otherwise, the later floor is a separate event from the first phase of construction and was laid by different craftsmen using the same roof slate quarry.

After the destruction of Area C's first structures in the third quarter of the seventeenth century, a new stone building was constructed with thick slate-stone walls similar to the first. Instead of relying exclusively on a nearby slate outcrop, these new builders also re-used some stone from the storehouse wall collapse. Therefore, the analysis and identification of any new quarry sites associated with this second construction would be both problematic and beyond the scope of this thesis.

Recent excavations to the west of Area C have unearthed the remains of other slate-roofed stone structures located alongside Ferryland's original quayside (see Chapter 8, section 8.3). If the chronology of these structures corresponds with that from Area C, then it is likely that these waterfront buildings were constructed by the same craftsmen using the quarry sites described above. Future excavation in this area will not only help delineate the parameters of Ferryland's seventeenth-century waterfront, but also show the extent to which the early craftsmen relied upon nearby slate quarries.

Chapter 5

Dating the Sequence of Construction

5.1 Introduction

Establishing a sequence of construction for Area C's features required a thorough study of the site formation processes, a dated stratigraphic sequence and an analysis of historic documents. All stratigraphic layers were first identified through profile maps and then examined according to its deposition on the site. Those layers that played an important role in the development of Area C were further selected for dating purposes. Occupation, destruction, and fill layers were dated using a combination of pipe bore, bowl and maker's mark analysis. Other less specifically datable artifacts, such as ceramics and glass were excluded because of the large size of the collections.

This chapter develops a dated stratigraphic sequence to explain how Area C evolved from its initial occupation in the sixteenth century to its total destruction at the end of the seventeenth century. It also determines whether Area C's development fits into documented changes in occupation/destruction at Ferryland. As a starting point, a summary of Area C's stratigraphic/construction sequence is presented below, followed by a detailed discussion of the evidence for this reconstruction.

5.2 Stratigraphic/Construction Sequence

Prior to any European contact, Area C was a gently sloping sand and gravel beach (Event 12). The first European occupation was found directly on this beach and consisted of a few scattered fragments of Norman/Breton pottery likely deposited during seasonal fisheries in the sixteenth century. Next came the West Country fishermen, who established summer fishing stations along Ferryland's shoreline. Several layers (Events 11, 26, 110) represent this seasonal visitation and/or the early colonial occupation. The tightly dated pipe samples taken from these events indicate that they must have been buried sometime in the 1620s. The thick layer that capped this early occupation involved a great deal of organized labour and time. Event 8 and its comparable layers throughout Area C (Events 7, 40, 229, 232, 296 and Stratum 3[3a]) are comprised mainly of fill taken from the nearby hillside to the south and vary in thickness from more than a metre in the north of Area C to only a few centimetres thick in the far south. This fill layer must have been deposited to level the land for building. A long stone retaining wall to the north was the first structural feature built in Area C. Marking the northernmost limit of the settlement's waterfront, this retaining wall (seawall) protected the newly reclaimed land to the south, but also served as a stone quay.

While Area C was being infilled, a rectangular stone-lined privy was incorporated into the original construction. This feature has two drainage openings at floor level in its north end that run through the seawall and out into the harbour. Despite the fact that the privy was designed to be "flushed" by tidal action, the lowest layers of deposited refuse date from the 1620s-40s (Events 111 and 114).

A large rectangular structure, most likely a storehouse, was constructed directly east of the privy and parallel to the seawall. The storehouse occupation layers (Events 6 and 44) display a variety of artifactual material, dating from the first to third quarter of the seventeenth century. During this early period of Ferryland's colonization, the storehouse, privy and seawall were the only structures at Area C. The precise year to when these features were built cannot be determined, but archaeological and historical evidence places the construction within the Calvert period (1620s). Occupation of these waterfront premises continued (though with new administration and possible minor structural changes) until the early 1670s.

On September 4, 1673 the Dutch sailed into Ferryland harbour and *"plundered, ruined, fired and destroyed the commodities, cattle, household goods, and other stores"* (Pope 1993:110). This is believed to be the cause of the

storehouse's destruction (Events 9, 16 and Stratum 1a), disuse of the privy (Levels 1, 2 and 3 [1986]) and collapse of the stone seawall (Events 13 and 15). A second construction phase started soon after the Dutch attack and began with the addition of fill (Events 20, 250 and 252) to the southern end of Area C upon which to build a new structure. This second structure may have been built south of the storehouse because of flooding which still occurs today during high tides. All structural evidence indicates that this building served as a combination cowhouse-storage shed. The construction of the cowhouse section of this building required that a slate drainage channel be placed through both walls of the structure so that waste could be channelled into the old privy feature.

The occupation and destruction layers from the cowhouse (Events 45 and 33) provide a tight set of dates for this building. All of the pipe bowls, for example, were manufactured during the fourth quarter of the seventeenth century, suggesting a construction date after the Dutch raid of 1673 and destruction late in the century, probably during the French attack of 1696. The destruction of the settlement in 1696 marks the end of discussions on occupation around the Ferryland Pool.

5.3 Clay Pipe Analysis of Area C's Events

5.3.1 Dating with pipes

Although reliance on a single artifact class for dating an archaeological site is fraught with problems, only tobacco pipes hold the promise of dating events close enough to answer questions of chronology at Area C. The English clay tobacco pipe is by far the most useful and universal dating tool available to historic archaeologists today. Starting around the 1570-80s, clay pipes began to be produced in England for the fashionable habit of tobacco smoking and by the early seventeenth century the practice had become commonplace (Noel Hume 1969:296). The widespread use of these pipes until the early twentieth century, as well as their low cost and fragile nature, explain why such vast quantities of fragments turn up during excavations at historic sites.

A great deal of research has been done to utilize this artifact as a potential dating tool. Pipe stem analyses by Harrington (1954) and Binford (1961) have provided a basic method for dating sites using pipe stem bore diameters, which undergo a regular reduction in size from 1620 to 1800. All stem hole diameters are measured according to 64ths of an inch, 9 being the largest and 4 the smallest. For this thesis, pipe stem fragments from each stratigraphic layer were measured, tabulated and plotted according to Harrington's bar chart and Binford's straight line regression formula (Appendix C). Though there has been some speculation

on the validity of the Binford formula (Hanson 1971) it is used simply to display a mean date in relation to the more accurate dates provided by pipe bowl analysis.

Whereas the diameter of any one pipe stem fragment can date throughout a broad time span, the pipe bowl is confined within a specific period of manufacture and can often be connected to individual pipe makers or particular regions of Europe. Pipe bowl shapes, styles and maker's marks have been studied extensively in both European and Colonial American contexts and are thus useful for precise dating of archaeological sites (for complete works, refer to Atkinson 1969; Noel Hume 1969; Oswald 1975; Pope 1988 and Walker 1977). All of the pipe bowls and maker's marks used to date Area C's stratigraphic sequence are described in Appendix B.

Other artifact classes including ceramics and glass are also useful for dating archaeological sites, yet their date ranges are so broad that they can often only be placed within a particular century. This is especially true for many ceramics found during excavations at Ferryland. Whether it is an early seventeenth-century occupation layer or late seventeenth-century destruction episode, most ceramic sherds consist of a variety of North Devon earthenwares, German stoneware and tin glaze earthenware. Glass fragments are somewhat more useful than ceramics. In cases where enough of a glass vessel remains to distinguish the form or style, it

can often be placed within an evolutionary series and confined to a specific date range (for examples, see Noel Hume 1969; Bickerton 1984). Nevertheless, the vast majority of both ceramic and glass fragments from Area C cannot be confidently dated to any isolated period and therefore, a careful analysis of the large number of fragments from the collections would not contribute significantly to this discussion.

5.3.2 Event system

Excavations at Ferryland were recorded using the Event system instead of the traditional system of strata. This system of stratigraphic notation was necessary because the stratigraphy encountered during excavations differed according to the excavation unit and often varied over large areas. Therefore, each layer was given an individual consecutive number (event), since each is the product of something that happened during the formation of the site (Tuck 1993:297). When excavation units were finally connected, many different events proved to be the same layer and were simply combined into one stratigraphic episode.

5.3.3 Early occupations

The earliest datable evidence for European occupation at Area C is from the seasonal West Country fishermen and/or the early colonial occupation.

Events 11, 26 and 110 represent this early cultural deposit and contain few artifacts beside scattered pieces of pipe, ceramic and glass. Both Event 11 and 110 are spread out over much of the site and contain considerably fewer artifacts than Event 26, which is a localized deposit to the west of Area C (Figure 1). It is possible that Events 11 and 110 represent a scattered deposit from the early fishermen who used Ferryland harbour prior to Calvert's attempt at an organized settlement.

Though neither Event 11 nor 110 contain any pipe bowl fragments, pipe stem analysis of the nine recovered pieces confirm an early occupation, with 56% of the stems measuring 9/64 of an inch in diameter. Such a small sample is not statistically convincing, but is used merely to point out the general trend of pipe bore sizes in these events. Yet, one must be wary of the limitations of pipe stem formula dates, especially in the absence of pipe bowl fragments, maker's marks and other contemporary deposits from which to calibrate your dates. This is illustrated in the stem fragments from Event 26, which have a mean date of 1662, much later than other objects from this layer and considerably later than dates for layers deposited directly above it. Compare this with the six pipe bowls from Event 26 (Plate 7), which are all early seventeenth-century styles (1610-40) in addition to one moulded stem fragment from a Raleigh pipe (1620-50). Event 26 is immediately capped by fill layer Event 8, also an early seventeenth-century

deposit and therefore dates prior to Area C's first construction phase in the 1620s.

5.3.4 Infilling and initial construction

Event 8 and its counterpart Stratum 3(3a), consist of an extensive deposit of fill distributed over most of Area C. Depending upon the excavation unit, this fill layer was anywhere from more than a metre to only centimetres thick and was deposited to reclaim the beach front and level the area for building. Though Event 8 (Stratum 3(3a)-1986) is the common reference to this filling, the varying nature of several strata within this larger deposit have been separated into different events to recognize the fact that they are discrete fill layers (Events 7, 40, 229, 232, 296). For both Event 8 and Stratum 3(3a), pipe bore, bowl and maker's mark analysis provided marginal results at best. This is because neither layer represents a discrete deposit. When immediately capped by stone walls and flagstone floors, the fill layer remained undisturbed but in those areas where it was left uncovered, subsequent infilling and structural additions caused a mixing and disturbance of the deposit.

Due to this discrepancy in the dating sequence, the contemporaneous fill layers were relied upon to provide a date range for Area C's major infilling. Since Events 40 and 232 are essentially sterile loads of fill dumped into Area C,

the numbers of artifacts would not be expected to be substantial. Only one pipe bowl from each layer was discovered. That from Event 40 dates between 1620-60 and that from Event 232 between 1610-40. Likewise, Events 229 and 296 contained no pipe bowls, but the majority of stem fragments were 8/64 of an inch bore diameter, placing their deposition within the first half of the seventeenth century. Additional support for dating these deposits was taken from Event 147, an initial occupation layer directly above Event 8 (pipe bowl date of 1610-1640) and in the occupation floors of the storehouse and lowest layers of the privy, which were undoubtedly deposited after the fill was added. This episode of infilling fits very well with Captain Wynne's early practice of using earth to reclaim "void or waste ground" (Wynne 7/28/1622). Not only do the dates coincide, but the work itself was a massive undertaking that required organization and a considerable labour force, two things that were present during Wynne's governorship.

This evidence would place the construction of the seawall, privy and storehouse to the same period. Pipe bore analysis from the lowest layers of the privy feature are of the larger bore diameters (especially 8/64") and the pipe bowls date from 1620-40 (Plate 8). Tuck (1993) mentions a concentration of "case" bottle glass and lack of "onion" bottle glass in the lower privy layers. This is relevant in that the latter type of bottle begins to appear on British North

American sites in the 1640s. One item of a rare and unusual nature is the small wax impression from a signet ring that was also found in the privy (Plate 9). Bearing the impression of the Immaculate Heart of Mary, pierced with an arrow and complete with three drops of blood below a weeping eye, such Roman Catholic symbolism would have most likely found its way into the privy during George Calvert's proprietorship (Tuck 1993:303-4).

Situated directly parallel to the seawall and east of the privy is a large rectangular stone storehouse partially floored with slate flagstones and partly of hard-packed earth. Both occupation floors (Events 6 and 44) display a variety of pipe bowls dating from the first to third quarter of the seventeenth century (Plate 10). Pipe bore analysis also shows a similar date. Of the two maker's marks and one moulded stem in these events, only the Lluellin Evans pipe (1661-88) provides a date later than 1640. The above results are suitable for providing a range of occupation for the storehouse, but to establish a firm construction date one must look to other sources.

From a letter dating August 17, 1622 Captain Wynne requested six masons, two or three quarrymen, a slater or two, four carpenters, and a lime burner. A quarryman and stone layer were already residing at the colony during this time and a slate quarry was being fitted. Chapter 7 explains that the construction at

Area C was completed by professional craftsmen, possibly the ones requested by Wynne in 1622. The lack of reference to these waterside features in the detailed early documents and shortage of tradesmen for such an ambitious task, suggests that these structures were not built until at least 1623 (when the documentary sources become scarce).

Comparative architectural features also suggest an early seventeenth-century construction date for the storehouse. The privy feature was constructed beside the storehouse and shares its eastern wall with part of the storehouse's western end. Likewise, the thick, light blue flagstone floor of the privy is identical to that of the storehouse floor. Even the technique of laying the floors, uncut flagstones with cobbles and slate fragments in the interstices, are the same. Most likely they were constructed by the same craftsmen. Therefore, by association the construction of the privy coincides with that of the storehouse.

In fact, all three structural features (seawall, privy and storehouse) that make up the waterfront premises were undoubtedly constructed under the direction of organized leadership. The dating evidence cited above points to an early seventeenth-century construction, specifically to that of the Calvert period. These structures were not present until at least 1623, but they would have been

completed before the Calvert families "desertion" of the colony in 1629. This securely places the initial construction at Area C from between 1623 and 1629.

5.3.5 Destruction of the waterfront premises

According to the stratigraphic sequence, the next major episode at Area C was the destruction of the storehouse, disuse of the privy and collapse of the seawall. Events 9, 16 and Stratum 1a clearly portray the sudden and violent destruction of the storehouse, characterized by a layer of shattered rock, roof slate, wood charcoal, ceramics, pipes and glass (Figure 2; Plate 11). Likewise, the privy's stratigraphy contains a thick deposit of shattered rock, roof slate fragments and many cannonballs (Plate 12). From the collection of historical documents on Ferryland, we know that the colony was attacked twice in the seventeenth century, first by the Dutch in 1673 and later by the French in 1696. To which, if either, does this destruction correspond? Pipe analysis from the occupation floors of the storehouse show that it went into disuse sometime during the third quarter of the seventeenth century. To investigate the suggestion that this destruction is the physical representation of the Dutch raid requires an in-depth look at all the pipes from Area C's first destruction episode.

The storehouse destruction layer contains the largest number of pipes found from any event in Area C. More than 3,000 stem fragments and 87

complete/near complete bowls were identified as coming from Events 9, 16 and Stratum 1a. The designation of three separate events was necessary in the initial phases of excavation until they could be joined stratigraphically. Even if connecting these events to one episode in Area C's history were not stratigraphically possible, pipe analysis showed this to be the case (Appendix B). To test the validity of the Dutch destruction hypothesis, all three events were analysed separately to determine if the results indicated similar dates.

Using Harrington's bar chart, all three events display the appropriate percentages for the 1650-80 grouping, with mean dates ranging between 1660-70. Pipe bowl analysis provided results similar to the stem dating, with most of the pipes dating within the third to fourth quarter of the seventeenth century. There are two points to mention when discussing pipe bowls from this destruction. First, a few pipes dating from 1610-40 were found, but can be explained by the immediate collapse and intermingling of this destruction layer with small areas of occupational refuse in the storehouse. Second, upwards of 50% of pipe bowls in all three events are of a particular style. According to Grant and Jemmett (1985), this pipe style is identified to Barnstaple manufacture, dating from 1660-1710 (Plate 13). If the dates for this style are accurate, and the events from Area C confirm this, then such information is an important indicator of heavy trade ties with North Devon during this period of Ferryland's history. Similar results were

substantiated by Pope (1988), in his study of Area B pipes. As will be shown in Chapter 9, these ties with North Devon may also be demonstrated in the architecture at Area C.

Identifiable maker's marks and decorated pipe stems also fit within the proposed 1673 destruction. Many exhibit raised relief Fleur de Lys stamps or other designed varieties, with one Raleigh pipe fragment and a WE stamp attributed to William Evans (1660-82). One marker's mark, **BA RVM**, is stamped on the heels of four pipes similar to the 1660-1710 Barnstaple pipes. Oswald identifies such a mark as Barnstaple manufacture (1969:134). Also, Grant and Jemmett's article states that the **BA RVM** lettering is actually Barnstaple's Latin abbreviation (1985:470). The same pipe mark was also found during excavation of a seventeenth-century planter's house in Renew, Newfoundland under the direction of Stephen Mills, Parks Canada. According to Mills (personal communication:1996), this pipe fragment was found in the wall collapse of the house, which dates to the 1660s.

All the pipe analysis techniques from these first destruction layers show that the storehouse was not destroyed until after 1660. When these results are incorporated with archaeological evidence from the privy, it proves that the first destruction episode at Area C is correlated with the Dutch raid. For example, all

16 pipe bowls in the upper stratigraphy of the privy (Levels 1, 2 and 3 [1986]) were dated specifically between 1660 and 1680. These three layers were filled with wall rocks, roof slate fragments and more than two dozen cannon shot of five different sizes, indicating either that some of the storehouse collapsed into the privy or that this debris was dumped [into the privy] as some sort of clean up effort. The presence of so many cannon balls, in association with the structural debris, implies that they were connected to a violent destruction somewhere between 1660 and 1680. The only known violent attack on Ferryland that fits this date range was the Dutch raid in 1673. Further support for this theory was provided when the occupation and destruction layers deposited after the first destruction were dated, thus, completing the chronological sequence of seventeenth-century construction, occupation and destruction at Area C.

5.3.6 Second construction

Area C's second construction phase did not occur until the fourth quarter of the seventeenth century. Construction efforts were concentrated directly south of the storehouse, but included part of its southern wall, which was modified and then used for part of the new building. The re-use of the earlier storehouse wall provides a clear separation between each episode of occupation, because the second phase of construction could not have taken place until the storehouse was no longer in use.

Architectural evidence in the new outbuilding points to its partial use as a livestock shelter. The eastern half of this structure contains a cobblestone floor with a drainage channel, post holes that once held tethering posts, a collecting box and outside drainage system, all of which were functional parts of a seventeenth-century English cowhouse or byre. Events 45 and 33 provide a tightly dated range for the occupation and destruction of this building (Figure 3). Similar to the earlier storehouse destruction layers, these events also include a large number of Barnstable pipes dated 1660-1710. In fact, 20 out of 25 pipe bowls (80%) were of this style. Such a high concentration of this pipe style skewed the pipe bore results for these events, as most are 7/64" bore diameters.

The remaining five pipe bowls from the cowhouse date from the late seventeenth to early eighteenth century and not one can be dated to before 1680. Those pipe bowls dating 1660-1680, which were so prevalent in the privy and storehouse destruction layers, are totally unrepresented in the later cowhouse occupation. This suggests that the 1660-1710 Barnstable pipes were not deposited until the fourth quarter of the seventeenth century and therefore, Area C's second construction dates to this period.

The above pipe results suggest an occupation and destruction confined from the fourth quarter of the seventeenth century to the early eighteenth century.

Within this date range is the documented destruction of Ferryland by the French in 1696. It can be argued that this cowhouse was constructed soon after 1673, only to be demolished by the French some twenty years later. However, several maker's marks, along with the wide date range for the Barnstaple pipes, could push the occupation date to as late as the early eighteenth century.

It is my belief, however, that the cowhouse destruction is a clear representation of the French raid in 1696. Situated directly above this deposit is another fill/occupation layer designated as Event 25 in 1993 (Figure 4). Pipe analysis points to an early eighteenth-century occupation for this event. Therefore, if this layer began to be deposited in the early eighteenth century, then the basic principle of stratigraphy dictates that the layer below it is of an earlier period. The stratigraphic provenience of these two deposits even helps explain the presence of some intrusive material (several pipe maker's marks from the eighteenth century) in the Event 45 destruction.

One final indicator of the date for the cowhouse destruction is from a single peculiar artifact found directly on its floor. An almost complete short-stemmed pipe, with a vasiform bowl and incised decoration was originally believed to be of native American origin (Plate 14). The identification of this pipe changed upon discovering a similar pipe excavated in a slave cemetery in

Barbados and classified as late seventeenth-century West African (Handler 1983:246). This led to a series of hypotheses on how such a pipe (or its African owner) could have made its way to Ferryland. It was not until the spring of 1996, with the assistance of Kevin McAleese, Steve Mills and Charles Bradley, that a match was found to this strange pipe. Two such pipes, one almost an exact duplicate to the cowhouse pipe, were uncovered during underwater excavation of the *Saphire* in Bay Bulls, Newfoundland (Plate 14). Both pipes were attributed to North African manufacture (Bradley, personal communication:1996). Yet, this does not necessarily indicate the ethnicity of its owner, for the style of these pipes enabled the smoker to separate the bowl from the stem (probably wood or reed) when not in use and had practical applications for professions such as sea-faring (Bradley, personal communication:1996). With the wreckage found just 40 kilometres from Ferryland harbour, the *Saphire* once served as naval frigate that was later burned by her crew during the French attacks in 1696. This provides a convincing date for the Ferryland pipe and also strengthens the argument for the cowhouse destruction in 1696.

5.4 Links to Documented Changes at Ferryland

Now that a stratigraphic sequence has been established, the layers dated and the construction phases for Area C's features determined, are there any links with documented changes of occupation/destruction at Ferryland? The simple

answer to this question is "yes." As shown earlier in this chapter, the infilling and initial construction at Area C coincide with the period of the Calvert occupation. David Kirke and his family were the next proprietors at the colony, but none of the structures at Area C can be directly attributed to the first decades of the Kirke period. Still, the addition of a second flagstone floor in the storehouse, constructed using a different raw material and construction style than the original floor, suggests a change in occupation at Ferryland. Considering that Pope (1986:26) believes some sort of reorganization of facilities occurred soon after Kirke's takeover, this new floor may be a physical manifestation of that reorganization.

It has been argued that the storehouse destruction was the result of the Dutch raid in 1673. Soon after this destruction, a new two-bayed outbuilding was constructed south of the collapsed storehouse. It was possibly the Kirke family who had this structure built, for Lady Kirke and several of her sons were in possession of much of the property around The Pool. Who would have required such a structure more than the Kirkes, with a 1677 census showing roughly 50% of the community's livestock belonging to various members of the Kirke family (Pope 1986:126)?

Whoever had ownership of this outbuilding, it was not in their possession for very long. Pipe analysis provided a late seventeenth-century destruction date, coinciding with the French attack in 1696. Re-occupation of the area in the late seventeenth and early eighteenth century sealed this destruction episode and thus marks an end to the discussion of Area C's construction sequence.

Chapter 6

Identification and Function of Area C's Structures

6.1 Introduction

In 1995, expanded excavations to the southeast of Area C helped clarify several unanswered questions dealing with the construction, dimensions and functions of the structures at this site. This has also greatly assisted in determining interior/exterior space and how it changed over the course of seventeenth-century occupation. Chapter 6 identifies the various structures and architectural features at Area C using comparative references from British and colonial American sources. The focus is placed on artifactual and architectural analysis to suggest the function(s) of each structure.

6.2 Waterfront Premises

As stated in Chapter 5, the first episode of construction at Area C began with infilling the site and building a single-faced stone retaining wall to protect this newly reclaimed land. At the same time, both the privy and stone storehouse were constructed. All three stone features are contemporaneous and are referred to throughout the thesis as the **waterfront premises** (Figure 6).

6.2.1 Land reclamation/seawall

The practice of "winning void or waste ground" is a widespread phenomenon in Britain with a long history dating back to the first-century Roman occupation (Hobley 1981:1). Several reasons have been suggested for historical land reclamation projects, most of which fit well with the Ferryland example. They are as follows: 1) to win land; 2) to provide a deep water berth; 3) to overcome problems of silting; 4) to maintain a sound frontage (Milne 1981:33). Winning land and maintaining a sound frontage were two obvious reasons for extending the harbour front at Area C, yet were these the only purposes for such an ambitious task? The answer lies in the true nature of the colony and the purpose it was to serve.

George Calvert wished to establish a colony at Ferryland to serve as the base of his colonial enterprise. This colony was to be a key port to the rich fishing grounds off the coast and therefore, all the appropriate works had to be in place to make Calvert's investment a profitable undertaking. Governor Wynne engaged in the construction of the waterfront premises, with the seawall also serving as a deep water berth and quay for the loading and unloading of goods via ship, thus ensuring the colony a suitable location for the trade and transport of goods.

The seawall/retaining wall is also a very common feature in ports and harbour towns throughout Europe. Such features usually have a facing of masonry, concrete, timber or sods to support or protect a bank or embankment (Hobley 1981:9). The earliest use of stone for seawall facing dates to the fourteenth century, but does not become common until the fifteenth century (Milne 1981:33). Ferryland's seawall is single-faced, constructed primarily of slate-stone and clay filler, stands over 1.2 metres high in places and during low tide can be seen extending for more than 50 metres (Plate 15). Additional segments of seawall may have been found during underwater excavations in 1991 and 1992 (Tuck 1993:302).

Preliminary excavation along a section of seawall west of Area C (designated site Area G-1996) revealed a northward turn in the wall continuing three to four metres before returning on its original east-west orientation. This unexpected turn in the seawall can be attributed to a combination of two things. The northward turn may have been planned so as to orient the seawall toward deeper water. In addition, this directional change could represent an effort to consolidate an existing feature into the seawall construction.

This feature consisted of a series of preserved wooded posts placed within a tightly-packed rock matrix. Some of these posts ran in an east-west direction

(along what was the original beachfront), while another group of larger posts jutted north toward deeper water. Both sets of posts were incorporated into a concentrated fill of large rocks and rounded boulders. By all appearances this conglomeration of rock and wood are the remains of an early wharf pre-dating the seawall built around it. Initially this seems awkward, yet Wynne states the construction of "a wharf in good forwardness, toward the low watermark" and that with Calvert's permission he would "hope to fortify" (7/28/1622). This wharf may have been the one that served the colony until the quarrymen and masons arrived to construct the seawall. Instead of dismantling the existing wharf, the masons simply built around it, with the rock already there serving as fill for the seawall. Sections of this new seawall were even constructed with a series of vertical posts and horizontal logs set directly against the wall facing to serve as strouders for boats to moor upon (Plate 16). A similar facing is illustrated in Plate 17.

The proportions of the seawall alone are indicative of the size and substance of the Colony of Avalon. If the structural features at Area C are any indication, then excavation further west may unearth the remains of a whole series of waterfront structures. In fact, evidence for a second slate-roofed structure west of Area C was found during the last week of excavations in 1996. This evidence, combined with the remains of a seventeenth-century cobblestone street one metre

below the present day roadway, provides a close match with the statement made by Captain Wynne in 1622. "For the comfort of neighbourhood, another row of building may be so pitched, that the whole may be a pretty street" (Wynne 7/28/1622). The second row of buildings, which included the waterfront premises, was constructed on the newly-reclaimed land and a cobbled street connected the new waterfront buildings with the structures erected in 1621-2.

Along the entire far eastern section of Area C, there is a large buildup of rounded boulders and earth similar to that found in the site's fill layers. The storehouse's east wall was constructed against this massive concentration of earth and thus served as a sort of retaining wall. The later cowhouse construction, also exhibiting well-built walls, curiously lacks a clearly-defined exterior wall face to the east. These irregularities in the construction at Area C were caused by this large deposit of fill placed along the outer eastern sections of the seventeenth-century Pool margin. The fact that the east wall of the storehouse was constructed against this fill implies that it was deposited before (or concurrent with) the construction of the storehouse in the 1620s. Because of its north-south orientation, this massive pile of fill could have been a portion of Wynne's "face of defense to the water-side ward, with the earth that we digged for both cellar and kitchen room" (7/28/1622). This presents another theory as to the

archaeological remains that may represent statements made in Wynne's early letters.

6.2.2 Storehouse

Parallel to the seawall is a large rectangular structure with an interior measurement of 4.8 metres wide by 16.8 metres long (16 x 56 feet), constructed entirely of local stone and partially floored in flagstones. This building lacked a fireplace, yet contained a large quantity of storage vessels, smoking pipes and glass, including such items as crucible fragments, cooper's tools and a lead scale weight. The location, size, lack of provision for heating and shortage of domestic artifacts all point to a multi-functional purpose for this structure, with its most important use probably that of storage.

This storehouse was undoubtedly part of Wynne's master plan for the colony. A solid and secure structure would have been required to store the colony's provisions, while a suitable location was also needed to facilitate the loading and unloading of goods. In 1622, Wynne stated that he had the provisions kept in a two-room tenement "which serves as a store-house til we are otherwise provided" (7/28/1622). Construction of a storehouse was delayed until the land could be reclaimed and a waterside frontage prepared. As shown from his early

letters, Wynne's planning was both careful and precise. This colony was to be every bit an English port town, albeit of a somewhat smaller scale.

At first glance, such a large structure appears too substantial to have served simply as a storehouse. However, in most cases, the Ferryland storehouse is smaller than contemporaneous examples. For example, the colony at Jamestown, Virginia had a group of three connected storehouses measuring 40 by 120 feet, within a tide's lap of the James river (Noel Hume 1994:317-8). Though of a later date than either Ferryland or Jamestown, an early eighteenth-century harbour-front storehouse in Scotland measured 42 by 70 feet with stone walls 2' 8" inches thick (Graham 1968:187). The closest available match to the Ferryland storehouse is an early sixteenth-century building in the Shetlands measuring 24 feet wide by 56 feet long. This structure was constructed with local stone and had walls averaging over 3 feet thick (Owen & Smith 1988:2). Whatever their exact purpose, such structures possessed similar characteristics,

"they had to be strong, secure, well-ventilated, provide maximum storage and facilities for handling and loading. They were best sited on the coast, close beside a beach which boats could use with reasonable ease and safety . . . [They] were plain, rectangular buildings. . . . sometimes larger than the neighbouring parish churches."
(Beaton 1986 as cited in Owen and Smith 1988:15-6).

Beside the many storage vessel fragments found on the storehouse floor, other artifacts such as a lead scale weight, crucible fragments and cooper's tools all point to this structure as a multi-purpose facility and work station. Nevertheless, one must be wary not to jump to any conclusions concerning the exact uses of this building at any given time. This is because Ferryland was occupied by several different administrative groups prior to the storehouse's destruction in the third quarter of the seventeenth century. The purpose(s) this structure served during the Calvert period, could have changed or been modified under the leadership of David Kirke or John Treworgie.

6.2.3 Privy

Constructed directly against the west wall of the storehouse and incorporated into the seawall, is a rectangular stone-lined pit measuring approximately 1.2 metres wide by 2.7 metres long (4 x 9 feet). The floor is covered with thick flagstones and there are two square openings in the bottom north end that pass through the seawall. The architectural features of this pit suggest that it functioned as a unit for the containment and expulsion of waste matter. Analysis of the organic remains in the lower levels revealed eggs from human intestinal parasites at a rate of 30,000 per gram of waste (Tuck 1993:305). This rectangular feature undoubtedly served as a privy during the early years of the colony.

Twice a day, changing sea levels would have flushed out waste from the privy, thus preventing the constant foul odour and periodic cleaning necessary with other privies and latrines. The idea of a water-flushing privy in England usually involved building over a stream or next to a river (Salzman 1952:282). So where did this ingenious idea of using tidal action to clean out the privy originate?

The answer may lie in the bigger picture pertaining to the origin of the whole waterfront premises. On two separate occasions, Captains Wynne (1621) and Powell (1622) departed from the port of Plymouth with a ship full of settlers and supplies on their journey to Ferryland. Excavation of that harbour throughout the 1960s has revealed several post-medieval features including a quay wall with a well-built seaward face, a waterside structure (most likely a warehouse) measuring 12 by 18 metres and three latrine shafts incorporated into the structure's seaward wall that were flushed clear by the daily movement of the tides (Barber and Gaskell-Brown 1981:144). If Wynne or Powell's men spent any length of time in Plymouth, securing provisions and other necessities, then it is possible that this idea of a flushing privy was picked up. In fact, the whole waterfront premises may have been fashioned from Plymouth's example, although gaps in both the historical and archaeological record prevent anything beyond speculation.

In the third quarter of the seventeenth century, the waterfront premises were destroyed by violent means. Those responsible for Area C's second building phase dealt with the first destruction by simply capping it over with fill and focusing new construction to the south. Although there is evidence to support some re-use, most of the storehouse wall and roof collapse was found in situ, indicating that re-use occurred only on a limited scale. The exact time of the second construction is unclear; nevertheless, pipe analysis suggests a short time span between the storehouse destruction and second occupation.

6.3 Cowhouse-storage shed

With the changes caused by the raid on Ferryland and the subsequent rebuilding of many structures, so there was a change in the use of space at Area C. What had been the inside of the storehouse prior to 1673, became an outside space. Likewise, the vacant area south of the storehouse was now the location for a new two-bayed outbuilding.

6.3.1 Construction

Construction began with the addition of up to a half metre of fill directly south of the storehouse. The western end of the storehouse's south wall was dismantled and a new wall running north-south was constructed (Wall #7). This wall measured 10.5 metres long and required two small buttresses to support it.

The remaining eastern section of the storehouse's south wall was used as part of the north wall for the new building. Directly perpendicular to this wall, but not incorporated into it, is another north-south wall (Wall #4) paralleling wall seven. Besides its obvious use for structural support, wall four also served as a partition within the new structure, separating it into two bays (refer to Figure 7 for illustrations). The lack of evidence for a slate roof suggests that this building was roofed in wooden shingles or thatch. In fact, excavation of the cowhouse floor has uncovered the remains of what may be part of the thatch roof (See Chapter 9, section 9.4).

6.3.2 Eastern bay

A concentration of fill in the eastern bay of this structure was used to construct a raised cobblestone floor. Exactly half the interior space in this eastern bay was constructed of well-laid cobbles bedded in a matrix of sand and clay. Extending east of this well-laid floor was a roughly floored continuation of cobbles and earth, with a slate floored alcove/animal stall in the far northeast end.

Upon closer inspection of the well-laid cobblestone floor, a channel can be seen running along its entire width and ending up in a small stone "box" at the edge of the partition wall (Plate 27). An opening in the wall allowed liquid matter to continue through and into a covered drain on the floor of the second

bay. Capped in cover stones, this drain leads across the floor, through wall seven and makes its way outside the new structure and into the old privy feature.

As stated in Chapter 5, the various structural features that comprise the eastern half of this building were all functional parts of an English cowhouse or animal shelter. Such structures were very important for the protection of livestock during the cold winter months. Cattle provided a variety of foodstuffs highly prized to the colonial diet, including milk, cream, butter, cheese and meat. It was because of this dietary value that cattle were housed in such well-built structures.

6.3.3 Western bay

Evidence for the function of the western half of this new structure is much less definitive. Artifact finds within this area were sparse and there was no evidence for a hearth or fireplace of any sort. Several clues, however, suggest that this bay served as interior space. First, the western end of the storehouse wall was dismantled and wall seven constructed so that its buttresses extended to the west, thus supporting the structure and roofing to the east of it. Second, the drainage channel that leads out of the cowhouse and onto the floor of the second bay was capped with cover stones (and a thin gravel floor) to prevent both the sight and smell of waste. Finally, a group of four slates in a square formation was found between walls four and seven and is associated with the second construction

because it was found directly above the dismantled southern wall of the storehouse.

These four slates (Plate 32) were originally believed to be some sort of drywell, but when placed in the context of this new outbuilding construction, another likely function emerged. In most English farming regions, there are a variety of structures required to store items associated with the storage and protection of agricultural implements and produce. Often referred to as barns, cartsheds and linhays, these buildings all have one feature in common, a large set of double doors. When closed, such large doors required a removable square centre-post to hold them in position. This post was fitted into a pocket in the door lintel at the top and a brace in the floor below (Brown 1986:298). I propose that the square slate feature at Area C served as a brace in the floor used to secure a centre post for a set of double doors and that this second bay functioned as a storage shed or barn.

This explains the dismantling of the west end of the storehouse's south wall in preparation for a new double-doored opening. The scarcity of artifactual material in this bay is also explained by the nature of such a structure. Most of the items stored would consist of carts, ploughs, harrows, foodstuffs, fishing gear and likely a quantity of hay and fodder for the adjacent cowhouse. Even the

building's north-south orientation supports the storage shed theory. Cartsheds and barns faced north because "the Sun does more harm to a cart than either Wind or Rain" (Markham as cited in Lake 1989:24).

6.3.4 Comparisons and connections

With the cowhouse in the eastern bay and storage shed in the western end, the total interior dimensions for this structure are 10.5 metres wide by 11.3 metres long (35 x 37 ½ feet). Such combination outbuildings are common in England and Wales. For example, Brunskill describes two-room field barns as structures providing storage for hay and winter accommodation for cattle (1992:64). Even seventeenth-century Welsh barns had a central cart shed, flanked by cowhouses (Lake 1989:22). Insufficient architectural features in the storage shed prevent any regional comparisons between this structure and similar buildings in Britain. Yet, the cowhouse may provide us with some answers.

When looking for comparable British structures, emphasis was placed on the West Country of England, because both documentary and artifactual evidence show strong ties between this area and Ferryland throughout the seventeenth century. Peter Beacham's book *Devon Building* illustrates a longhouse which has similar architectural features to the Ferryland cowhouse (Figure 8). In Devon, a both cowhouses and longhouses were usually "facilitated by a cobblestoned floor

into which was set a large central drain, the cows usually tethered with their rear ends nearest the drain* (Beacham 1990:51). Such structures are common in Devon and can still be seen in many rural farms (Plate 30). This does not provide positive proof that the outbuilding at Area C was constructed from a known Devon style, for cowhouses of similar fashion have been documented in many parts of England (Peters 1981; Darley and Toler 1981). It is suggested that all available evidence points to a West Country origin for construction techniques in the latter part of the seventeenth century.

Another possibility exists concerning the function of the cobblestone-floored building at Area C. Some investigators have suggested that this building may have been a fish cellar for processing and storing fish (Alcock 1995; Cox 1996, personal communications). The traditional methods of fish processing conducted by Newfoundlanders for the past 400 years call this suggestion into question. Fish were processed by gutting and cleaning on a stage, with the unused remains simply thrown back into the water. There was no logical reason to construct a substantial stone building with a cobbled floor and elaborate drainage system to process fish when the traditional method was so much simpler. In addition, no reference could be found for such a structure in any early fishing settlements in North America. Livestock shelters, on the other hand, were a necessary component in many colonial establishments.

6.3.5 Modified privy

The final feature in this discussion is the privy and the function it served during Area C's second occupation. To accommodate the cowhouse drain that was to flow into it, the top section of the privy's south wall was dismantled and rebuilt with a new drainage opening (Plate 26). Initially, the stratigraphy within the privy was puzzling to the cowhouse interpretation. How could this feature have flushed out the accumulating animal waste if the remains from the previous occupation and destruction were still present? This flushing function was no longer necessary because the privy was now simply a dung pit, modified to retain (not expel) the solid and liquid manure from the cowhouse. This explains why the privy was never cleaned out. Similar pits can be found in farms throughout Devon (Laycock 1920:165) and other parts of England (Brunskill 1982:62). One discussion on cowhouses even states that manure from the central drain leads directly to the dung pit or midden (Darley and Toler 1981:142).

Occupation of the cowhouse-storage shed was confined to a short period. Pipe analysis from the cowhouse floor demonstrates that it was destroyed during the French attack in 1696. Serving as an animal shelter and storage shed for not much longer than twenty years, one would not think this building was conducive to pipe smoking. Yet, 25 complete bowls and approximately 500 stem fragments were recovered directly on the cobblestone floor, in association with many glass

and ceramic fragments. Excavations at the southern end of the cowhouse in 1995 uncovered many of these artifacts along with several horizontal depressions that may represent interior partitions. The presence of the existing road prevented a complete excavation of the eastern end of the structure, but the above evidence hints at multiple uses for the cobblestoned section of this outbuilding. It is even conceivable that some artifacts deposited in the thick destruction layer came from a lofted section above the cowhouse floor, which could have served as accommodations for seasonal fishermen or farm hands.

Chapter 7

Stone Construction Techniques

7.1 Introduction

When one thinks of seventeenth-century stone construction techniques, it often evokes images of fabulous stone mansions and palaces or monumental churches designed by famous English architects like Sir Christopher Wren or Inigo Jones. Such works required hundreds of skilled craftsmen, thousands of tons of stone and often took years to build. In contrast to these designs of majestic architecture are the majority of simple vernacular stone buildings in rural England and Wales, both practical in design and constructed from local materials. These simple, yet functional, designs were copied for the construction at Area C.

To appreciate the detail, expertise and hard work that went into the construction of the stone structures and features at Area C, it is necessary to understand the methods and techniques used by these early builders. This chapter focuses on these construction techniques and how they varied according to specific tasks. A general description of walling and flooring is followed by individual discussions of the covered drain, seawall and privy. Photographs and figures supplement the written descriptions by adding visual examples to the discussion.

Finally, this chapter examines the technology and tools required for construction. Historic documents and primary sources identify and describe those items that were a necessary part of the colonial craftsman's tool kit. Analysis of the iron tools at Area C is used in conjunction with the historic documents to provide support for, and examples of, those tools identified.

7.2 Walls

As stated previously, the structural development of Area C has undergone two separate construction phases. The first phase concentrated on a storehouse, privy and seawall, whereas the second consisted of a two-bayed outbuilding constructed directly south of the storehouse. The long time span between the two construction phases confirms that the buildings were erected by different craftsmen. Yet, the similarity in wall construction styles suggest that each craftsman was skilled and knowledgeable in the use of slate-stone. Except for two walls in the far eastern end of Area C, all structural walls were built of local slate-stone, mortared in clay and laid to a uniform thickness of 0.78 metres (30 inches).

7.2.1 Wall construction

Such solid and well-built walls required a planned sequence of construction. The first step usually involved in building a stone wall was to dig a builder's trench. Yet, no builder's trench was found in any of the excavated

areas. The foundations for these walls were laid directly upon a layer of fill, with more fill deposited around the footings. None of the walls from either construction phase exhibits the use of a builder's trench and therefore, more than one episode of infilling occurred. Area C's stratigraphy clearly shows that an initial fill layer was deposited to level the land for construction (Event 8-1620s). Soon after the destruction of the waterfront complex (ca. 1673), a second deposit of fill (Events 20, 250 and 252) was added directly south of the storehouse to accommodate the cowhouse-storage shed.

The addition of fill around the wall foundations provided extra stability though according to Brunskill, this may not have been necessary. "Stability of foundations was not usually a serious matter for the quite low buildings erected by mass walled constructional methods . . . as an aid to foundational stability . . . the use of large rounded boulders . . . was common at the base of mass walled buildings" (Brunskill 1987:35). Rounded boulders such as those described above were used for the foundations of the seawall, storehouse and the later cowhouse-storage shed (Plate 33). In both the storehouse and cowhouse, additional footings were laid above the boulder foundations. These footings were two or three layers thick and extended out an extra 15-25 centimetres from each side of the wall (Plate 34).

Walling was ready to begin when the footings were laid and enough stone was brought to the construction site. Before the actual construction, masons would have sorted wall rocks according to their size and suitability for cornerstones and wall facing. Stones used for the outside of a wall are called the **facing**, those on the inside **backing** and the stones placed between the two sides are **filling** (Newbold 1924:60). Except for some minor chipping and alteration, most of the wall rocks were laid unworked, in the same form that it left the quarry. This type of stone is said to be "quarry pitched" (Smith 1985:59).

When building a stone wall(s), each layer or "course" was constructed separately. A course of facing and backing was laid with the best edge outward and the ends pointed inward to focus the wall's strength toward the centre (Brunskill 1982:174). Large fill stones were fitted between the gaps of the facing and backing, and smaller stones added after the larger holes were filled. The entire course was then covered by a thin layer of clay. This whole process was repeated over and over again, until the final wall course was completed. The only variation in the upper wall courses would be the presence of smaller slate-stones, as compared with larger stones at the lowest levels. This gradation in sizes ensured that most of the building's weight was concentrated toward the base of the walls.

Although each course was laid individually, the natural properties of slate made level joining and coursing very labour-intensive and time-consuming. The ability to cleave slate into long thin slabs was simple, but forming a squared piece required cutting against the cleavage plane, which often ruined the stone. Therefore, wall courses could not always be laid on a continuous horizontal plane, a technique referred to as "regular joint interrupted at intervals" (Brunskill 1987:39).

Likewise, vertical joints did not always have a perfect fit. Small waste rock was often set between joints to fill spaces and secure that section of the wall (Plate 35). As shown in Plate 36, vertical joints from one course never aligned with the course above or below it. This technique is the **"one over two - two over one"** formula and is a basic rule in stone wall construction (Fields 1971:36). Aligned joints could compromise a wall's stability and strength, and were carefully avoided. Some large wall rocks even cover several joints and penetrate several courses (Plate 37), a technique called "jumper work" (Clifton-Taylor and Ireson 1983:81).

In some cases, large stones were hammered or chiselled into squared forms for use as cornerstones. These cornerstones or "quoins" are large stones that form a corner facing for two sides of a wall (Plate 38). When constructing a right-

angled corner, it is important to remember that each new course must overlap the lower layer so as to bind most effectively those surrounding it as well as those above and below it (Fields 1971:44).

In the year 1796, W. Marshall stated in the *Rural Economy of Yorkshire*, that

"formerly ordinary stone buildings were carried up entirely with 'mortar', that is common earth beaten up with water, without the smallest admixture of lime. The stones themselves were depended upon as the bond of union, the use of mortar being merely that of giving warmth to the building and a degree of stiffness to the wall" (Marshall as cited in Innocent 1971:121).

Stone walls in Wales were fashioned in a similar manner, often mortared with a mixture of clay and cow dung (Peate 1946:169). In either case, the common technique was based on the use of clay or mud to bind the walls and was the same as that used during both construction phases at Area C. One would not expect lime to have been used for either mortaring or whitewashing the walls. This is for two reasons. First, lime was a scarce and expensive luxury for the early seventeenth-century colonies in North America (Morrison 1952:69). Second, lime mortar and whitewash were common on British houses and cottages, but rarely used on outbuildings (Clifton-Taylor and Ireson 1983:43).

7.2.2 Windows and doors

Area C's thick stone walls were limited in the number, size and proportions of window and door openings. This was because every opening reduced the strength of stone walled structures (Brunskill 1987:36). Openings were brought into consideration when building, for certain structures needed more openings than others. For example, a cowhouse would have had few openings and often those were very small. "Early cowhouses were low and dark with little ventilation. . . . Light and ventilation were considered detrimental" (Brunskill 1987:154). In spite of all the structural features excavated at Area C, only one door opening has been positively identified. This doorway is on the eastern end of the storehouse's south wall and measures almost 1.2 metres wide (Plate 39). Such a wide entranceway would have been necessary to convey goods to and from the storehouse, and likely served as a main access route from the colony.

Another possible opening was discovered in the cowhouse during excavations in 1995. This feature is in the far northeast section of the cowhouse, measures 1.5 metres wide by 2 metres long and is completely floored in flagstones (Plate 40). Not only are the length and width of this feature too big for a regular entranceway, but the clay and rock matrix directly east of it shows that access to the cowhouse could not be gained through this side (see Chapter 6, section 6.2.1).

Therefore, its function must have been directly associated with housing livestock, probably serving as a separate animal stall for a bull or young calf.

7.3 Floors

Five stone floors were excavated within Area C. Four of these floors were constructed using slate flagstones and the other of beach cobbles. The flagstone floors are in the privy, west end of the storehouse and the east part of the cowhouse. The remainder of the cowhouse floor is laid with cobblestones.

Flagstones are by definition "Broad Stones for Floors of several breadths and lengths, and about three or four inches thick" (Holme 1688, Book III:111). The flagstone floors in the storehouse were initially believed to be one unit, but upon closer inspection, they were evidently two connected floors (Plate 18). The first floor, in the western end closest to the privy, measures approximately 4.5 metres wide by 3.6 metres long (Plate 19). It was constructed with a thick, light-blue slate with rough edges and the interstices between the flags were filled with cobbles and upright slate fragments (Plate 20). The second flagstone floor was built directly alongside and butted against the first floor. This floor measured 4.5 metres wide by 4.2 metres long and was constructed using thinner, more friable, dark-blue slate that was cut into squares and then closely fitted (Plate 21). Both floors were laid in a matrix of sand and clay.

The privy floor was built using the exact raw material and techniques seen in the storehouse's first floor; as compared to the flagstone floor in the cowhouse (animal stall), which was constructed with attributes similar to that of both storehouse floors. These flagstones are of the same thin, dark-blue slate as the storehouse's second flagstone floor, but were not cut into squared forms. Instead, they were laid unworked and the spaces between the flagstones were filled with upright slate fragments similar to that in the storehouse's first floor.

The construction of the cowhouse's cobblestone floor and covered drain was the product of a different group of colonists who were established at Ferryland as late as the fourth quarter of the seventeenth century. A thick fill layer was first deposited to provide a suitable platform upon which to build and at the same time, ensured an elevated height for the animal waste to flow west into the lower drainage system. A thin layer of sand and clay capped this fill and was used as a bedding to lay the cobbles. The cobbles for this floor were collected from a nearby beach to the east of Area C. This beach contains cobblestones with angular shapes and flat smooth edges, whereas cobbles from other beaches are round and seem to have been rarely used (Tuck, personal communication, 1997). Each cobblestone was laid upright, with the flat (or smooth) end facing up and the remaining part pushed into the sand bedding (Plate 29). This ensured that most of the cobblestone was buried into the sand, thus preventing it from

being dislodged and weakening the surrounding cobbles. Similar styles of cobbling were found while uncovering the remains of an early road in Areas B and F.

The cowhouse floor was constructed so that it sloped downward from both ends to form a channelled depression at the lowest point. This channel runs west until ending in a square box feature at the edge of wall four (Plate 28). The box (37.5 by 37.5 centimetres) consists of 3 thin slates set on edge with 3 bricks (10 by 22.5 centimetres each) placed inside and angled down toward the cobble floor. Animal waste would have collected in the box and eventually continued through a squared opening in wall four and dropped down into a covered drain on the storage shed floor. Without the presence of this peculiar box feature, the flow of waste into the drainage system would have been unhindered. Therefore, its purpose was not to help in the drainage, but to impede the flow and collect some valuable solid waste for fertilizer. If this "collecting" box had not been constructed, then both daily use and periodic flushing and cleaning of the cobble floor would have resulted in the accumulation of waste and the clogging of the adjacent covered drain. It appears that the builders of this cowhouse had anticipated, and were familiar with such problems prior to the actual construction.

7.4 Covered Drain

Located on the opposite side of the cowhouse partition wall and directly in line with its cobblestone drain, is the beginning of a covered drainage channel constructed entirely of slate (Plate 31). This feature averages between 20 and 25 centimetres wide and 12.5 centimetres deep, and is lined with long thin slates for the flooring and thicker, flat-sided slate-stone for the sides. Capped with large slate coverstones along its entire length, the drain continues on a gradual downward slope for more than nine metres, passing through the storage shed's west wall and into the dung pit (old privy feature).

7.5 Seawall

The first stone feature constructed at Area C was the seawall. Its construction coincided with a major land reclamation project along the south shore of The Pool. The seawall was designed specifically to retain this massive concentration of fill and therefore had to be of sound construction. Work began with the placement of a single row of huge rounded boulders along the length of the Pool margin. These boulders served as the foundation for the seawall. Directly south of this foundation, a concentrated pile of stone and earth was added so that it would provide stability to the wall. As successive courses of slate-stone seawall facing were laid, more fill was placed against it. The task was

completed when the seawall achieved a height of roughly 1.2 metres and enough fill was added behind it so that the area could be levelled for building.

Continued excavations in 1996 revealed the easternmost extent of the seawall and several more intact sections of the same wall further west of Area C. At the eastern end of the seawall, a second stone retaining wall continues north until disappearing under a massive deposit of sand fill over 2 metres deep (Plate 41). If excavations were ever expanded to uncover more of this new feature, it should help to delineate more of the seventeenth-century Pool margin modified by Wynne and his colonists in the 1620s.

7.6 Privy

Built alongside the west wall of the storehouse is a large rectangular pit measuring roughly 1.2 metres wide, 2.7 metres long and 1.2 metres deep (Plate 22). This feature served as a privy from the 1620s up until the Dutch raid in 1673. During the second construction phase at Area C, the privy was modified and then re-used as a dung pit for the cowhouse. Both phases involved construction using slate-stone and clay mortar, though with different results.

The original privy walls were carefully constructed, especially at the lower courses, so that they provided a watertight environment. Light blue flagstones

were laid as flooring and the gaps between them filled with upright slate fragments (Plate 23). At floor level in its north end are two square openings (Plate 24) that allowed waste to flow through the seawall and out into the harbour (Plate 25). This was aided by the movement of the tides, which periodically flushed out the privy feature. For all intents and purposes, this privy was the first flush toilet in the New World (Tuck, personal communication:1994). On top of this entire unit, some sort of stone or wood structure must have been constructed to allow colonists a measure of privacy.

The second phase of use for the privy feature involved a similar, yet, different function. No longer was it needed to expel human waste, but instead to contain animal manure. The upper section of the privy's south wall was dismantled and rebuilt so that the covered drain from the cowhouse flowed into it. Smaller slate-stones and poorer bonding between the joints distinguish this second construction from the first. This poor-quality bonding technique is known as a stack bond (Tuck, personal communication:1994).

7.7 Technology & Tools

The technology required to construct the buildings at Area C was not complex even by seventeenth-century standards. Everything from infilling the site and stone quarrying, to wall construction and slating the roof, could all be completed using a relatively small variety of tools and implements.

Starting with the addition of fill to the original beachfront, basic tools such as picks, mattocks, shovels, wheelbarrows and carts would have enabled colonists to obtain earth from the nearby hillside and transport it back to the site. Both picks and shovels are in Area C's iron tool collection (Plate 42). In addition, the preserved remains of a wheelbarrow were found in the lower levels of the privy. Tools and implements such as these were used during the first years of the colony, for in 1622 Captain Wynne's letters mention breaking ground, winning void or waste ground and even constructing earthworks.

When collecting slate from the nearby quarries, an assortment of picks, bars, wedges, hammers and chisels was necessary. After obtaining the raw material and transporting it to the work site, the most important tools were the hammer and chisel. The hammer or mallet, of which the mason(s) may have had several types, was used separately or with a chisel to trim and shape irregular slate into a suitable wall rock (Plate 43). Specialized measuring tools such as

triangles, lines and plummets were also necessary to give "instructions to the Work-man, whether his work be true, either on the flat, or in the upright" (Holme 1688, Book III:394). After each wall course had been laid, a thin layer of clay/mud was applied with a trowel or similar tool. A great variety of other mason's tools and devices have been described in works by McKee (1973) and Cramb (1992), but are irrelevant to this discussion because of the specific construction techniques used at Area C.

Several chisels have been recovered from excavations at Area C. However, one cannot assume that any were directly associated with construction or masonry work. Unless the craftsmen requested by Wynne were to be permanent colonists, any masons sent over to Ferryland would return to England with their tool kits. Although there would have been steady work for a year or more, the professional mason was not as essential or sought after as other craftsmen like blacksmiths or coopers. Therefore, any items at Area C that can be indirectly associated with a mason's tool kit, probably belonged to other more common colonial craftsmen.

The final and most well-documented aspect of tool use at Area C is in the construction of the storehouse's slate roof. As discussed in the next chapter, this roof was constructed by a professional slater(s), presumably the ones requested by Wynne in 1622. A complete description of seventeenth-century slater's tools can

be found in Holme's *Academy of Armory*, dated 1688. Though he describes them in two separate instances (Book III:265 and 394-5), the basic tools remain the same:

A Slaters Hatchet

A Hewing Knife to cut the slates even and square.

A Pick to make a hole in the Slate.

A Pinning Iron to widen the hole in the Slate to put the Pin in.

A Hewing Block, any square piece of Wood or Stone to cut the slates upon.

A Lathing or Stone measure.

Pins, Stone Nails, or Lath Nails, and Laths or Latts.

The function of each item is described above except for the slater's hatchet and the lathing or stone measure. The slater's hatchet has both a hammer head to strike nails and a hatchet edge for trimming the ends off laths. A lathing or stone measure was used to measure the desired slate size to be cut and shaped, so they could then be separated into groups according to their placement on the roof. All five tools, including the hewing knife, pinning iron and pick, are illustrated in Figure 9.

No slater's tools have been found during excavations, yet by examining the roof slate fragments it can be established that most of the tools described by Holme were used at Ferryland. Straight cut edges on the slates indicate the use of a hewing knife or similar cutting tool, which had to be worked on a hewing block to provide an even surface. The presence of set slate groupings among the

roof slate collections (see Chapter 8) verify the use of a stone measure or similar slate measuring device. Evidence for the use of a pick and pinning iron can be seen in several slate fragments exhibiting two punched holes. The smallest holes, which represent imprecise strikes or undesirable hole placements, were unused and a second hole punched in another area on the slate. These small holes are of a triangular form, caused by the impression of the pointed end of a pick, as compared to the larger holes which are rounded in appearance and shaped out by a pinning iron (Plate 44).

Oddly, Holme does not mention the tools necessary for the first step of splitting the slate blocks into thin slabs for shaping and trimming. Though it only required the use of a broad-bladed chisel and mallet, this task may have been separate from the traditional duties of a slater and thus overlooked. Nevertheless, both splitting and trimming were usually conducted in a single work area. This resulted in a great deal of wastage and therefore, even if most of the slate debris was re-used, this site would be easily recognised if future excavations were ever to uncover it.

Little has changed in the technology of roof slate production up to the twentieth century. The basic tool kit described by Holme 300 years ago is still in use by craftsmen, such as those at the Welsh Slate Centre in Llanberis, Wales.

Now a working museum, this centre stopped large-scale commercial production in 1969, but continues to exhibit the techniques of splitting and dressing slate. The thick slate blocks are first split into the desired thickness with mallet and chisel (Plate 45). They are then passed along to the trimmer, who determines the shape of a slate with a device similar to the stone measure described above (Plate 46). The final task is to cut out the shape of the slate on a hewing block using a large knife to produce a straight edge. This display is an almost exact duplicate of the slater depicted by Holme in 1688 (Plate 47). The only difference in twentieth-century slating practice is the use of a boring machine to drill the nail holes, rather than the pick and pinning iron of the seventeenth century.

Chapter 8

Roof Slate Analysis

8.1 Introduction

To begin analysis of Area C's roof slate, it was first necessary to examine the complete inventory of Ferryland's roof slate. From these collections, a grand total of 3,697 pieces (both whole and fragmentary) were found at Area C. Roof slate distributions were plotted according to square metre and the resulting pattern showed a clear concentration in and around the storehouse. The following topics are discussed in this chapter: slate roofing in Britain/colonial North America, slate roofing at Ferryland/slate-roofed storehouse, variations in slate sizes and shapes, slate groupings and techniques for roofing.

8.2 Slate Roofing in Britain/Colonial North America

The use of slate for roofing material can be traced back to Roman times and is often mentioned in documents pertaining to medieval construction (Innocent 1971:173-4). In England and Wales, prior to the introduction of transport by canals in the nineteenth century, slate roofing and walling was largely restricted to those areas in which slate occurred naturally (Innocent 1971:175). Thus, geologic differences and local building styles resulted in regional variations of roof slate production and construction techniques. Depending on the migration

patterns to England's overseas colonies, some of these roof slate production/construction techniques may have exhibited themselves in the architecture at Ferryland.

Colonial North America provides several comparative examples of slate roofing in the seventeenth century. The earliest archaeological evidence for the use of roof slate in the United States comes from Jamestown, Virginia. Excavations at this site have uncovered roof slate in strata dated 1620-50 and 1640-1670. These slates presumably were brought over from Britain (McKee 1970:77). The fact that the slates were found in association with pantiles and flat tiles suggest that the roof was not constructed entirely of slate, but a combination of all three materials (Cotter as stated in McKee 1970:77). In the town of Boston, evidence for slate roofing and local quarrying can be cited back to 1654 (Waite 1976:138). Canada's first example of slate roofing was in New France, with the construction of a slate-roofed parish church at Quebec in 1664 (Cullen 1990:10). As shown from these examples, the Ferryland roof slate collection is important in both a temporal and architectural context. The archaeological evidence shows that Ferryland was the location of the earliest known slate-roofed building(s) in North America and that quarrying was also practised at this time.

8.3 Slate Roofing at Ferryland/Slate-Roofed Storehouse

Archaeological and historical evidence places the construction of the slate-roofed storehouse between 1623 and 1629. Within this limited time, George Calvert sent over the masons, slaters, quarrymen and carpenters that Governor Wynne requested and construction began on a whole series of waterfront structures. Beside the waterfront storehouse, many other buildings were also roofed in slate. The remains of one such structure were uncovered west of Area C during the last week of excavations in 1996. Early pipe bowls and "case" bottle glass were found directly under the collapsed roofing remains, suggesting a construction and occupation similar to that of Area C's first stone structures.

The blacksmith shop at Area B was also roofed in slate. Carter (personal communication:1996) has found several slates in the early seventeenth-century occupation/abandonment layers at Area B (ca.1620s-50s) that correspond with the slate sizes from Area C. This leads him to believe that Ferryland's early blacksmith shop had a slate roof. The presence of roof slate fragments in most of the other excavated areas (Sites F and G) likewise indicate a general trend toward the use of slate for roofing both new and previously built structures at Ferryland.

Figure 10 shows that the overwhelming majority of roof slate fragments from Area C was discovered in and around the immediate periphery of the storehouse. The reason for this distribution is the destruction and collapse of this structure in the third quarter of the seventeenth century. Quite a substantial number of roof slates would have been needed for complete coverage of the storehouse. For comparative purposes, one seventeenth-century barn measuring 24 ½ by 74 ½ feet required approximately 4,500 to 6,500 roof slates (Tyson 1981:222). Area C's storehouse measures 4.8 by 16.8 metres (16 x 56 feet) and thus would have used less roof slate than the above example. It must also be emphasized that even under ideal burial conditions, many roof slates have crumbled, others were obliterated by the Dutch raid and a few were even re-used. Allowing for these factors, a total of 3,697 roof slate fragments from Area C fits well into the required bracket.

8.4 Roof Slate Terminology, Sizes and Shapes

In slating practice, certain terminology applies to the various parts of a roof slate. The **bed** is the underside of the slate, placed against the roof; the **back** is the upper exposed face; **head** is the upper and **tail** the lower edge of a slate as laid on the roof (Newbold 1924:24). When the slater was punching a hole in the slate, it was done from the smooth or bed side. The breakage on the rough or back side of the slate resulted in a countersunk hole. The holes punched in the

storehouse roof slates were placed one inch from the head of the slate and of roughly equal distance from the sides. This method is often referred to as **head nailing** (McCawley 1938:119).

Area C's roof slate collection exhibits a diversity of shapes and sizes. The basic roof slate shape is rectangular with a rounded or tapered head, but sizes range from 3 ¼ to 14 ½ inches wide and 6 to 10 inches long. Slate thickness averages around ¼ inch with some variations exhibiting more (⅜) or less (⅙). Several roof slate anomalies include examples with two nail holes, slates with iron nails still embedded into the holes and triangular slates.

8.4.1 Slate with two nail holes

Ten roof slates from the collection have two nail holes instead of one, suggesting that the slater(s) reworked some roof slate and/or the storehouse roof had undergone some repairs (Plate 48). When head nailing a roof slate, any imprecise strike, undesirable hole placement or breakage around the hole would require the placement of a second hole. Likewise, if the storehouse roof was damaged and some slates had broken off at the nail hole, they could easily be re-used for repairs.

8.4.2 Iron nails for roofing

C.F. Innocent cites many sources on slate roofing in Britain to argue that iron was impractical for nailing roof slate because of its corrosive nature and high cost; instead, they were nailed onto laths by oak pegs, small bones/antler or some sort of wood lath nail (Innocent 1971:177-180). Although the use of iron was an uncommon practice in England, the builders at Ferryland relied upon iron nails to attach at least some roof slate. Plate 49 displays several slates with the iron nails still corroded in place. The nails used for slating a roof were different from ordinary wrought iron construction nails (Plate 50). Slate nails have a large thin head designed to fit within the nail hole so that they lie flush with the slate (McCawley 1938:119). Use of any other nail not suited for this purpose can often result in the slate riding over the smaller head and sliding off the roof (McCawley 1938:119). The use of iron nails for roofing the storehouse was probably due to the early establishment of the colony's blacksmith shop. In addition, the enormous quantity of iron artifacts excavated at Area C attests to the abundance of iron in the colony throughout the seventeenth century.

8.4.3 Triangular slates

The presence of 11 triangular slates in the Area C collection enhances our understanding of Ferryland's early roofing styles, while complicating the identification of the storehouse roof construction. Originally it was believed that

the storehouse roof was constructed in a gable style. This technique was best suited for a slate roof, especially in the absence of mortar, lead lining or shaped tiles to cover any hips or valleys (Brunskill 1987:86). However, references illustrating the use of triangular slates (Beacham 1990:25; Brunskill 1987:87) place them specifically on a hipped roof.

To figure out the exact purpose of the triangular slates, it was necessary to assess their distribution throughout Area C. The results showed that 10 of the 11 triangular slates were found between the western storehouse wall and the privy feature. If the storehouse was constructed with a hipped roof, then there would have been a concentration of triangular slates on each side of the building collapse. The lack of evidence for such a concentration, implies that these slates instead served a particular function in relation to their distinct concentration. As discussed in Chapter 7, the privy had a framed structure constructed around it for privacy. Maybe this small structural addition built alongside the western storehouse wall had a hipped roof. A comparison of two complete triangular slates shows that both were cut at an angle of between 45 and 50 degrees (Plate 51). This provides a good indicator of roof slope for the overlying privy structure and that of the adjacent storehouse.

8.5 Slate Groupings

To determine the existence of specific slate groupings, all the complete slates from Area C (totalling 207) were sorted according to length and width. Length was measured from the nail hole to tail and width was taken from across the tail. Four separate length groupings emerged from the findings (Plate 52), with each group having a variety of different widths. These four length groupings include a 6, 7, 8 and 10 inch range (for examples, refer to Appendix C).

Randle Holme's *Academy of Armory*, published in 1688, provides a list of names for slates according to length:

Short Haghattee
 Long Haghattee
 Fatwells
 Chitts
 Warnetts
 Shorts
 Shorts save one, or short so won
 Short Backs
 Long Backs
 Batchlers
 Wivetts
 Short Twelves
 Long Twelves
 Jenny why Gettest thou
 Rogue why Winkest thou

Holme states that the shortest of these slates is about 4 inches, "all the rest exceed an Inch, one in length from the other; sometimes less or more, according

as the Workman pleaseth" (1688, Book III:265). This account is very useful, but contradicts the Ferryland results. In total, Holme states 15 different names according to slate size, an estimate that far outranges the Ferryland slate sizes. According to Holme's groupings, the slate lengths would starting at 4 inches and end at 18. Though the Ferryland roof slate collection is incomplete, it should represent a sound sample of the various roof slates utilized.

The discrepancy between Holme's slate sizes and the Ferryland roof slate collection must be an example of regional variation. As Holme himself said when describing differences in the size of roof slate, "according as the Workman pleaseth" (1688, Book III:265). Regional variation in roof slate production is also apparent in North Wales. Hughs and North explain that prior to the nineteenth century, roof slates were "generally not larger than 5 by 10 inches to 7 by 12 inches" (1908:47). The similarity with the Ferryland slate is encouraging, but it does not necessarily prove that Welsh craftsmen constructed the roof at Area C. First-hand examination of both Welsh and Devon roof slate revealed that slate sizes and techniques of roofing construction were almost identical. To suggest an origin for the construction of the storehouse roof to either of these regions would only be mere conjecture.

8.6 Techniques for Constructing a Slate Roof

This section addresses the techniques that were applied in the construction of the storehouse roof. To understand how the slater(s) constructed this roof, three basic principles must be remembered. First, roof slates were laid in diminishing courses, with the largest slates placed at the eaves and progressively smaller ones up to the ridge (Muir 1986:189). Second, each successive layer overlapped the previous layer to a certain degree. Finally, to ensure protection from the elements, slate roofs were pitched at an angle between 30 and 50 degrees. By combining these three rules with the roofing remains from Area C, a basic working model of roof construction can be developed.

8.6.1 Diminishing courses

The first task of the slater was to grade slates according to size by stacking them into separate length groupings. Each group consisted of only one slate length, but the widths varied (Hughes and North 1908:46-8). A wood lath was then nailed across the bottom of the roof frame and spaced according to the largest slate length grouping. This largest grouping was nailed in a single course across the lath. When all the courses for this slate size were laid, it was followed by progressively closer spaced laths and their appropriate slate sizes. Each course would incorporate the different slate widths to ensure that every slate covered the junction of the two slates below it.

The technique of diminishing coursework was a widespread practice in Britain and is documented in many sources dealing with slate roofing (Brunskill 1982; Cox and Thorp 1991). It was commonly used because it provided greater protection against the spread of water under the lower courses due to the increase both in width and length of the slates toward the eaves (Bennett and Pinion 1935, as cited in Cox and Thorp 1991). Another common characteristic in both British and Area C roof slate is that most exhibit a rounded or tapered head. Rounding the heads was a useful practice because squared tops had no weathering value, could be a source of unevenness and may have disrupted the course above it (Cox and Thorp 1991:9).

Area C's roof slate sizes reveal a clear pattern of roof placement according to length (Appendix C). Forty-seven percent of all complete slates place within the 7 inch slate range, whereas, the sizes above it (6 inch) and below it (8 inch) account for 20 percent and 29 percent respectively. The largest slate size (10 inch) accounts for only 4 percent. Therefore, the ten inch slates covered the initial courses of the storehouse roof, followed by several courses of eight inch slates. The entire middle section of the roof consisted of seven inch slates and six inch slates completed the uppermost levels.

8.6.2 Overlapping courses

The second basic rule in slate roofing is that each successive layer overlaps the previous one to a certain degree. The only exception to this rule is in the first and last slate courses. Starting at the eaves, a double layer of roof slates was laid. "In early British practice this was done by nailing a course of larger slates then pushing smaller pieces under the breaking joints" (Nicholson as stated in Cullen 1990:51-2). From the first course onward and continuing up to the ridge, successive layers overlapped the two slate courses below (Plate 53). The part of the slate that was covered by two other slates [3 slates thick] is called the **lap** (Cox and Thorp 1991:5). When roofing with a diminished coursework technique, a basic lap would be one-third (Cox and Thorp 1991:12). Overlapping improved weatherproofing by preventing water leakage through the joins between slates.

When the last slate course was completed, a protective covering was placed along the entire ridge. Many techniques and materials could have been used for this ridge covering. Everything from shaped-stone ridges and interlocking slates to specific techniques such as saddle ridges were all utilized depending upon the area, builders and individual structure. Lack of archaeological evidence for shaped ridges or interlocking slates suggests that a specialized technique, such as the **saddle ridge**, was employed to finish the storehouse roof. According to Cullen, "Comb and saddle ridges . . . were traditional old country methods of

providing slate apexes for the slate roof* (1990:53). In fact, several long thin slates from the Area C collection -which do not fit into any previous length groupings- were the type used to construct a saddle ridge (Plate 54).

To lay a saddle ridge, the last regular slate course on both sides of the roof was applied to butt against each other at the head of the slate (McCawley 1938:130-1). This was covered over by combing slates, which were nailed to the laths through small gaps left by the rounded tops of the last slate course. The combing slates from each side were laid horizontally and carefully fitted to butt against one another at the ridge (Figure 11). To complete the task, a mixture of lime, mud, cow dung and cow hair was applied to the underside of the combing slates for stability and weatherproofing.

8.6.3 Angle of the roof

The final principle of roof slate construction is that the roof had to be pitched at an angle between 30 and 50 degrees. As a rule, the smaller the unit of roofing material, the steeper the pitch (Brunskill 1987:93). The reason being that water would quickly flow off a steep roof, thus preventing it from seeping in through the roofing material. It is because of this that the pitch of a slate roof must be within set parameters. The only indication for the pitch of the

storehouse roof was from the triangular slates mentioned previously. These slates were laid at an angle of 45 to 50 degrees.

Upon the completion of a slate roof, a common practice in Britain was to acquire the services of a moss man. His job was to provide added protection from the elements by poking hay, straw and moss under the slates with a trowel-like tool known as a mossing iron (Innocent 1971:181). Some type of adhesive compound, whether it was lime, clay or cow dung, was also frequently used for the same purpose. The telltale markings of lime mortar were not found on any of the slates from Area C. Unfortunately, the deteriorating nature of the other materials mentioned above also prevents a determination of their use on the storehouse roof.

Chapter 9

Connections, Construction Styles and Colonial Links

9.1 Introduction

England and Wales have a variety of local stone available to builders including limestone, sandstone, granite, slate and flint. This diverse assemblage of stone resources encouraged the development of local construction styles and building adaptations that differed from one region to another. As demonstrated from the stone remains at Area C, the craftsmen employed at Ferryland were both skilled and knowledgeable in slate construction techniques. These craftsmen, along with Ferryland's other settlers, originated from specific regions of Britain. A direct correlation between the slate construction styles in any one of these regions and that from Area C would provide solid evidence for British vernacular architecture transplanted to Newfoundland in the early seventeenth century. This could open a wide range of possibilities for future study, especially since information concerning the colonists and structures at Ferryland becomes scanty after 1622.

9.2 British Slate Construction Regions

Since the main construction material used at Area C was slate, only those areas in Britain that are rich in slate resources were examined for similar building

techniques. Britain's four major slate construction regions are Wales, Cornwall, Devon and the Lake District (Clifton-Taylor and Ireson 1983:43). Of these four, both Wales and Devon have strong connections to Ferryland, whereas there is no historical or archaeological evidence linking Cornwall or the Lake District to this seventeenth-century colony.

The first twelve settlers at Ferryland, including the governor Captain Edward Wynne, are reported to have been Welsh (Prowse 1895:132; Cell 1969:92). These men constructed the first series of buildings, set up a slate quarry and reclaimed land in anticipation of expanding the colony. No mention is made of these Welsh colonists beyond the first few years of settlement. Consequently, any influence the Welsh had in constructing Ferryland's buildings occurred within the years of the Calvert proprietorship.

Devon's connection with Ferryland is based on the pattern of England's migratory fishery. Men from South Devon fished the northern part of the Avalon Peninsula from Old Perlican to Cape Broyle, while those from the North Devon ports of Bideford and Barnstaple concentrated around the Southern Shore from Cape Broyle to Trepassey (Matthews 1973:231). Hence, documents pertaining to seventeenth-century Ferryland are filled with references of Devon ships trading and fishing in the area. The high percentage of North Devon ceramics unearthed

during excavations also attests to the contact and interaction this colony had with the West Country of England.

9.3 Welsh and Devon Connections

To prove that Area C's construction styles originated from either Wales or Devon, it was necessary to delve further into Ferryland's seventeenth-century occupation and to the historic documents that enrich our understanding of this period.

9.3.1 Wales

Most of the Welsh affiliation with Ferryland can be directed toward the first few years of colonization and especially to the governor, Captain Edward Wynne. The Wynnes were a well-known and prominent family who had close ties to North Wales throughout the sixteenth and seventeenth centuries (Calendar of Wynne Papers 1515-1690; Thomas 1988:197). George Calvert, himself a prestigious nobleman and Secretary of State to James I, could have easily come into contact with the Wynne family through Parliament, court politics or colonial investment schemes. Calvert's relationship with the Wynnes, especially Edward Wynne, is unknown. Nevertheless, there had to have been an understanding and trust between the two in order for Edward to be placed in charge of establishing Calvert's Newfoundland colony. With the governorship under his belt and full

authority over the development and construction of Ferryland, Edward Wynne chose his Welsh countrymen as the first group of settlers.

As in most British counties prior to 1750, the traditional Welsh construction materials depended largely upon what was locally available (Lindsay 1974:19). The North Wales counties are particularly abundant in slate resources and therefore, many buildings in this region were built exclusively of slate (Lindsay 1974:19). North Wales was also very maritime-oriented (Dodd 1957:7), although many sailors and seamen of the seventeenth century started their working lives on farms or estates as labourers, before joining into service on a ship (Nash, personal communication:1995). Thus, they would have been familiar with basic building methods and involved in erecting various structures. These skills would have proven useful when settlements such as that at Ferryland were established (Nash, personal communication:1995).

It is evident that Ferryland's first Welsh colonists were skilled in building methods and techniques, for Governor Wynne and his men constructed a series of structures including a mansion house, tenement, forge, hen house, stone well and wharf. Early reports of extensive progress at Ferryland pleased Calvert so much that when the letter stating Wynne's request for masons, quarrymen and slaters arrived, it was promptly answered. Trusting in Wynne's earlier choice of

colonists, George Calvert, or one of his advisors, could have easily obtained the craftsmen from the vast slate areas of North Wales, presumably with the assistance of the influential Wynne family.

9.3.2 Devon

The Welsh connection with Ferryland is confined to the 1620s, although, Devon's influence spans the seventeenth century. This is largely because of Devon's links to the migratory fishery. A Welsh presence in Ferryland during the early years of the colony does not dictate that Welsh craftsmen constructed the first structural features at Area C. Thick slate-stone walls, flagstone floors and slate roofs are also common architectural features in buildings from Devon. A piece of documentary evidence from Wynne's letter to Calvert dated August 17, 1622 suggests that Devon craftsmen constructed the waterfront premises. In the letter, Captain Wynne stated a need for craftsmen (masons, quarrymen, slaters) and a "convenient number of west-country labourers to fit the ground for the plough" (8/17/1622). The specific request for West Country labourers indicates that both colonists and craftsmen were chosen from the same general area. It would make little sense to procure craftsmen from one part of Britain and simple colonists and fisherfolk from another, when both groups could be found in Devon.

The first two shiploads of settlers to Ferryland also departed from the Devon port of Plymouth. Prior to their departure, valuable connections were made with the local merchants and craftsmen while obtaining the necessary provisions for the colony. Furthermore, it is possible that some of Plymouth's craftsmen were later sent over to help in constructing the waterfront premises. Recall from Chapter 6 that a series of stone waterside features, quite similar in function to those at Area C, have been uncovered in this Devon port.

9.4 Comparisons with the Ferryland Remains

The examination of Welsh slate construction techniques points to a marked similarity with the structural remains at Area C. This can be demonstrated in the wall construction, flagstone flooring and roof slate remains from the waterfront premises. As for Devon slate construction, it is so similar to the Welsh techniques that distinguishing between the two is impossible. Slate-stone walls from each region display the exact properties and methods used at Ferryland. For example, both apply techniques using quarry-pitched stones, placement of waste rock to fill the interstices, jumper work and clay infill for mortar. In addition, roof slate remains from both regions exhibit the same tapered head, a single nail hole in the top centre, graded sizes and techniques for laying a roof. Even the use of slate as a flooring material is universal in the slate-producing areas of England and Wales and thus cannot be attributed to one region. Therefore, the challenge of placing

a regional origin to the waterfront premises is not meaningfully answerable as both Wales and Devon have equally valid historical connections and construction similarities with Ferryland.

The likelihood of a Welsh influence on other structural remains at Ferryland diminishes as the colony progressed into the latter parts of the seventeenth century. It was within this period that a second structural addition was completed at Area C. This two-bayed outbuilding has particular architectural features that distinguish it from the earlier storehouse construction. Both its cobblestone floor and possible thatched roof are similar to examples in Devon. As discussed in Chapter 6, the cowhouse's cobble floor, drainage system and dung pit is comparable with Devon-style livestock shelters.

This outbuilding was not roofed in slate and therefore some form of organic alternative was utilized. Excavation of the cobblestone floor in 1993 uncovered patches of straw/reeds and the decayed impressions of long thin poles at the top of the cowhouse destruction layer, which were preserved when the roof collapsed in 1696. These clumps of straw and reed are the primary evidence to suggest thatching.

9.5 Colonial links

As for comparing the slate construction at Area C with other British North American colonial settlements, Ferryland stands alone. Only the French fort at Pentagoet, Maine (ca.1635-74) has substantial stone walls akin to those at the Colony of Avalon. The construction at Pentagoet also used local slate-stone and the walls were built of coursed stonework, expertly laid in a mortar of sandy clay loam (Faulkner 1987:60). Roofing was primarily of shingles and thatch, with no evidence for roofing slate. Faulkner (personal communication:1995) was surprised by the similarities between the Ferryland construction and that of Pentagoet, for he had always attributed this kind of well-laid masonry to the French colonial occupation in North America.

The lack of North American evidence to compare with Area C's remains does not signify that other seventeenth-century colonial sites were not constructed with slate-stone or roofed in slate. The previous chapter mentions slate roofs in New France by 1664, both slate roofing and quarrying at Boston in 1654 and the use of roof slate in Virginia during the first half of the seventeenth century. In any colonial setting, several factors help facilitate the use of local slate resources for construction purposes. These include the proximity and size of the slate quarry, skill in its extraction, preparation and use, and the desire to construct a

solid and permanent structure. Wherever some or all these factors occur, one should find either documentary and/or physical evidence for such buildings.

The possibility of finding other early seventeenth-century slate structures in Newfoundland is limited to those settlements along the English shore between Old Perlican and Trepassey. This is because the basic geology of the Avalon Peninsula shows a concentration of slate and shale along the coastlines of Conception Bay and the Southern Shore (Map 4). The largest pockets of slate (and slate-like stone) are between Carbonear and Harbour Grace in Conception Bay, and from Cape Broyle to Cappahayden on the Southern Shore. Excluding Ferryland, Newfoundland's early colonization period involved the settlement of two colonies along both the Southern Shore and Conception Bay.

William Vaughan's Southern Shore colony (ca.1617) was poorly organized, mismanaged and short-lived. As a result, no substantial structures were ever constructed. Henry Cary's (Lord Falkland) colony at Renews (ca.1623) was also dissolved after only a few years. However, Whitbourne's written preparations for the colony (1622) made note of wanting to send masons and other professional craftsmen, signifying a desire to construct permanent structures and thus avoiding the same problems that occurred to Vaughan (Cell 1969:89).

Cupids (Cupers Cove) and Harbour Grace (Bristol's Hope) were both sites of seventeenth-century colonization in Conception Bay. Documentary and archaeological evidence shows that masons were working in Conception Bay at the time of these early settlements. Preliminary excavation at Cupids in 1995 has revealed a fireplace feature constructed with stones squared by a mason, in association with numerous seventeenth-century artifacts (Gilbert 1996:91). Early records also state that two different masons were working during separate occasions at Cupids between the years 1610-20 (Gilbert 1996:91).

The colony of Bristol's Hope (ca.1618) was not as large or well-documented as those in Cupids or Ferryland, but was in an area surrounded by many outcrops of slate and shale. Therefore, any structural feature that required stone for construction (for example, fireplaces, foundations and wells) would have been built with raw material from a nearby outcrop. A brief survey of Bristol's Hope in 1986 identified a stone wall surface feature and nearby test pits contained a rich find of seventeenth-century artifacts (Pope 1986:274). Considering that this colony was successfully planted and continually occupied throughout the seventeenth century, future excavation could demonstrate a reliance upon the local slate resources.

The presence of masons working in Conception Bay during the first quarter of the seventeenth century was also mentioned by Captain Wynne in 1622. He stated that "I look for a mason, and one more out of the Bay of Conception" (8/17/1622). If he was seeking the assistance of a mason in Conception Bay, Wynne would have found this craftsman at either the colony of Cupids or Bristol's Hope. It would be interesting to discover if the unnamed mason employed at Cupids throughout the winter of 1619-20 was the same man Wynne was seeking in 1622, or if there were others working in the same area.

Chapter 10

Planners, Proprietors and Colonists

10.1 Introduction

The great archaeological challenge is to bridge the theoretical gap between a culture's material remains and questions about the lives of people whose debris has been uncovered (Pope 1986:31). The preservation and substantial construction of Area C's stone features provide a unique opportunity to derive information about early colonial life at Ferryland. They also illustrate the value of archaeology in understanding aspects of history not preserved in the documentary record (Tuck 1996:36).

This thesis has provided answers to the most commonly asked questions about the stone structures at Area C, such as the location of quarry sites, sequence of construction, functions of the buildings, construction techniques, use of slate for roofing and possible Welsh or Devon connections. Yet, other questions remain. Why were the waterfront premises constructed entirely of stone? What can the presence of such substantial waterfront buildings tell us about the economics and operations under the proprietorships of George Calvert or David Kirke? How do Area C's structures and their change over time relate to the colony as a cohesive unit?

10.2 Building with stone

Thick slate-stone walls, flagstone floors and a slate roof are the main structural features that characterized the first construction phase at Area C. The decision to use stone for the principal building material was based on the personal experience and planning of those who ordered and supervised the construction of the waterfront premises. To some extent, this style of construction may have been the express will of George Calvert. Yet, early documents direct us toward one man, Captain Edward Wynne.

Wynne was the governor of Ferryland until 1624 and during his time a great deal of progress was made in constructing buildings, establishing fortifications and expanding the physical parameters of the colony. Two years prior to his departure from Ferryland, Wynne wrote two letters to Calvert (refer to Appendix A) which among other things stated a need for masons, quarrymen and slaters, reported a roof slate quarry in fitting and the use of earth to reclaim land. As was explained previously, these three things that Wynne mentioned were all necessary components in the construction at Area C. Considering the zest with which Captain Wynne worked and his continuing ambition to further the colony's development, I believe that the waterfront premises were constructed under his personal direction.

Wynne's plan for the colony demanded that stone be used for the waterfront premises. His August 17, 1622 letter stated to Calvert that the colony's first group of structures was to be coupled with a second series of buildings erected on reclaimed land to the north. These newer buildings were close by the water and therefore had to be constructed with a durable material that provided protection from the elements. Nothing was better suited for this purpose than local slate-stone. In fact, constructing these buildings in stone was more economical and practical for several reasons. First, the colonists had easy access to slate outcrops nearby and once transported to the work site, stone required little alteration before it was ready to use. Second, except for the timber-frame roof and roof slates, no nails were needed for construction and clay infill was used instead of lime mortar. Finally, stone construction was permanent, rot-proof and essentially maintenance-free, something that was ideally suited to a busy colonial lifestyle.

Wynne's designs were also mingled with his knowledge of construction styles and town planning. The same can be said of those craftsmen and colonists sent over to assist in further developing and expanding the settlement. Ferryland's Welsh and Devon colonists were familiar with construction in both wood and stone. This enabled Wynne to develop a plan for the colony's layout, so that the construction material suited the function of each building. The series

of waterfront structures along the southern edge of The Pool were to serve a variety of storage, fishery and other task-related functions. Consequently, stone was used for its solidity and durability, with little consideration for its very poor insulation qualities (Wright 1985:10). The opposite plan was generated for the dwellings and tenements in which the colonists lived. For this construction, wood was the main constituent and stone served a secondary function in chimneys, foundations and for walling kitchen rooms.

10.3 Economics and Operations

Area C's massive stone structures, their location vis-a-vis the rest of the colony and the artifactual remains within these structures reveal a great deal about Ferryland's economics and operations during the early part of the seventeenth century.

The construction of the waterfront premises along the southern edge of the colony's inner harbour, shows that Ferryland owed its livelihood to a maritime-oriented economy. The cod fishery has always been the mainstay for the people of Ferryland, yet this waterfront area was not constructed for the simple purpose of fishing by a small group of planters. Instead, these massive stone structures were designed for the larger objectives of trade, interaction and profit.

There has been some discussion about whether or not this colony initially served as a commercial venture or personal family refuge for the Calverts (Cell 1969:92; Lahey 1977:492-3; Pope 1986:22-3). Beside the documented references that were the focal points of these discussions, archaeological evidence from Area C strengthens the argument that Ferryland was indeed an investment for the purpose of commercial gain. The lengthy seawall, waterside storehouse and other structures that lined the inner harbour were geared toward fishing, trading and interacting with other ships for provisions, providing services and goods to the migratory fishing fleet and storing the colony's own supplies. According to Milne, major harbour works such as these arguably reflect both the quantity and type of vessels it could accommodate, which in turn reflected the importance of trade to the town's development (1987:196).

A colonial settlement with a broad and varied economic base would have been better able to adapt and survive in the face of changing conditions. Artifactual remains from the storehouse and privy show how Ferryland's colonists tried to diversify their economic base. In the eastern end of the storehouse, several fragments of crucibles and cupels were found trampled into the earthen floor (Plate 55). These vessels are commonly associated with the analysis of ores by alchemists and metallurgists, and likely served to test the local mineral resources (Tuck 1996:34). There are no historical references to this activity ever

occurring at Ferryland, nor are there any precious metal deposits closer than several kilometres into the interior (King, personal communication:1997). Therefore, any attempts made to explore and exploit this possible resource were undoubtedly brief and unproductive. A solid cast-lead weight was also found on the storehouse's flagstone floor (Plate 56). Weights such as these were not reliable for exact measurements required for coins, but were used instead to determine bulk measurements of provisions or trade goods (Sullivan 1986:30). Numerous ceramic storage vessels in the storehouse and fragments of preserved barrel parts in the privy, also hint at a trade and exchange of goods between colonists and migratory ships. Most of the barrel fragments in the privy consisted of head pieces, cut staves, hoop fragments and shavings, all of which were common refuse associated with a cooperage that must have been in operation nearby (Tuck 1996:34). Three woodworking gimlets (Plate 57) were found in the west end of the storehouse, suggesting that this section may have served as the cooperage. Not one of these three activities can be placed specifically to one period in Ferryland's history and thus, transpired anytime between the construction of the storehouse and its destruction in the third quarter of the seventeenth century.

Brief test excavations west of Area C have revealed that the seawall and other associated stone structures continued westward along the inner harbour. As

stated previously, these structures may be the same ones that Wynne planned to construct when he wrote George Calvert in 1622. Future excavations could uncover an entire series of structures all related to task-specific work such as fish processing, shipbuilding and saltmaking, helping us to comprehend the full range of activities taking place at Ferryland during the seventeenth century.

10.4 Colony as a Cohesive Unit

The sharing, co-dependance and cooperation that occurred during the years of the Calverts and Kirkes had a major influence on the colonists' lives. Like most of the early colonial settlements in British North America, Ferryland was established to make a profit and its success or failure depended a great deal on the colonists themselves. This is why Ferryland was geared toward a communal system. If the colony profited and prospered, then so did its colonists. Most of the structures erected, and tasks performed, were done for the colony as a whole. For example, tenements were constructed to house the settlers, while blacksmiths and other craftsmen were employed to satisfy the settlement's requirements. Likewise, the storehouse secured and protected the colony's provisions and also served as a centre for trade and exchange.

Even the privy exacted a measure of control over an individual's private behaviour. The construction of a privy ensured communal disposal of most waste

and at the same time prevented it from being discarded over the entire settlement. This shows that order and organization into communal matters and control over private behaviour had begun to develop at an early stage in Ferryland.

By around the middle of the seventeenth century, differences in the physical appearance of the colony and the purpose of its structures begin to appear in the archaeological record. With the end of Ferryland's proprietor-based ownership, there began a gradual increase in the number of individual planter families and bye-boatmen (Pope 1986:34-5). Every resident planter and his family owned their own dwelling, storerooms, stages, train vats, boats, servants and livestock, as compared with the more communal ownership under Calvert or Kirke. This transformation in the lives of Ferryland's settlers afforded them some measure of control over their own destinies, but also weakened the settlement as a cohesive unit.

The second phase of construction at Area C is an example of the change from communal to private ownership. This two-bayed outbuilding served partially as a cowhouse during the fourth quarter of the seventeenth century. The surface area of the cowhouse floor was sufficient to house many cattle, but not near enough to accommodate the large herd present at Ferryland during this time. For

example, between the years 1675 and 1677 there were anywhere from 27 to 32 cattle at Ferryland, at least ten of which belonged to various members of the Kirke family (Pope 1993:112-126). Considering that Sara Kirke and several of her sons ran a successful fishing establishment throughout the seventeenth century and were in possession of lands around The Pool, it can be speculated that this structure served as winter housing for the Kirke's herd of cattle. Whether or not this can be proven, the substantial size and careful construction of the cowhouse suggest that it belonged to one of Ferryland's more prominent families.

Chapter 11

Summary and Conclusions

11.1 Summary

This thesis has answered important questions pertaining to the stone structures at Area C. These questions include several key issues such as the location of quarry sites used by early colonists, sequence of construction for Area C's features, various functions of the buildings, construction techniques, use of slate for roofing, possible Welsh or Devon connections and aspects of colonial planning, economics and the lives of Ferryland's colonists. The following section is a brief summary from each of the last seven chapters.

11.1.1 Location of quarry sites (Chapter 4)

Starting with the investigation for quarry sites, five different locations were identified as possible slate procurement areas. Each of these sites has its own unique geologic and logistical attributes that helped to determine the feasibility of its use. Two sites have been designated as quarries used during the first phase of construction at Area C. The first (site two) quarry is situated northwest of The Pool along a stretch of beach parallel to the Southern Shore highway. A comparison of samples from this site with Area C's stone walls revealed matching micro-fossils and bedding planes that could not be attributed to any of the other

quarries. Likewise, the slate outcrops from a second quarry (site three) to the north, exhibit the same geologic properties as samples from Ferryland's roof slate collection. Both quarries were in production during Ferryland's early colonial occupation and therefore, they played an important part in supplying raw material for walling, flooring and roofing many early buildings.

11.1.2 Dating the sequence of construction (Chapter 5)

Chapter 5 focused on developing a dated stratigraphic sequence to explain the evolution of Area C from its initial occupation and intensive construction, to its destruction, re-occupation and destruction again in the latter part of the seventeenth century. The first evidence for occupation at Area C involved brief visitations by European fishermen in the sixteenth century, followed by seasonal West Country fishermen in the late sixteenth to early seventeenth centuries. Beginning in the early 1620s, these layers were covered by a thick deposit of fill used to level the land for construction. A seawall, storehouse and privy were then constructed on top of (and incorporated into) this fill layer. This ambitious land reclamation and construction project was completed in the 1620s and corresponds to the statement made by governor Edward Wynne in 1622 of using earth to win back "void or waste ground."

All three stone features were destroyed as a result of violent means.

Artifacts found in the thick destruction layers provide a termination date within the third quarter of the seventeenth century, coinciding to the documented raid on Ferryland by four Dutch ships in 1673. Re-occupation of Area C occurred during the fourth quarter of the seventeenth century and concentrated on the construction of a two-bayed outbuilding directly south of the storehouse. Occupation of this outbuilding was confined to a relatively short period, as shown by the tightly-dated artifacts found on its floor. This structure, like most of the others in Ferryland, was burnt to the ground in 1696 when a considerable French force swept across the Avalon Peninsula in an attempt to oust the English colonists.

11.1.3 Identification and function of Area C's structures (Chapter 6)

All of Area C's structures were built for a specific function(s). The first stone feature constructed at Area C was the seawall, which protected the newly-reclaimed land to the south and also served as a quayside to provide a deep-water berth. Directly south of the seawall was the privy and storehouse. Built alongside the storehouse's west wall, the privy pit functioned as a unit for the containment and expulsion of waste matter. The large stone storehouse itself served a variety of roles throughout the seventeenth century. Its location, size, lack of provision for heating and shortage of domestic artifacts all point to a storage function for

this building. Yet, other artifacts including a solid cast-lead weight, alchemist's crucibles and cooper's tools, hint at a multi-purpose facility or work station.

Area C's second construction phase consisted of a two-bayed cowhouse-storage shed whose most prominent feature was a cobblestoned floor in its eastern half. This floor was built to accommodate cattle and was thus equipped with a drainage channel, tethering posts, collecting box and covered drain that lead into the old privy feature. The privy was dismantled and rebuilt to accommodate this new drain, but now functioned as a dungpit to contain instead of expel waste.

11.1.4 Stone construction techniques (Chapter 7)

The craftsmen involved in the construction at Area C employed a variety of techniques and tools to ensure that these structures were solidly built. Local slate was the principal medium for this construction and was used in walling, flooring and roofing. The long time span between Area C's two construction phases confirms that each building phase was erected by different craftsmen. Yet, the similarity in wall construction styles suggest that both groups were skilled and knowledgeable in the use of slate-stone. All structural walls were built to a uniform thickness using coursed stonework mortared in clay.

Flagstone floors were laid in two different construction fashions. The earlier style of flooring was laid with thick, rough-edged, light blue slate and the spaces between them filled with cobbles and slate fragments. The later flooring was constructed using thinner, more friable, dark blue slate that was cut into squares and then closely fitted. Instead of using flagstones, the craftsmen that constructed the cowhouse relied upon cobblestones to serve as the main flooring. The cobblestones were laid upright, into a bedding of sand and clay, with successive stones placed tightly to one another.

The seawall, privy and covered drain are unique structural features that were each constructed according to its particular function. Likewise, the tools required to produce the landscaping and structural features at Area C depended upon the specific type of job. The labourious task of digging for fill and transporting it to the work site was completed with a variety of tools including picks, mattocks, shovels, wheelbarrows and carts. Picks, wedges, hammers and chisels cut slate from the quarry sites. The hammer, chisel, triangle, line and plummet were necessary to build a fair and straight wall.

The most well-documented aspect of tool use is in the construction of the slate roof. Many basic tools were identified through seventeenth-century

documentation, present-day slating practice and even from the roofing remains themselves.

11.1.5 Roof slate analysis (Chapter 8)

The analysis of Ferryland's roof slate collection revealed a total of 3,697 pieces (both whole and fragmentary) located at Area C. When plotted according to square metre, these slates showed a clear concentration in and around the storehouse. Chapter 5 dated the storehouse construction to the 1620s, placing Ferryland as the site of the earliest known slate-roofed building(s) in North America.

The roof slate from Area C's collection exhibited a diversity of shapes and sizes, ranging from 3 ¼ to 14 ½ inches wide and 6 to 10 inches long, with thicknesses averaging around ¼ inch. Some of these slates included fragments with two nail holes, some had iron nails still embedded into the holes and several were triangular in form. Examination of all 207 undamaged roof slates revealed four separate length groupings, with each group having a variety of different widths. The four length groupings included a 6, 7, 8 and 10 inch range.

These length groupings are important to remember when developing a basic model for how the storehouse roof was constructed. This is because slates

were laid in diminishing courses, with the largest slates at the eaves and progressively smaller ones up to the ridge. Each successive layer also overlapped the previous layer to a certain degree. Finally, to ensure protection from the elements, slate roofs were pitched at an angle between 30 and 50 degrees. Archaeological evidence could not be found to indicate the use of shaped-stone ridges or interlocking slates as a ridge covering. Therefore, a specialized technique, such as a saddle ridge, was applied by the slater(s) to finish the storehouse roof.

11.1.6 Connections, construction styles and colonial links (Chapter 9)

Both Wales and Devon have direct connections to seventeenth-century colonization at Ferryland. It was because of this connection that further research was initiated to identify Welsh and Devon stone construction techniques. The results demonstrated that each region constructed slate-stone walls, flagstone floors and slate roofs identical to those of the first construction phase at Area C. Historical documents provide an equally valid argument for the possibility of either a Welsh or Devon influence on this construction.

Further into the seventeenth century, the Welsh influence faded while Devon's association with Ferryland remained. The construction of the cowhouse-

storage shed in the fourth quarter of the seventeenth century has architectural attributes similar to examples in Devon.

Links between Ferryland's construction and that of other North American colonial sites are few. In fact, only the French fort at Pentagoet, Maine (ca. 1635-74) has substantial walls and features similar to those at Area C. The possibility of finding other comparable stone structures in seventeenth-century colonial settings would depend upon the proximity of stone outcrops, skill in its extraction, preparation and use, and the desire to construct solid and permanent buildings. Future work in Newfoundland may reveal such features in Renews, Cupids or Bristol's Hope.

11.1.7 Planners, proprietors and colonists (Chapter 10)

The preservation and substantial construction of Area C's stone features provide a unique opportunity to study early colonial life at Ferryland. These remains help us to understand decision making processes among those in charge of the colony's construction, aspects of colonial economics under proprietary leadership and facets of the colonists' lives that changed throughout the seventeenth century.

Governor Edward Wynne was a major influence in the construction of the waterfront premises. The use of stone for this construction was based on Wynne's plans for the colony and was more economical, durable and suited to the building's functions.

The construction of the massive waterfront premises shows that Ferryland's livelihood was based on a maritime-oriented economy and that these structures were an investment for the purpose of commercial gain. Several artifacts in the storehouse and privy hint at a diversified economy that included a brief stint testing and analysing mineral resources, trading between the colony and migratory ships and the presence of specialized craftsmen such as coopers.

When Ferryland was no longer run by proprietors or profit-hungry shareholders, the nature of settlement and its structures gradually changed to that of individual family ownership. Each planter family owned its own fishing rooms, wharfs, stages, storehouses and dwellings, as opposed to the more communally-based social structure in the past. A physical representation of these changes is exhibited in the two different construction phases at Area C.

11.2 Conclusions

This thesis presents an interpretation of seventeenth-century stone construction techniques at Area C. This can assist in identifying other structures and features constructed under similar circumstances at Ferryland or even in other sites throughout Newfoundland and North America. Area C's waterfront premises is only a section of the entire harbourside area that was in use throughout most of the seventeenth century. Previous excavations also suggest that the depth of overburden and lack of intrusive activities in many areas protected and preserved the integrity of the structures from the early colonial period and those throughout the seventeenth century. Based on this information, continued excavation should uncover an entire series of waterfront structures.

The study of stone construction at Area C is very important to our overall understanding of seventeenth-century life at Ferryland. On the most basic level, it establishes how the craftsmen and colonists constructed the stone structures, where the raw materials originated and what tools they used. To be able to date the sequence of construction and to interpret properly the site formation processes, enables archaeologists to correlate discrete building phases with known changes in occupation/settlement. In this way, we can pose questions as to the reasons for these new additions and enhance our awareness of Ferryland's development as a colony.

Identifying the overall purpose and function(s) of each structure helps determine its context in relation to other associated structures and the colony overall. Likewise, the stone construction techniques used at Area C can be compared with similar styles of stone construction in both Wales and Devon, two regions with close ties to seventeenth-century colonization at Ferryland. As the first step in such investigations, this research can be used as a benchmark from which future studies of archaeology and vernacular architecture would be compared.

The preservation and substantial construction of Area C's stone features provide a unique opportunity to derive information about early colonial life at Ferryland. These remains serve to answer why the waterfront premises were constructed entirely of stone, to what level Ferryland's colonists relied upon trade and economic diversification schemes and how Area C's two construction phases reflect the changing lives of Ferryland's colonists. Whereas most archaeological sites in North America uncover the remains of post holes and soil stains left by previous structures, the reliance upon stone at Ferryland preserved the structural integrity of Area C's features and thus ensured them a prominent place in the history of this colony.

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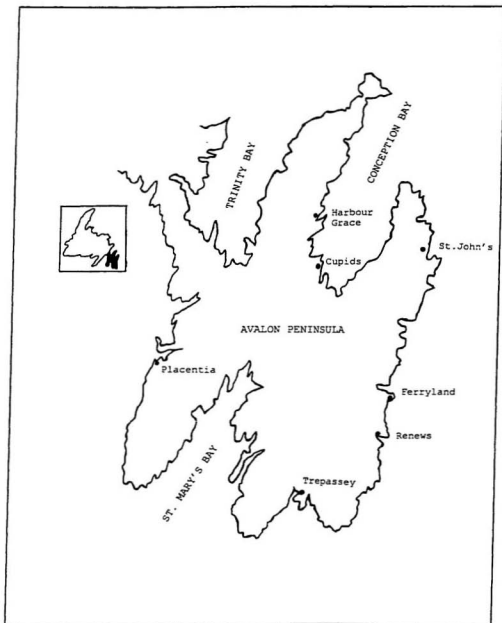
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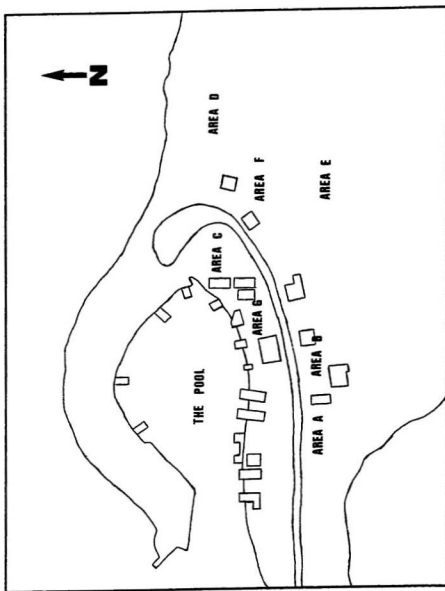
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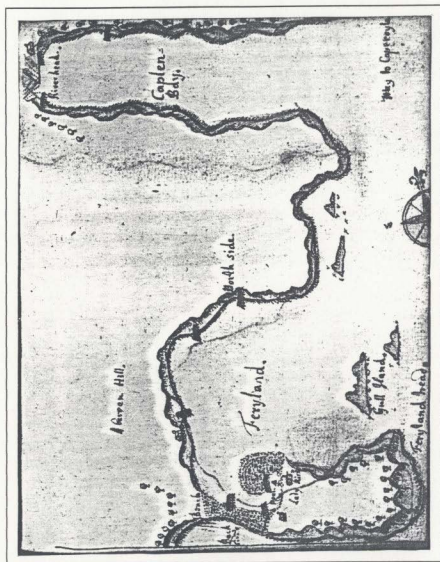
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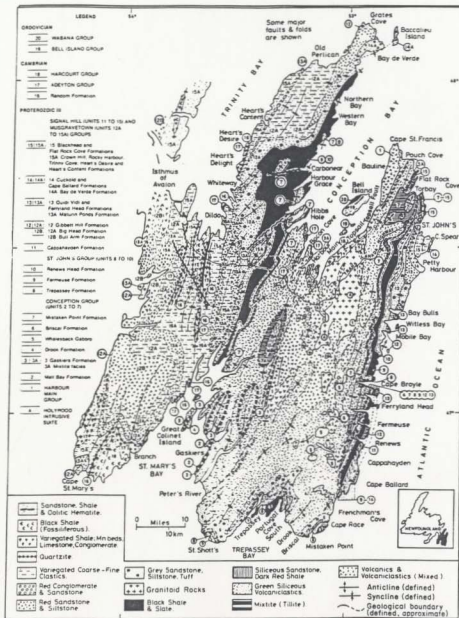
Map 1: Map of Newfoundland (inset), Avalon Peninsula.



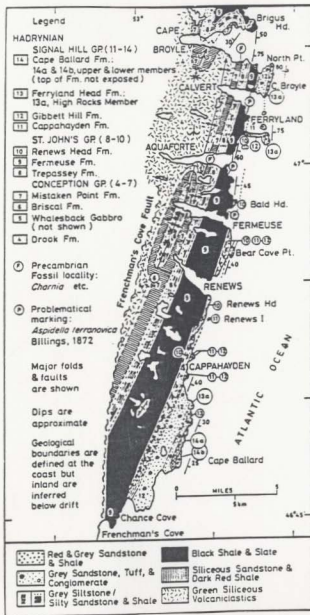
Map 2: The Pool, Ferryland- showing seven different excavation areas.



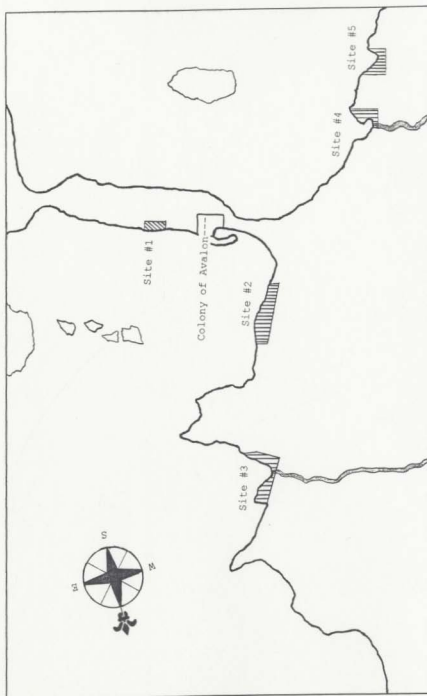
Map 3: James Yonge's map of Ferryland, dated 1663.



Map 4: Geology of the Avalon Peninsula, published in the *Geology of Newfoundland and Labrador*, 1989. Edited by J. P. Hodych and A.F. King.



Map 5: Geology of the Ferryland area, published in the *Geology of Newfoundland and Labrador*, 1989. Edited by J. P. Hodych and A.F. King.



Map 6. Location of possible quarry sites around the Ferryland coastline.

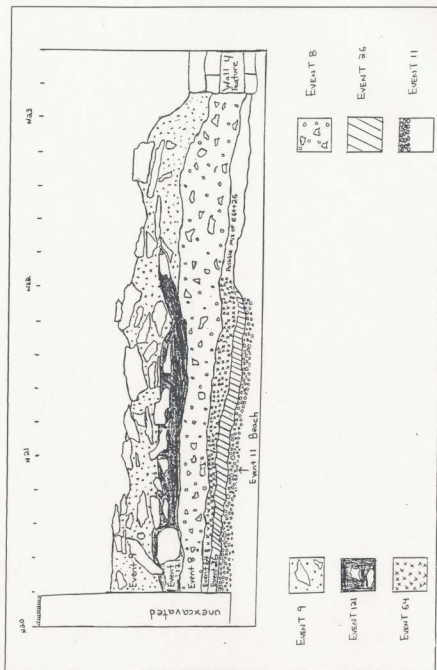


Figure 1: Profile of Area C's early occupation and fill layers.

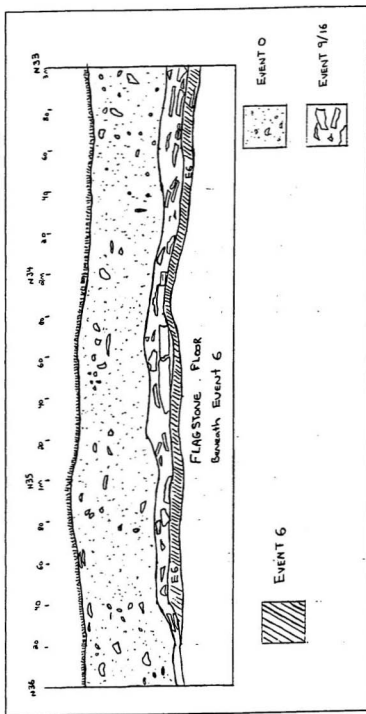


Figure 2: Profile of storehouse occupation and destruction.

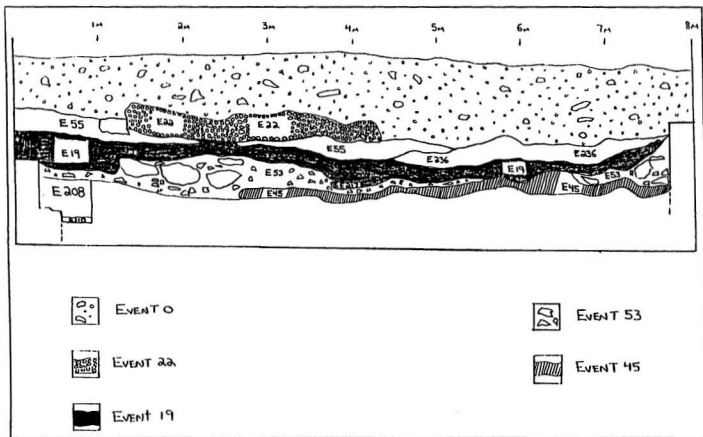


Figure 3: Area C's south profile showing the stratigraphy of the cowhouse destruction and later occupation.

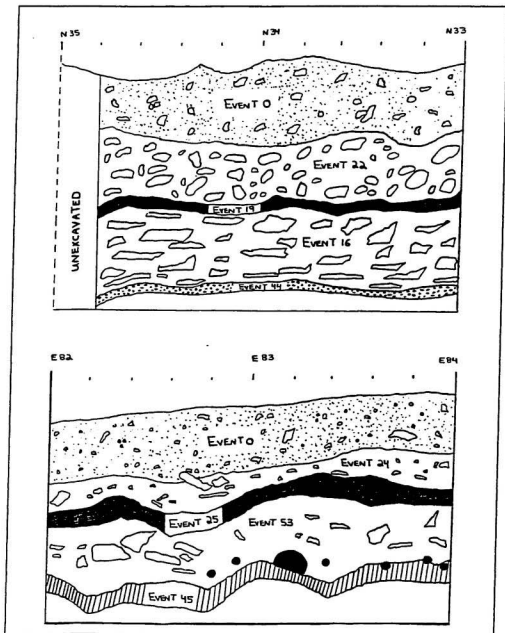
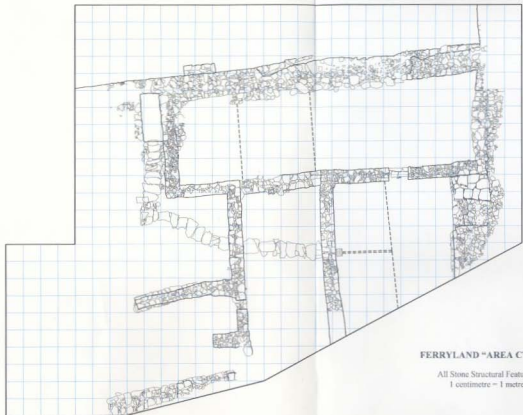


Figure 4. Profile showing Area C's separate destruction episodes.

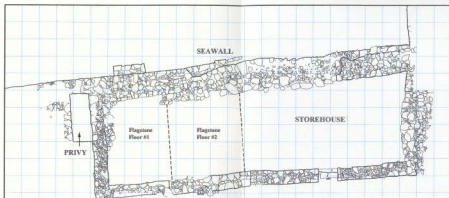
Figure 5: Area C map, all stone structural features.



FERRYLAND "AREA C" MAP

All Stone Structural Features
1 centimetre = 1 metre

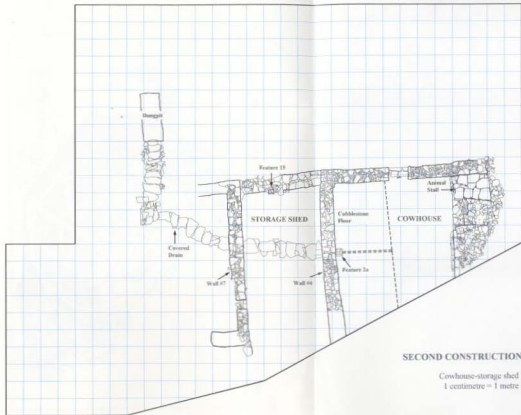
Figure 6: Area C's first construction phase (ca. 1620s).



FIRST CONSTRUCTION PHASE

Storehouse, Privy and Seawall
1 centimetre = 1 metre

Figure 7: Area C's second construction phase (fourth quarter of the 17th century).



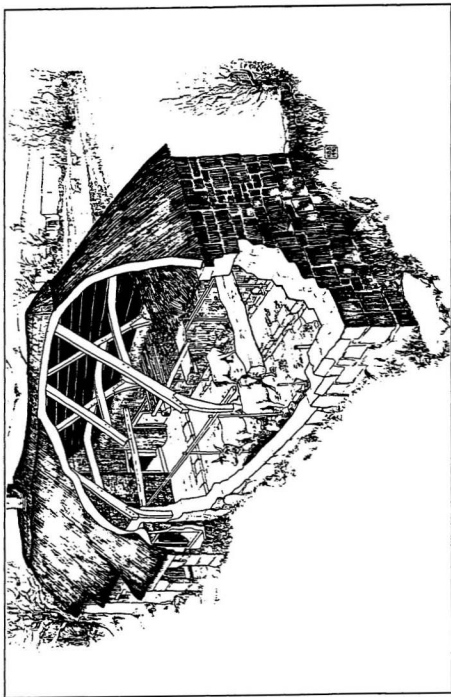


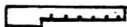
Figure 8: Longhouse, as illustrated in *Devon Building*, ed. Peter Beacham. Copyright © Devon County Council, 1990.



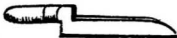
A Pick to make a hole in the slate



A Pinning Iron to widen the hole in the slate to put the Pin in



A Lathing or Stone measure



A Hewing Knife to cut the slates even and square



A Slaters Hatchet

Figure 9: Illustration of 17th century slater's tools, taken from Randle Holme's *Academy of Armory*, originally published in 1688.

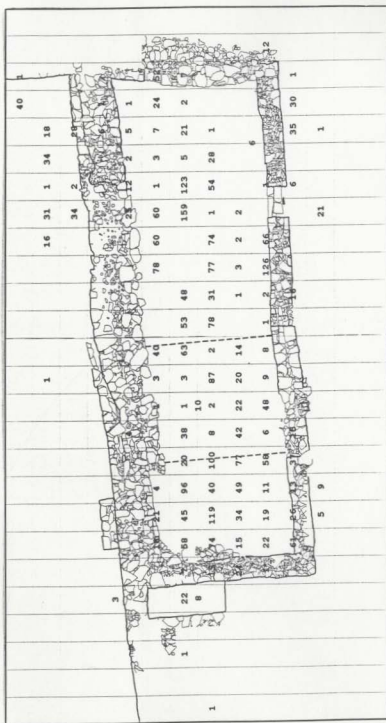


Figure 10: Distribution of roof slate in Area C's first destruction episode.

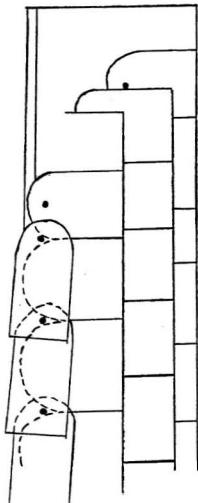


Figure 11: The use of a saddle ridge technique for a slate roof.



Plate 1. Aerial view of "The Pool," Ferryland.



Plate 2. Aerial view of Area C.



Plate 3. Quarry site # 2.



Plate 4. Fossils in quarry # 2 (above), compared to sample from Area C (below).



Plate 5. Quarry site # 3.



Plate 6. Slate outcrop in quarry # 3.



Plate 7. Pipes from early European occupation, Event 26.



Plate 8. Pipes from early fill layers (2 at far left) and privy (right).



Plate 9. Wax impression from the privy.



Plate 10. Storehouse pipes displaying range of occupation, Events 6 and 44.



Plate 11. Storehouse destruction layer.

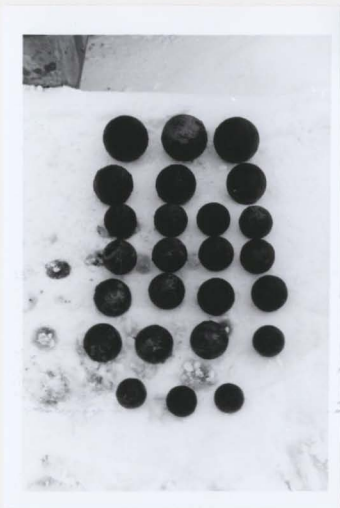


Plate 12. Cannon Balls found in the privy destruction layers.



Plate 13. Assortment of Barnstaple pipes (1660-1710) from Area C.



Plate 14. Short-stemmed pipe found on the wreck of the Saphire-1696 (above) compared with a similar pipe found on the cowhouse floor (below).



Plate 15. Seawall continuation west of Area C.



Plate 16. Area G, seawall and post feature.



Plate 17. Stone quayside with wooden strouders in Clovelly, Devon.

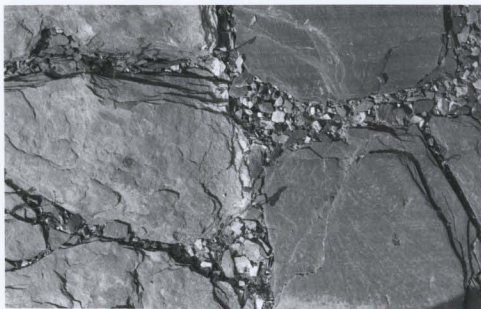


Plate 18. Two flagstone floors in the storehouse.



Plate 19. First flagstone floor in the storehouse.



Plate 20. Floor 1: Cobbles and slate fragments in the interstices.



Plate 21. Second flagstone floor in the storehouse.

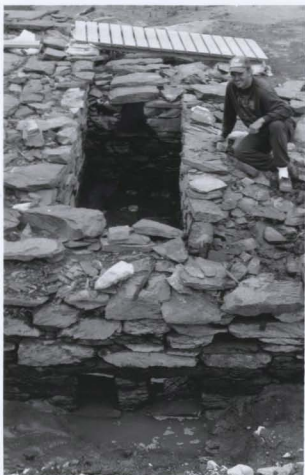


Plate 22. Privy.



Plate 23. Privy floor.



Plate 24. Privy openings on the floor leading out through the seawall.



Plate 25. Privy openings on the outside of the seawall.



Plate 26. Privy addition and new southern opening.

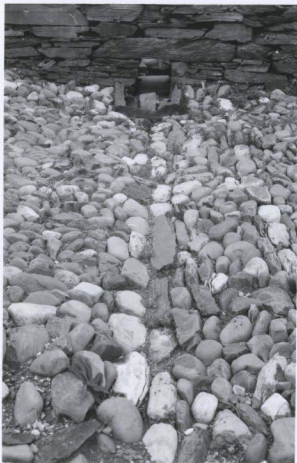


Plate 27. Cobblestone drain leading to box feature.



Plate 28. Box Feature 2a, cowhouse.



Plate 29. Cobblestones on the cowhouse floor.



Plate 30. Ludbrook, Devon: cowhouse drain and cobble floor.



Plate 31. Covered drain leading to dung pit (modified privy).



Plate 32. Feature 15, four upright slates on edge.



Plate 33. Large rounded boulders at the base of walls.

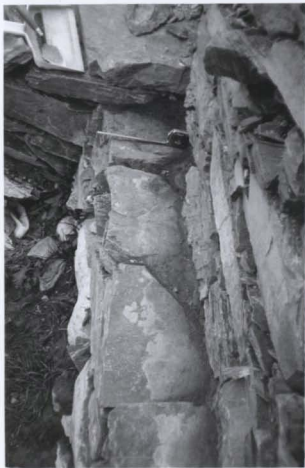


Plate 34. Extended footings.



Plate 35. Fill rocks between joints.



Plate 36. The 2 over 1, 1 over 2 technique of wall construction.



Plate 37. Jumper work.



Plate 38. Cornerstones-quoins.



Plate 39. Storehouse entranceway, southeast end.



Plate 40. Flagstone floored alcove, cowhouse.



Plate 41. Seawall continuation, north of Area C.



Plate 42. Pick and shovel artifacts.



Plate 43. Using a hammer and chisel to reconstruct a stone wall.



Plate 44. Triangular holes in roof slates.



Plate 45. Craftsman at the Welsh Slate Museum: cutting.



Plate 46. Craftsman at the Welsh Slate Museum: shaping.



Plate 47. Slater from Holme's *Academy or Armory*, dated 1688 (above),
Craftsman at the Welsh Slate Museum: trimming (below).

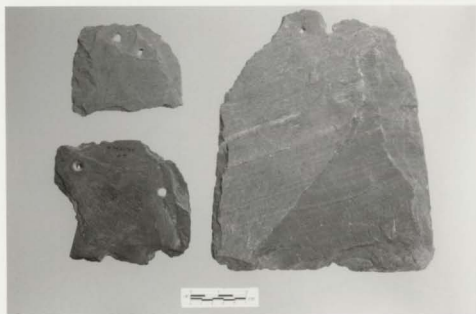


Plate 48. Slates with 2 holes.



Plate 49. Slates with iron nails still corroded into place.



Plate 50. Possible roofing nails and slate.

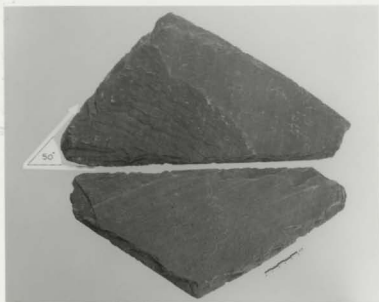
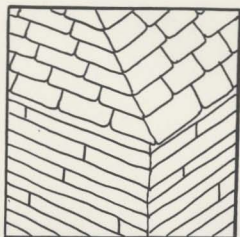


Plate 51. Illustration of triangular slates as placed on a hipped roof (above)
Ferryland's triangular roofing slates: 45-50 degree angle (below).



Plate 52. Slate length ranges.

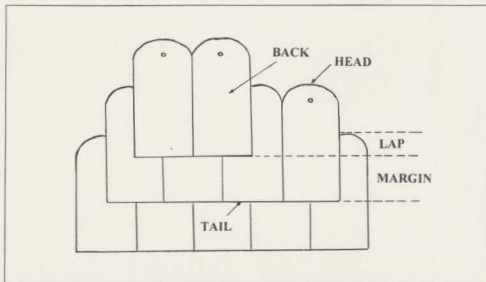


Plate 53. Roof slate terminology (above), example of overlapping courses (below).

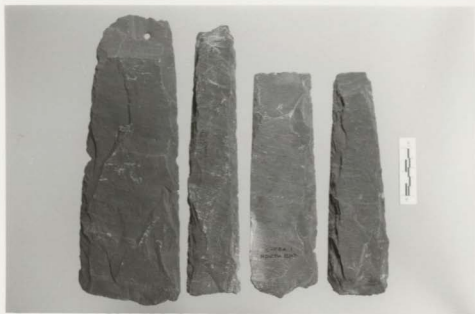


Plate 54. Exceptionally long thin slates (combing slates).



Plate 55. Crucible fragments found on the storehouse floor.



Plate 56. Solid cast-lead weight.



Plate 57. Three woodworking gimlets.

APPENDIX A

28 July, 1622
 Edward Wynne
 Letter to George Calvert [from Ferryland]

A Letter from Captaine Edward Wynne, Governor of the Colony at Ferryland, within the Province of Avalon, in Newfoundland, unto the Right Honourable Sir GEORGE CALVERT Knight, his Maiesties Principall Secretary. July 1622.

May it please your Honour:

Upon the 17th day of May, I received here your letters of the 19th of February, from the hands of Robert Stoning. Upon the 26th of the same, a ship of Master Jennings, with your people and provision, arrived here in safety, and from the hands of Captain Powell I received then your Honour's letters of the 14 of March. And upon the last of June, Master James came hither, from Renewes, and the salt-maker Master John Hickson, from whose hands I received two letters more: that by Master James being of the 4th of May and the other by Hickson of the 10th of the same.

All these being received by me, with an humble and a most thankful hand, first unto God for your Honour's health and next to your Honour for your continual favour towards me, beseeching the same Almighty God, long and long to continue your health, to the advancement of his glory, both here at home and else-where. I most humbly pray you to build upon my dutiful care and diligence, in the setting forwards and following of your Honour's business, even to your best advantage, and advancement of the work, and also that I shall be a dutiful observer of your pleasure and commandment. And so with the like humility, I do present your Honour with the good tidings of all our healths, safety and good success in our proceedings (God's Holy Name be praised for it.) It followeth now (as my duty requireth) that I render unto your Honour a due account of what hath been done by us here this year and of all things else which appertain unto me to do.

Therefore it may please your Honour, that as soon as I had delivered my last letters of the 5th of September, I immediately addressed myself only to our business. Notwithstanding our diligent labour and extraordinary pains- taking, it was All Hallowtide [November 1] before our first range of building was fitted for an habitable being - the which being 44 foot of length and 15 foot of breadth; containing a hall 18 foot long, an entry of 6 foot and a cellar of 20 foot in length; and of the height, between the ground floor and that over head, about 8 foot; being divided above that throughout into four chambers and four foot high to the roof or a half storey. The roof over the hall I covered with deal boards and the rest with such thatch as I found growing here about the harbour, as sedge, flagg and rushes - a far better covering than boards, both for warmth and tightness. When I had finished the same with only one chimney of

stonework in the hall, I went forward with our kitchen, of length 18 foot, 12 foot of breadth and 8 foot high to the eaves, and walled up with stone-work, with a large chimney in the same. Over the kitchen I fitted another chamber; all which with a staircase and convenient passages, both into the kitchen and the room over it, were all finished by Christmas eve. This is all the building, with a hen-house, that we have been able to accomplish before Christmas.

Many things else were done by us in the interim, as the getting home of timber trees, firewood, the raising up of a face of defense [fortification] to the water-side ward, with the earth that we digged both for cellar and kitchen room (which we found a very labourious work), also the sowing of some wheat for a trial and many other businesses besides.

After Christmas, we employed ourselves in the woods, especially in hard weather, whence we got home as many board-stocks as afforded us above two hundred boards, and above two hundred timber trees besides. We got home as much or as many trees as served us to palizado [palisade fortification] into the plantation about four acres of ground, for the keeping off of both man and beast, with post and rail seven foot high, sharpened in the top, the trees being pitched upright and fastened with spikes and nails.

We got also together as much firewood, as will serve us yet these two months. We also fitted much garden ground for feed, I mean barley, oats, peas and beans.

For addition of building, we have at this present a parlour of fourteen foot, besides the chimney, and twelve foot broad, of convenient height and a lodging chamber over it. To each a chimney of stone-work, with stairs and a staircase, besides a tenement of two rooms, or [of] a storie and a halfe, which serves for a store-house till wee are otherwise provided. The forge hath been finished this five weeks; the salt-work is now almost ready. Notwithstanding this great task for so few hands, we have both wheat, barley, oats, peas and beans about the quantity of two acres. Of garden room about half an acre: the corn [grain], though late sown, is now in earing; the beans and the goodliest peas that I ever saw have flourished in their blooms this twenty days. We have a plentiful kitchen garden of lettuce, radish, carrots, coleworts [cabbage], turnips and many other things. We have also at this present a flourishing meadow of at least three acres, with many haycocks of exceeding good hay, and hope to fit a great deal more against another year. In the beginning of the last winter, we sunk a well of sixteen foot deep in the ground, the which affords us water in a sufficient measure. The timber that we have got home first and last is above five hundred trees of good timber. There have been above three hundred boards, besides the former, sawed since the arrivall of Captain Powell. We have also broken much ground for a brewhouse room and other tenements. We have a wharf in good forwardness, towards the low watermark. So that our endeavour that way affords a double benefit, the one of ridding and preparing the way to a further work, the other of winning so much void or waste ground, to so necessary a purpose as to enlarge this little room, whereon (with your Honour's leave and liking) I hope to fortify, so that

within the same, for the comfort of neighbourhood, another row of building may be so pitched, that the whole may be made a pretty street.

For the country and climate: it is better and not so cold as England hitherto. My comfort is, that the Lord is with your Honour and your designs: for we have prospered to the admiration of all the beholders in what is done. And thus with my humble duty remembered, I rest,

Your Honours most humble and faithful servant, EDWARD WYNNE.
Ferryland, 28 July, 1622.

Postscript.

The ships with the rest of our provision arrived here this morning and what is omitted by me, shall by God's help shortly be performed. Your Honour hath greater hopes here than heretofore I have been able to discern. All things succeed beyond my expectation.

17 August, 1622
 Edward Wynne
 Letter to George Calvert [from Ferryland]

Another Letter to Master Secretary Calvert, from Captaine Wynne, of the 17th of August, 1622.

May it please your Honour:

Upon the 17th day of May, your Honour's letters of the 19th of February, I received here from the hands of Robert Stoning, etc. And so forward as in his former letter of the 28th of July, relating the manner and proportion of their building.

we have wheat, barley, oats and beans both eared and coddled [podded], and though the late sowing and setting of them might occasion the contrary, yet it ripens now so fast, that it carries the likelihood of an approaching harvest. We have also a plentiful kitchen garden of many things, and so rank, that I have not seen the like in England. Our beans are exceeding good; our peas shall go without compare, for they are in some places as high as a man of an extraordinary stature; radish as big as mine arm; lettuce, kale or cabbage, turnips, carrots, and all the rest is of like goodness. We have a meadow of about three acres; it flourished lately with many cocks of good hay, and now it is made up for a winter feeding. We hope to be well fitted with many acres of meadow against another year. Of pasture land, we have already to serve at least three hundred heads of cattle; and to all this, if it please God, a good quantity of seed ground shall be fitted, and such buildings as we shall be able to accomplish.

Now in the next place it may please your Honour to understand that touching this country, the summer time here is so fair, so warm and of so good a temperature, that it produceth many herbs and plants very wholesome, medicinable and delectable; many fruit trees of sundry kinds; many sorts of berries wholesome to eat and in measure most abundant, in so much as many sorts of birds and beasts are relieved with them in time of winter, and whereof with further experience I trust to find some for the turn of Dyers.

Our high levels of land are adorned with woods, both fair and seemly to behold, and green all winter. Within land there are plains innumerable, many of them containing many thousand acres, very pleasant to see to, and well furnished with ponds, brooks and rivers, very plentiful of sundry sorts of fish, besides store of deer [caribou] and other beasts that yield both food and fur. Touching the soil, I find it in many places of goodness far beyond my expectation: the earth as good as can be, the grass both fat and unctuous and if there were store of cattle to feed it up, and with good ordering, it would become a most steadfast nourishment - whereof the large breed of cattle to our northern plantation [Cupids?] have lately given proofs sufficient, though since, they have been

most shamefully destroyed. The air here is very healthful, the water both clear and wholesome, and the winter short and tolerable, continuing only in January, February and part of March; the day in Winter longer than in England; the nights both silent and comfortable, producing nothing that can be said either horrid or hideous. Neither was it so cold here the last winter as in England the year before. I remember but three several days of hard weather indeed, and they not extreme neither, for I have known greater frosts, and far greater snows in our own country.

At the Bristol Plantation, there is as goodly rye now growing as can be in any part of England. They are also well furnished with swine and a large breed of goats, fairer by far, than those that were sent over at the first.

The stones, kernels and seeds that Stoning brought me, were put into the ground presently after his arrival, the which are already of a pretty growth, though late set, for they came to my hands but upon the 17th of May.

The vines that came from Plymouth do prosper very well: nay, it is to be assured, that any thing that grows in England, will grow and prosper very well here - whereby it plainly appears unto your Honour, what manner of country the same is. Therefore it may please you to give credit unto no man that shall seem to urge the contrary. And, for my part, seeing that by the providence of God and your Honours mere favour towards me, this employment is fallen to my lot, I trust that neither God's grace in me, nor the experience that I have gained by the travels of my youth, will suffer me to wrong your Honour. Far be it from me to go about to betray you and my country, as others have done that have been employed in the like trust. I trust also that what I have undertaken, either by word or writing, will be found the characters of a true and zealous mind, wholly devoted unto your Honour's service, the good of my poor distressed countrymen, and to the advancement of God's glory.

It may please your Honour to understand that our salt-maker hath performed his part with a great deal of sufficiency, by whom I have sent your Honour a barrel of the best salt that ever my eyes beheld, who with better settling doth undertake to better this which he hath made already. I shall humbly also desire you to remember my last years suit, that our delicate harbours and woods may not be altogether destroyed, for there have been rinded this year not so few as 50,000 trees and they heave out ballast into the harbours, though I look on. It may likewise please your Honour to give express order, first, that such as be sent hither hereafter may be such men as shall be of good strength, whereof we stand in need of six masons, four carpenters, two or three good quarry men, a slater or two, a lime-burner and limestones, a good quantity of hard laths, a couple of strong maids that (besides other work) can both brew and bake; and to furnish us with wheels, hemp and flax and a convenient number of west-country labourers to fit the ground for the plough.

Secondly, that no more boys and girls be sent hither, I mean upon your Honour's charge, nor any other persons which have not been brought up to labour, for they are unfit for these affairs.

Thirdly, your Honour of necessity must send some guns and a gunner with his necessities [ordnance], for the place and time do require it. It is a durable chattel; they will command the harbour and secure all.

We stand also in need of another brewing copper [kettle], some clapboards, more iron and steel, brick, some lime and tiles for a beginning, whilst the slate-quarry is in fitting.

A complete magazine of all things will be necessary with victuals, linen, woolen for apparel and bedding, with better coverlets, shoes of wet leather, Irish stockings, coarse knit hose, coarse ticks [ticking], good flocks [stuffing] in cask, and instead of cloth, coarse mingled kersies, and no canvas suits, nor any ready made. But otherwise, it may please your Honour to send tailors, such as will help to guard the place, and do other things. The like of other tradesmen, and all to be furnished out of the magazine, upon account.

I went to Fermeuse and Renewes, upon the fourth of this month, to buy salt for your Honour against the next year, because it is so dear in England, and that which is now bought for the next year's fishing amounts to the number of 186 hogsheads.

It may please your Honour, that another iron mill, and two Bridewell mills may be sent hither, and then our bread-corn may be sent unground and if at any time it should happen to take wet, it may be dried again.

We want a dozen of leather buckets, a glazier, some glue, rats-bane [rat poison?], two fowling pieces of six foot in the barrel and one of seven foot, with a mold to cast shot of several sizes for fowling.

The last year I showed your Honour of much courtesy received from sundry masters; many this year have done the like, though some likes not our flourishing beginning and prosperity. Howsoever, I have proceeded with a great deal of care and respect unto your Honour's commandments, to use them with all humanity. I hope you will be pleased to send us the plough next year and guns, for the time requires it. And so conclude, resting

Your Honour's most humble, thankful and faithfull servant,

Ferryland, 17
August. 1622.

EDWARD WYNNE.

The names of all those that stay with me this year.

Captain Powell.	Henry Doke, Boats-master.
Nicholas Hoskins.	William Sharpus, Tailor.
Robert Stoning.	Elizabeth Sharpus, his wife.
Roger Freshman, Surgeon	John Bayly.
Henry Dring, Husbandman.	Anne Bayly, his wife.
Owen Evans.	Widdow Bayly.
Mary Russell,	Joseph Parscer.
Sibell Dee, maide.	Robert Row, Fisherman.
Elizabeth Kerne.	Philip Jane, Cooper.
Jone Jackson. } Girles	William Bond.
Thomas Wilson.	Peter Wotton. } Boats-masters,
John Prater. } Smithes.	Ellis Hinckson.
Iames Beuell, Stone-layer.	Digory Fleshman.} Boyes.
Benjamin Hacker, Quarry-man.	Richard Higgins.
Nicholas Hinckson.	In all 32.
Robert Bennet. } Carpenters.	
William Hatch.	

I looke for a mason, and one more out of the Bay of Conception [Conception Bay].

Both of Wynne's letters are taken from Peter Pope's *Documents Relating to Ferryland 1597-1726*. Report on file at the Archaeology Unit, Memorial University, St. John's.

APPENDIX B

EVENTS FOR AREA C PIPE ANALYSIS

Sorted according to stratigraphic sequence & proposed sequence of construction/occupation/destruction.

Note: Pipe analysis includes the tabulation of bore measurements and the identification of bowl shapes, sizes and maker's marks when data is available.

Event's 11, 26 and 110: Early West Country occupation and/or initial settlement in 1621.

Event's 8, 40, Stratum 3(3a), 229, 232 and 296: Initial fill layers in Area C. Some broadcast throughout large area of the site [Event's 8, 40, Stratum 3(3a)], others are discrete fill layers.

Event 147: Immediately on top of Event 8 (brief occupation).

Feature 1a: Privy Events

Event 116	Event 49
Event 114	Level 3 (1986)
Event 111	Level 2 (1986)
Event 50	Level 1 (1986)

Event's 6 and 44: Occupation layers on storehouse floor.

Event's 9, 16 and Stratum 1a: Destruction of storehouse- Dutch raid 1673.

Event 15: Disuse and abandonment of the stone seawall.

Event 20: Levelling/infilling of the site for new construction.

Event's 33 and 45: Cowhouse occupation/destruction layer- French attack 1696.

Event 53: Shattered rock and clay associated with cowhouse destruction layer.

Event's 19*, 25 and 31: Early-mid 18th century destruction.

FERRYLAND (AREA C) PIPE STEM ANALYSIS**Event 11**

Stem bore	Number
4/64	0
5/64	0
6/64	0
7/64	1
8/64	0
9/64	4
TOTAL-----	5

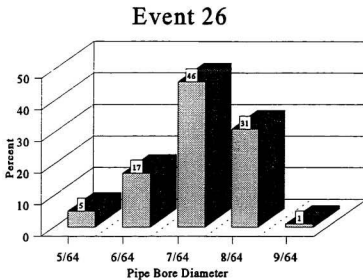
Event 110

Stem Bore	Number
4/64	0
5/64	0
6/64	1
7/64	1
8/64	1
9/64	1
TOTAL-----	4

Stem Bore	Number
4/64	0
5/64	4
6/64	13
7/64	35
8/64	24
9/64	1
TOTAL-----	77

Mean pipe stem bore is 7.0649

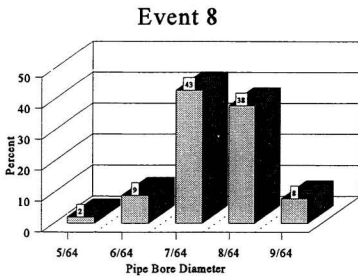
Mean date for Event 26 is 1662



Stem Bore	Number
4/64	0
5/64	2
6/64	8
7/64	37
8/64	33
9/64	7
TOTAL-----	86

Mean pipe stem bore is 7.488372

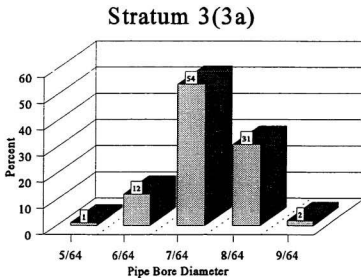
Mean date for Event 8 is 1645



Stem Bore	Number
4/64	0
5/64	2
6/64	26
7/64	122
8/64	69
9/64	5
TOTAL	224

Mean pipe stem bore is 7.21875

Mean date for Stratum 3(3a) is 1656



Event 40

Stem Bore	Number
4/64	0
5/64	0
6/64	2
7/64	9
8/64	5
9/64	0
TOTAL-----	16

Event 229

Stem Bore	Number
4/64	0
5/64	0
6/64	1
7/64	9
8/64	3
9/64	4
TOTAL-----	17

Event 232

Stem Bore	Number
4/64	0
5/64	0
6/64	0
7/64	1
8/64	0
9/64	1
TOTAL-----	2

Event 296

Stem Bore	Number
4/64	0
5/64	0
6/64	2
7/64	1
8/64	8
9/64	2
TOTAL-----	13

Event 49 (Privy)

Stem Bore	Number
4/64	0
5/64	1
6/64	2
7/64	4
8/64	8
9/64	2
TOTAL-----	16

Event 50 (Privy)

Stem Bore	Number
4/64	0
5/64	0
6/64	1
7/64	7
8/64	12
9/64	2
TOTAL-----	22

Event 111 (Privy)

Stem Bore	Number
4/64	0
5/64	0
6/64	1
7/64	1
8/64	7
9/64	2
TOTAL-----	11

Event 114 (Privy)

Stem Bore	Number
4/64	0
5/64	0
6/64	0
7/64	2
8/64	2
9/64	2
TOTAL-----	6

Event 116 (Privy)

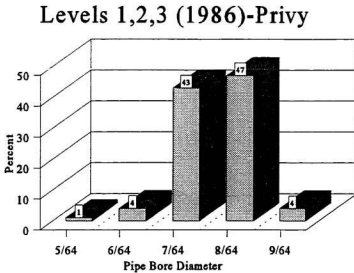
Two pipe stems in this event

7/64
8/64

Stem Bore	Number
4/64	1
5/64	2
6/64	17
7/64	143
8/64	137
9/64	11
TOTAL-----	311

Mean pipe stem bore is 7.4341

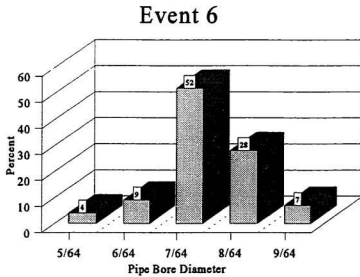
Mean date for Levels 1,2,3 is 1647



Stem Bore	Number
4/64	0
5/64	2
6/64	4
7/64	24
8/64	13
9/64	3
TOTAL-----	46

Mean pipe stem bore is 7.2391

Mean date for Event 6 is 1655

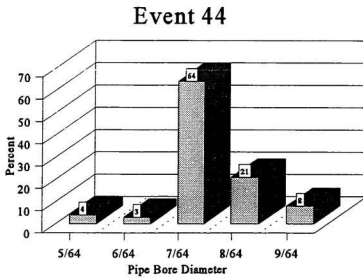


Stem Bore	Number
4/64	0
5/64	6
6/64	4
7/64	70
8/64	20
9/64	7

TOTAL _____ 107

Mean pipe stem bore is 7.1389

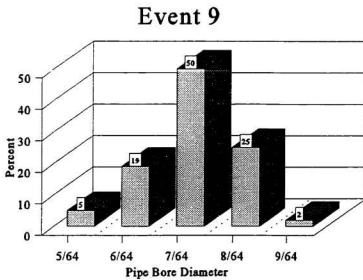
Mean date for Event 44 is 1659



Stem Bore	Number
4/64	2
5/64	40
6/64	156
7/64	416
8/64	207
9/64	16
TOTAL	837

Mean pipe stem bore is 6.9964

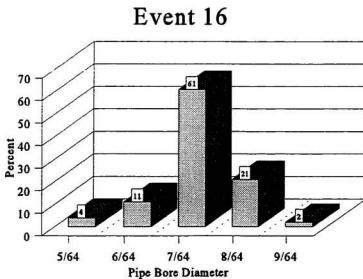
Mean date for Event 9 is 1664



Stem Bore	Number
4/64	4
5/64	33
6/64	104
7/64	565
8/64	193
9/64	22
TOTAL	921

Mean pipe stem bore is 7.0597

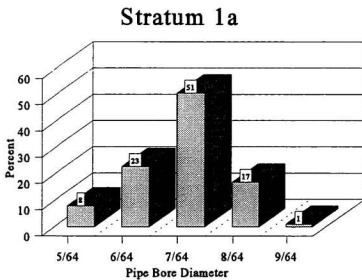
Mean date for Event 16 is 1662



Stem Bore	Number
4/64	3
5/64	97
6/64	297
7/64	655
8/64	221
9/64	13
TOTAL	1286

Mean pipe stem bore is 6.80327

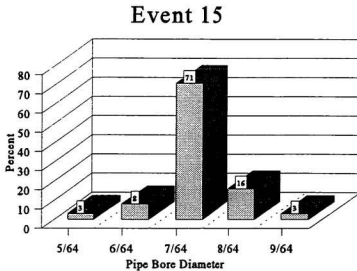
Mean date for Stratum 1a is 1672



Stem Bore	Number
4/64	0
5/64	1
6/64	3
7/64	27
8/64	6
9/64	1
TOTAL-----	38

Mean pipe stem bore is 7.07895

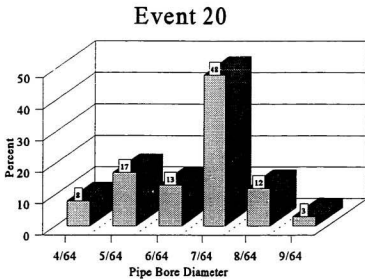
Mean date for Event 15 is 1661



Stem Bore	Number
4/64	4
5/64	9
6/64	7
7/64	24
8/64	6
9/64	2
TOTAL	52

Mean pipe stem bore is 6.48077

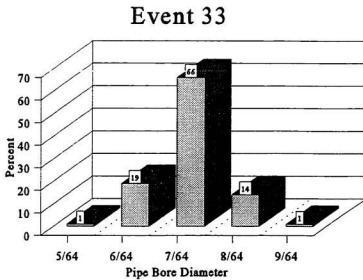
Mean date for Event 20 is 1684



Stem Bore	Number
4/64	0
5/64	1
6/64	30
7/64	102
8/64	21
9/64	1
TOTAL	155

Mean pipe stem bore is 6.9419

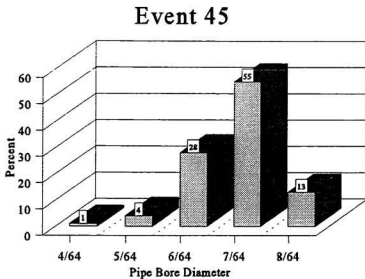
Mean date for Event 33 is 1666



Stem Bore	Number
4/64	3
5/64	15
6/64	112
7/64	223
8/64	52
9/64	1
TOTAL	406

Mean pipe stem bore is 6.76108

Mean date for Event 45 is 1673



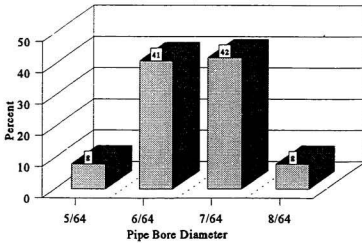
Stem Bore	Number
4/64	0
5/64	16
6/64	78
7/64	79
8/64	16
9/64	0

TOTAL----- 189

Mean pipe stem bore is 6.502646

Mean date for Event 53 is 1683

Event 53

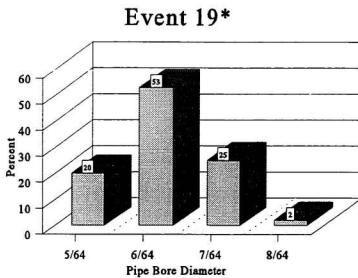


Stem Bore	Number
4/64	0
5/64	30
6/64	81
7/64	38
8/64	3
9/64	0
TOTAL-----	152

Mean pipe stem bore is 6.09211

Mean date for Event 19* is 1699

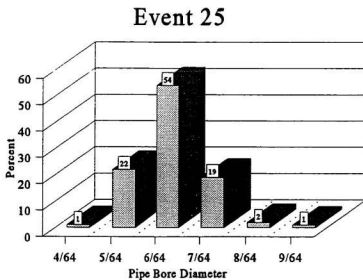
* This event was recorded above Event 45 and therefore dates to after the French attack in 1696.



Stem Bore	Number
4/64	2
5/64	39
6/64	96
7/64	34
8/64	4
9/64	2
TOTAL	177

Mean pipe stem bore is 6.0282

Mean date for Event 25 is 1701

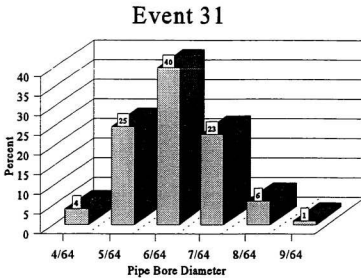


Stem Bore	Number
4/64	13
5/64	74
6/64	116
7/64	67
8/64	18
9/64	3

TOTAL----- 291

Mean pipe stem bore is 6.0412

Mean date for Event 31 is 1701



FERRYLAND (AREA C) PIPE BOWL ANALYSIS

Event 26: Early West Country Occupation (6 complete/fragmentary bowls).

- #1) 45996** (7/64): Oswald 1975 (1600-40); Oswald in Fairclough 1976 (1635-1665); Noel Hume 1969 (1610-40); Pope 1988 (1610-40); Atkinson & Oswald 1969 (1610-40).
- #2) 48395** (8/64): Noel Hume 1969 (1610-40).
- #3) 47320** (7/64): Noel Hume 1969 (1610-40); Atyo 1979 (1610-40); Atkinson & Oswald 1969 (1610-40).
- #4) 44999** (8/64): Noel Hume 1969 (1610-40); Atkinson & Oswald 1969 (1610-40).
- #5) 44282** (8/64): Noel Hume 1969 (1610-40).
- #6) 26474** (7/64): Oswald 1975 (1600-40); Pope 1988 (1610-40); Atkinson & Oswald 1969 (1610-40).

Event 8: Initial fill layer in Area C (4 complete/fragmentary bowls).

- #1) 73684** (8/64): Oswald 1975 (1600-40); Noel Hume 1969 (1610-40); Atkinson & Oswald 1969 (1610-40).
- #2) 26118** (8/64): Atkinson & Oswald 1969 (1660-80); Noel Hume 1969 (1650-80); Oswald 1975 (1660-80).
- #3) 72598** (8/64): Atyo 1979 (1660-80); Atkinson & Oswald 1969 (1660-80); Pope 1988 (1660-90); Oswald 1975 (1660-80).
- #4) 72587** (no measurement): Atkinson & Oswald 1969 (1660-80); Oswald 1975 (1660-80).

Stratum 3 (3a): Fill layer discovered in 1986, equivalent to Event 8 (12 complete/fragmentary bowls)

- #1) **5539** (6/64): Noel Hume 1969 (1610-40); Oswald 1975 (1600-40); Oswald in Fairclough 1976 (1635-65).
- #2) **5541** (8/64): Pope 1986 analysis (1610-30); Atyo 1979 (1610-40); Atkinson & Oswald 1969 (1580-1610).
- #3) **5816** (8/64) with RC heel mark: Pope 1988 (1640-70); Noel Hume 1969 (1620-60); Atkinson & Oswald 1969 (1640-70).
- #4) **3573** (no measurement): Noel Hume 1969 (1610-40); Oswald 1975 (1600-40).
- #5) **3196** (7/64): Pope 1986 analysis (1630-60); Noel Hume 1969 (1620-60); Oswald 1975 (1640-60).
- #6) **5540** (no measurement) MM on heel: Pope 1986 analysis (1640-70); Atkinson & Oswald 1969 (1640-60); Noel Hume 1969 (1620-60); Tatman 1985 (1650-60).
- #7) **5814** (8/64): Pope 1986 analysis (1640-70); Oswald 1975 (1640-60); Atkinson & Oswald 1969 (1640-70).
- #8) **5817** (7/64): Pope 1986 analysis (1640-70); Noel Hume 1969 (1620-60); Atkinson & Oswald 1969 (1640-60).
- #9) **5818** (no measurement): Atkinson & Oswald 1969 (1640-60); Noel Hume 1969 (1620-60); Atyo 1979 (1660-80).
- #10-12) **4508** (7/64); **5538** (7/64); **4471** (7/64): Pope 1986 analysis (1660-1710).

Event 40: Fill layer, deposited during same time as E8 (1 bowl).

- #1) **40299** (no measurement): Noel Hume 1969 (1620-60); Oswald 1975 (1640-60).

Event 232: Discrete fill layer above E26 and contemporaneous with E8 (1 bowl).

#1 16411 (7/64): Oswald 1975 (1600-40); Noel Hume 1969 (1610-40); Pope 1988 (1610-40).

Event 147: Initial occupation level directly on top of Event 8 (1 bowl).

#1 96679 (8/64): Oswald 1975 (1600-40); Pope 1988 (1610-40); Noel Hume 1969 (1610-40).

Feature 1a: Privy/Cess Pit Events and Levels.

Between Event 114 & 116: (1 bowl).

#1 108839 (7/64): Noel Hume 1969 (1620-60); Atyo 1979 (1640-60); Pope 1988 (1620-50); Atkinson & Oswald 1969 (1640-60); Oswald 1975 (1640-60).

Event 111: (1 bowl).

#1 76519 (no measurement): Oswald 1975 (1600-40); Atkinson & Oswald 1969 (1610-40); Noel Hume 1969 (1610-40).

Event 50: (4 bowls).

#1 69590 (8/64): Atkinson & Oswald 1969 (1610-40); Noel Hume 1969 (1610-40)

#2 116356 (no measurement): Noel Hume 1969 (1610-40); Oswald 1975 (1600-40); Atkinson & Oswald 1969 (1610-40).

#3 102019 (7/64): Pope 1988 (1630-60); Atkinson & Oswald 1969 (1640-60); Noel Hume 1969 1620-60).

#4 93000 (9/64): Atkinson & Oswald 1969 (1640-60); Pope 1988 (1620-50).

Event 49: (1 bowl).

#1 122363 (9/64): Noel Hume 1969 (1610-40); Oswald 1975 (1600-40); Atkinson & Oswald 1969 (1610-40).

Level 3: (2 bowls) 1986.

#1) **5180** (8/64): Pope 1986 analysis (1660-80); Noel Hume 1969 (1650-80); Oswald 1975 (1660-80).

#2) **35043** (7/64): Oswald 1975 (1660-80); Pope 1986 analysis (1660-80); Noel Hume 1969 (1650-80).

Level 2: (13 bowls) 1986.

#1) **4863** (7/64): Pope 1986 analysis (1635-55); Noel Hume 1969 (1645-65); Atkinson & Oswald 1969 (1660-80).

#2-3) **4869, 35044** (8/64) MM on heels : Pope 1986 analysis (1660-90); Noel Hume 1969 (1650-80); Oswald 1975 (1660-80).

#4-6) **4866** (8/64), **35041** (8/64), **35042** (9/64): Pope 1986 analysis (1660-80); Noel Hume 1969 (1650-80); Atkinson & Oswald 1969 (1660-80).

#7-10) **4868a-h** (2x 7/64, 1x 8/64): Pope 1986 analysis (1650-90); Noel Hume 1969 (1645-65); Oswald 1975 (1660-80).

#11-13) **4870a-d** (6,7,8/64): Pope 1986 analysis (1660-90); Noel Hume 1969 (1645-65); Atkinson & Oswald 1969 (1660-80); Atyo 1979 (1660-80).

Level 1: (1 bowl) 1986.

#1) **5686a-b** (8/64) MM on heel: Pope 1986 analysis (1660-90); Noel Hume 1969 (1650-80); Oswald 1975 (1660-80).

Event 6: Occupation layer from storehouse floor (3 bowls).

#1) **45753** (7/64): Oswald 1975 (1600-40); Noel Hume 1969 (1610-40); Atkinson & Oswald 1969 (1610-40).

#2) **65638** (7/64): Oswald 1975 (1640-70); Pope 1988 (1640-80); Noel Hume 1969 (1645-65).

#3) **48958a** (7/64): Noel Hume 1969 (1650-80); Atkinson & Oswald 1969 (1660-80).

Event 44: Occupation layer from storehouse floor (6 bowls).

- #1) 132218 (7/64): Oswald 1975 (1610-40); Noel Hume 1969 (1610-40).
- #2) 59986 (8/64) MM on heel: Atkinson & Oswald 1969 (1610-40); Noel Hume 1969 (1610-40).
- #3) 134324 (no measurement): Pope 1988 (1620-50); Noel Hume 1969 (1620-60); Oswald 1975 (1640-60).
- #4) 137647 (no measurement): Pope 1988 (1620-50); Noel Hume 1969 (1620-60); Oswald 1975 (1640-60).
- #5) 132640 (7/64): Oswald 1975 (1640-70); Pope 1988 (1640-80); Noel Hume 1969 (1645-65).
- #6) 134121 (8/64): Pope 1988 (1650-80); Noel Hume 1969 (1645-65); Atkinson & Oswald 1969 (1660-80).

Event 9: Destruction of Storehouse, Dutch 1673 (26 bowls).

- #1) 65633 (8/64): Noel Hume 1969 (1610-40); Pope 1988 (1610-40).
- #2) 154809 (no measurement): Oswald 1975 (1610-40); Noel Hume 1969 (1610-40).
- #3) 57268 (6/64): Atkinson & Oswald 1969 (1640-60); Noel Hume 1969 (1620-60).
- #4) 154722 (no measurement): Oswald in Fairclough 1976 (1660-80); Atkinson & Oswald 1969 (1640-60); Noel Hume 1969 (1620-60); Pope 1988 (1620-60).
- #5) 155187 (8/64): Oswald 1975 (1640-70); Pope 1988 (1640-80); Noel Hume 1969 (1645-65); Atkinson & Oswald 1969 (1640-60).
- #6) 63289 (8/64): Oswald 1975 (1640-60); Pope 1988 (1630-50); Noel Hume 1969 (1620-60).
- #7) 76187 (7/64): Noel Hume 1969 (1645-65); Atkinson & Oswald 1969 (1660-80); Pope 1988 (1650-80).

- #8) 154383** (8/64): Pope 1988 (1660-90); Atkinson & Oswald 1969 (1660-80).
- #9) 57771** (6/64): Oswald 1975 (1660-80); Atkinson & Oswald 1969 (1660-80).
- #10) 59419** (6/64): Pope 1988 (1660-1710); Oswald 1975 (1660-90?); Oswald 1969 (17th century Barnstaple pipe); Grant and Jemmett 1985 (1660-1710).
- #11) 73476** (7/64): Pope 1988 (1660-1710); Oswald 1975 (1660-90?); Oswald 1969 (17th century Barnstaple pipe); Grant and Jemmett 1985 (1660-1710).
- #12) 50370** (7/64): Pope 1988 (1660-1710); Oswald 1975 (1660-90?); Oswald 1969 (17th century Barnstaple pipe); Grant and Jemmett 1985 (1660-1710).
- #13) 154203** (7/64): Pope 1988 (1660-1710); Oswald 1975 (1660-90?); Oswald 1969 (17th century Barnstaple pipe); Grant and Jemmett 1985 (1660-1710).
- #14) 59911** (6/64): Pope 1988 (1660-1710); Oswald 1975 (1660-90?); Oswald 1969 (17th century Barnstaple pipe); Grant and Jemmett 1985 (1660-1710).
- #15) 57230** (7/64): Pope 1988 (1660-1710); Oswald 1975 (1660-90?); Oswald 1969 (17th century Barnstaple pipe); Grant and Jemmett 1985 (1660-1710).
- #16) 42266** (6/64): Pope 1988 (1660-1710); Oswald 1975 (1660-90?); Oswald 1969 (17th century Barnstaple pipe); Grant and Jemmett 1985 (1660-1710).
- #17) 42804** (8/64): Pope 1988 (1660-1710); Oswald 1975 (1660-90?); Oswald 1969 (17th century Barnstaple pipe); Grant and Jemmett 1985 (1660-1710).
- #18) 155291** (7/64): Pope 1988 (1660-1710); Oswald 1975 (1660-90?); Oswald 1969 (17th century Barnstaple pipe); Grant and Jemmett 1985 (1660-1710).
- #19) 155196** (8/64): Pope 1988 (1660-1710); Oswald 1975 (1660-90?); Oswald 1969 (17th century Barnstaple pipe); Grant and Jemmett 1985 (1660-1710).
- #20) 59139** (7/64): Pope 1988 (1660-1710); Oswald 1969 (17th century Barnstaple pipe); Grant and Jemmett 1985 (1660-1710).
- #21) 51015** (7/64): Pope 1988 (1660-1710); Oswald 1969 (17th century Barnstaple pipe); Grant and Jemmett 1985 (1660-1710).

- #22) 63771 (7/64): Pope 1988 (1660-1710); Oswald 1969 (17th century Barnstaple pipe); Grant and Jemmett 1985 (1660-1710).
- #23) 57266 (7/64): Pope 1988 (1660-1710); Oswald 1969 (17th century Barnstaple pipe); Grant and Jemmett 1985 (1660-1710).
- #24) 53571 (7/64): Pope 1988 (1660-1710); Oswald 1969 (17th century Barnstaple pipe); Grant and Jemmett 1985 (1660-1710).
- #25) 50494 (6/64): Pope 1988 (1660-1710); Oswald 1969 (17th century Barnstaple pipe); Grant and Jemmett 1985 (1660-1710).
- #26) 30770 (7/64) MM on the heel: Pope 1988 (1660-1710); Oswald 1969 (17th century Barnstaple pipe); Grant and Jemmett 1985 (1660-1710).

Stratum 1a: Destruction layer discovered in 1986. Equivalent to Event's 9 & 16. (21 bowls).

- #1) 5645 (8/64): Pope 1986 analysis (1620-50); Noel Hume 1969 (1620-60); Oswald 1975 (1640-60).
- #2) 7341 (7/64): Pope 1986 analysis (1660-80); Noel Hume 1969 (1660-80); Atkinson & Oswald 1969 (1660-80).
- #3) 20025 (7/64): Oswald 1975 (1640-70); Pope 1988 (1640-80); Noel Hume 1969 (1645-65).
- #4) 16348 (7/64): Oswald 1975 (1660-80).
- #5) 34157 (6/64): Oswald 1975 (1660-80).
- #6) 27778 (6/64): Oswald 1975 (1680-1710); Noel Hume 1969 (1680-1710); Atkinson & Oswald 1969 (1680-1710).
- #7) 16421 (5/64) MM on sides of heel: Noel Hume 1969 (1700-70); Oswald 1975 (1700-40); Atkinson & Oswald 1969 (1700-70).
- #8) 27387 (6/64): Atkinson & Oswald 1969 (1700-40); Oswald 1975 (1730-60?).

- #9) 28390** (7/64): Pope 1988 (1660-1710); Oswald in Fairclough 1976 (1700-30?); Oswald 1975 (1660-90); Oswald 1969 (17th century Barnstaple pipe).
- #10) 14384** (6/64): Pope 1988 (1660-1710); Oswald 1969 (17th century Barnstaple pipe); Grant and Jemmett 1985 (1660-1710).
- #11) 27261** (7/64): Pope 1988 (1660-1710); Oswald 1969 (17th century Barnstaple pipe); Grant and Jemmett 1985 (1660-1710).
- #12) 18099** (7/64): Pope 1988 (1660-1710); Oswald 1969 (17th century Barnstaple pipe); Grant and Jemmett 1985 (1660-1710).
- #13) 30781** (7/64): Pope 1988 (1660-1710); Oswald 1969 (17th century Barnstaple pipe); Grant and Jemmett 1985 (1660-1710).
- #14) 29030** (6/64): Pope 1988 (1660-1710); Oswald 1969 (17th century Barnstaple pipe); Grant and Jemmett 1985 (1660-1710).
- #15) 6710** (7/64): Pope 1988 (1660-1710); Oswald 1969 (17th century Barnstaple pipe); Grant and Jemmett 1985 (1660-1710).
- #16) 7305** (8/64): Pope 1988 (1660-1710); Oswald 1969 (17th century Barnstaple pipe); Grant and Jemmett 1985 (1660-1710).
- #17) 6886** (7/64): Pope 1988 (1660-1710); Oswald 1969 (17th century Barnstaple pipe); Grant and Jemmett 1985 (1660-1710).
- #18) 7118** (7/64): Pope 1988 (1660-1710); Oswald 1969 (17th century Barnstaple pipe); Grant and Jemmett 1985 (1660-1710).
- #19-21) 5695a-c** (3 bowls) (7/64): Pope 1988 (1660-1710); Oswald 1969 (17th century Barnstaple pipe); Grant and Jemmett 1985 (1660-1710).

Event 16: Destruction of Storehouse, Dutch 1673 (40 bowls).

- #1) 143089** (8/64): Oswald 1975 (1600-40); Noel Hume 1969 (1610-40); Atkinson & Oswald 1969 (1610-40).
- #2) 138552** (8/64): Oswald 1975 (1600-40); Noel Hume 1969 (1610-40); Atkinson & Oswald 1969 (1610-40).

- #3) 143660 (8/64): Pope 1988 (1620-50); Oswald 1975 (1600-40); Noel Hume 1969 (1610-40).
- #4) 132357 (7/64): Pope 1988 (1620-50); Oswald 1975 (1600-40); Noel Hume 1969 (1610-40).
- #5) 132645 (6/64): Pope 1988 (1620-50); Oswald 1975 (1600-40); Noel Hume 1969 (1610-40).
- #6) 132797 (7/64): Oswald 1975 (1640-60); Noel Hume 1969 (1620-60); Atkinson & Oswald 1969 (1640-60).
- #7) 134056 (7/64): Oswald 1975 (1640-60); Noel Hume 1969 (1620-60); Atkinson & Oswald 1969 (1640-60).
- #8) 129653 (6/64): Oswald 1975 (1640-60); Noel Hume 1969 (1620-60); Atkinson & Oswald 1969 (1640-60).
- #9) 56298 (7/64): Oswald 1975 (1640-60); Noel Hume 1969 (1620-60); Atkinson & Oswald 1969 (1640-60).
- #10) 62072 (6/64): Oswald 1975 (1640-70); Pope 1988 (1640-80); Noel Hume 1969 (1645-65).
- #11) 66745 (7/64): Atkinson & Oswald 1969 (1660-80); Oswald 1975 (1660-80).
- #12) 151004 (7/64): Noel Hume 1969 (1650-80); Atkinson & Oswald 1969 (1680-1710).
- #13) 76902 (7/64): Noel Hume 1969 (1680-1710); Atkinson & Oswald 1969 (1680-1710).
- #14) 144318 (no measurement): Oswald in Fairclough 1976 (c.1730?).
- #15) 48002 (7/64) MM on bowl: Noel Hume 1969 (1680-1710); Oswald 1975 (1730-60); Pope 1988 (1660-1710).
- #16) 77811 (7/64): Pope 1988 (1660-1710); Oswald 1975 (1670-80).
- #17) 149342 (no measurement) MM on heel: Pope 1988 (1660-1710?); Grant and Jemmett 1985 (1660-1710).

- #18) 77693 (8/64): Atkinson & Oswald 1969 (1660-80); Pope 1988 (1640-80).
- #19) 149316 (7/64): Atkinson & Oswald 1969 (1660-80); Noel Hume 1969 (1645-65).
- #20) 41375 (7/64): Pope 1988 (1660-1710); Oswald 1969 (17th century Barnstaple pipe); Grant and Jemmett 1985 (1660-1710).
- #21) 37843 (7/64): Pope 1988 (1660-1710); Oswald 1969 (17th century Barnstaple pipe); Grant and Jemmett 1985 (1660-1710).
- #22) 41100 (7/64): Pope 1988 (1660-1710); Oswald 1969 (17th century Barnstaple pipe); Grant and Jemmett 1985 (1660-1710).
- #23) 41374 (7/64): Pope 1988 (1660-1710); Oswald 1969 (17th century Barnstaple pipe); Grant and Jemmett 1985 (1660-1710).
- #24) 41088 (7/64): Pope 1988 (1660-1710); Oswald 1969 (17th century Barnstaple pipe); Grant and Jemmett 1985 (1660-1710).
- #25) 42384 (6/64): Pope 1988 (1660-1710); Oswald 1969 (17th century Barnstaple pipe); Grant and Jemmett 1985 (1660-1710).
- #26) 42011 (8/64): Pope 1988 (1660-1710); Oswald 1969 (17th century Barnstaple pipe); Grant and Jemmett 1985 (1660-1710).
- #27) 79103 (6/64): Pope 1988 (1660-1710); Oswald 1969 (17th century Barnstaple pipe); Grant and Jemmett 1985 (1660-1710).
- #28) 40083 (8/64): Pope 1988 (1660-1710); Oswald 1969 (17th century Barnstaple pipe); Grant and Jemmett 1985 (1660-1710).
- #29) 41373 (7/64): Pope 1988 (1660-1710); Oswald 1969 (17th century Barnstaple pipe); Grant and Jemmett 1985 (1660-1710).
- #30) 41086 (7/64): Pope 1988 (1660-1710); Oswald 1969 (17th century Barnstaple pipe); Grant and Jemmett 1985 (1660-1710).
- #31) 42650 (8/64): Pope 1988 (1660-1710); Oswald 1969 (17th century Barnstaple pipe); Grant and Jemmett 1985 (1660-1710).

- #32) 66537 (6/64): Pope 1988 (1660-1710); Oswald 1969 (17th century Barnstaple pipe); Grant and Jemmett 1985 (1660-1710).
- #33) 66658 (7/64): Pope 1988 (1660-1710); Oswald 1969 (17th century Barnstaple pipe); Grant and Jemmett 1985 (1660-1710).
- #34) 131842 (8/64): Pope 1988 (1660-1710); Oswald 1969 (17th century Barnstaple pipe); Grant and Jemmett 1985 (1660-1710).
- #35) long stem & bowl (no #?) (7/64): Pope 1988 (1660-1710); Oswald 1969 (17th century Barnstaple pipe); Grant and Jemmett 1985 (1660-1710).
- #36) 60790 (no measurement): Atkinson & Oswald 1969 (1660-80); Oswald 1975 (1660-80).
- #37) 60156 (no measurement): Oswald 1975 (1660-80); Pope 1986 analysis (1660-80); Noel Hume 1969 (1650-80).
- #38) 143808 (no measurement): Oswald 1975 (1660-80); Pope 1986 analysis (1660-80); Noel Hume 1969 (1650-80).
- #39) 48012 (6/64): Pope 1988 (1660-1710); Oswald 1969 (17th century Barnstaple pipe); Grant and Jemmett 1985 (1660-1710).
- #40) 45054 (7/64): Pope 1988 (1660-1710); Oswald 1969 (17th century Barnstaple pipe); Grant and Jemmett 1985 (1660-1710).

Event 15: Collapse of the seawall, Dutch 1673 (2 bowls).

- #1) 187812 (6/64): Noel Hume 1969 (1645-65); Atkinson & Oswald 1969 (1660-80); Atyo 1979 (1660-80).
- #2) 187788 (7/64): Pope 1988 (1660-1710); Oswald 1969 (17th century Barnstaple pipe); Grant and Jemmett 1985 (1660-1710).

Event 45: Cowhouse occupation/destruction layer, French attack of 1696 (20 bowls).

- #1) 38698 (6/64):** Noel Hume 1969 (1690-1750); Atkinson & Oswald 1969 (1690-1720).
- #2) 84416 (7/64) MM on bowl:** Noel Hume 1969 (1680-1710); Atkinson & Oswald 1969 (1700-40); Walker 1977 (1660-82); Faulkner 1987 (1660-97).
- #3) 40528 (7/64):** Atkinson & Oswald 1969 (1700-40); Walker 1977 (1690-1720).
- #4) 40962 (6/64):** Noel Hume 1969 (1700-70); Atkinson & Oswald 1969 (1700-70); Walker 1977 (1690-1720).
- #5) 41338 (5/64):** Noel Hume 1969 (1700-70); Atkinson & Oswald 1969 (1700-70); Walker 1977 (1690-1720).
- #6) 81192 (7/64):** Pope 1988 (1660-1710); Oswald 1969 (17th century Barnstaple pipe); Grant and Jemmett 1985 (1660-1710).
- #7) 149762 (7/64):** Pope 1988 (1660-1710); Oswald 1969 (17th century Barnstaple pipe); Grant and Jemmett 1985 (1660-1710).
- #8) 84388 (7/64):** Pope 1988 (1660-1710); Oswald 1969 (17th century Barnstaple pipe); Grant and Jemmett 1985 (1660-1710).
- #9) 40419 (7/64) MM on heel:** Pope 1988 (1660-1710); Oswald 1969 (17th century Barnstaple pipe); Grant and Jemmett 1985 (1660-1710).
- #10) 125441 (6/64):** Pope 1988 (1660-1710); Oswald 1969 (17th century Barnstaple pipe); Grant and Jemmett 1985 (1660-1710).
- #11) 44902 (7/64):** Pope 1988 (1660-1710); Oswald 1969 (17th century Barnstaple pipe); Grant and Jemmett 1985 (1660-1710).
- #12) 41340 (6/64) MM on heel:** Pope 1988 (1660-1710); Oswald 1969 (17th century Barnstaple pipe); Grant and Jemmett 1985 (1660-1710).
- #13) 54531 (7/64):** Pope 1988 (1660-1710); Oswald 1969 (17th century Barnstaple pipe); Grant and Jemmett 1985 (1660-1710).

- #14) 41288 (6/64): Pope 1988 (1660-1710); Oswald 1969 (17th century Barnstaple pipe); Grant and Jemmett 1985 (1660-1710).
- #15) 151694 (7/64): Pope 1988 (1660-1710); Oswald 1969 (17th century Barnstaple pipe); Grant and Jemmett 1985 (1660-1710).
- #16) 40523 (6/64): Pope 1988 (1660-1710); Oswald 1969 (17th century Barnstaple pipe); Grant and Jemmett 1985 (1660-1710).
- #17) 82484 (7/64): Pope 1988 (1660-1710); Oswald 1969 (17th century Barnstaple pipe); Grant and Jemmett 1985 (1660-1710).
- #18) 161244 (6/64): Pope 1988 (1660-1710); Oswald 1969 (17th century Barnstaple pipe); Grant and Jemmett 1985 (1660-1710).
- #19) 149652 (7/64): Pope 1988 (1660-1710); Oswald 1969 (17th century Barnstaple pipe); Grant and Jemmett 1985 (1660-1710).
- #20) 85546 (7/64): Pope 1988 (1660-1710); Oswald 1969 (17th century Barnstaple pipe); Grant and Jemmett 1985 (1660-1710).

Event 33: Cowhouse occupation/destruction layer, French attack of 1696? (5 bowls).

- #1) 44910 (7/64): Pope 1988 (1660-1710); Oswald 1969 (17th century Barnstaple pipe); Grant and Jemmett 1985 (1660-1710).
- #2) 44903 (7/64): Pope 1988 (1660-1710); Oswald 1969 (17th century Barnstaple pipe); Grant and Jemmett 1985 (1660-1710).
- #3) 141935 (7/64): Pope 1988 (1660-1710); Oswald 1969 (17th century Barnstaple pipe); Grant and Jemmett 1985 (1660-1710).
- #4) 31159 (7/64): Pope 1988 (1660-1710); Oswald 1969 (17th century Barnstaple pipe); Grant and Jemmett 1985 (1660-1710).
- #5) 63049 (7/64): Pope 1988 (1660-1710); Oswald 1969 (17th century Barnstaple pipe); Grant and Jemmett 1985 (1660-1710).

Event 53: Clay and shattered rock associated with Event 45 occupation/destruction (2 bowls).

#1) 152138 (6/64): Noel Hume 1969 (1700-70); Atkinson & Oswald 1969 (1700-70); Walker 1977 (1690-1720).

#2) 152159 (7/64): Pope 1988 (1660-1710); Oswald 1969 (17th century Barnstaple pipe); Grant and Jemmett 1985 (1660-1710).

Event 25: Early-mid 18th century occupation layer (16 bowls).

#1) 50638 (no measurement) MM on side of bowl: Oswald 1975 (1706-23); Mark 1968 (1680-1730).

#2) 42264 (5/64) MM on side of bowl: Oswald 1975 (1706-23); Mark 1968 (1680-1730).

#3) 47083 (no measurement) MM on side of bowl: Oswald 1975 (1706-23); Mark 1968 (1680-1730).

#4) 40327 (5/64) MM on side of bowl: Oswald 1975 (1716-49).

#5) 79645 (6/64): Noel Hume 1969 (1700-70); Atkinson & Oswald 1969 (1700-70); Walker 1977 (1690-1720).

#6) 38406 (6/64): Noel Hume 1969 (1700-70); Atkinson & Oswald 1969 (1700-70); Walker 1977 (1690-1720).

#7) 41889 (5/64): Noel Hume 1969 (1700-70); Atkinson & Oswald 1969 (1700-70); Walker 1977 (1690-1720).

#8) 85272 (6/64): Noel Hume 1969 (1700-70); Atkinson & Oswald 1969 (1700-70); Walker 1977 (1690-1720).

#9) 38024 (6/64): Pope 1988 (1660-1710); Oswald 1969 (17th century Barnstaple pipe); Grant and Jemmett 1985 (1660-1710).

#10) 42387 (7/64): Pope 1988 (1660-1710); Oswald 1969 (17th century Barnstaple pipe); Grant and Jemmett 1985 (1660-1710).

- #11) 38410** (7/64): Oswald 1975 (1660-1680).
- #12) 24856** (5/64): Noel Hume 1969 (1700-70); Atkinson & Oswald 1969 (1700-70); Walker 1977 (1690-1720).
- #13) 77733** (6/64): Noel Hume 1969 (1700-70); Atkinson & Oswald 1969 (1700-70); Walker 1977 (1690-1720).
- #14) 44466** (6/64): Noel Hume 1969 (1700-70); Atkinson & Oswald 1969 (1700-70); Walker 1977 (1690-1720).
- #15) 41693** (6/64): Noel Hume 1969 (1700-70); Atkinson & Oswald 1969 (1700-70); Walker 1977 (1690-1720).
- #16) 40966** (6/64): Noel Hume 1969 (1700-70); Atkinson & Oswald 1969 (1700-70); Walker 1977 (1690-1720).

MAKER'S MARKS AND DECORATIONS ON 39 AREA C PIPES

- All Maker's Marks and decorated pipes are taken from the following Events in accordance with Area C's stratigraphic sequence:

- | | |
|--|--|
| <ul style="list-style-type: none"> - Event 26 - Event 8 - Stratum 3(3a) - Event 6 - Event 44 - Event 9 | <ul style="list-style-type: none"> - Event 16 - Stratum 1a - Event 45 - Event 33 - Event 53 - Event 25 |
|--|--|

Analysis includes: Maker Mark identification, source(s) of identification, along with pipe bowl dating and bore measurement where appropriate.

Event 26: Early West Country occupation (1 decorated stem)

#1) 48421 (6/64): Moulded stem (Dutch design) Possible fragment of **Raleigh** pipe?

- Oswald 1975 (1630-50)
- Brongers 1964 (1620-40)
- Duco 1981 (1630-50)

Event 8: Initial fill layer in Area C (2 decorated stems).

#1) 72668 (7/64): Multiple Fleur de Lys pattern on stem.

- Bradley & DeAngelo 1981 (17th century date)
- Oswald 1969 (no date, Dutch origin)

#2) 152878 (8/64): Fleur de Lys and rouletted stem design.

- Oswald 1969 (no date, Dutch origin)

Stratum 3 (3a): Fill layer discovered in 1986, equivalent to Event 8 (2 Maker's marks).

#1) 5816 (8/64): Complete bowl w/ **RC** maker's mark on heel.

- Pope 1988 (1640-70)
- Atkinson & Oswald 1969 (1640-70)

#2) 5540 (no measurement): Near complete bowl with crude **8 spoked wheel** maker's mark on heel.

- Pope 1986 analysis (1640-70)
- Oswald 1969 (no date, just identification)
- bowl shape date (1640-60), Atkinson & Oswald 1969
- Tatman 1985 (1650-60)

Event 6: Occupation layer above flagstone floor in storehouse (1 decorated stem).

#1) 45619 (7/64): Moulded stem with raised floral designs (Dutch?).

- Brongers 1964 (beginning of 17th century)
- Oswald 1969 (Dutch 17th century)
- similar to "Baroque" style in Oswald 1975 (1620-40)
- Oswald in Fairclough 1976 (c. 1640)

Event 44: Occupation layer from storehouse floor (1 bowl w/MM and 1 decorated stem w/MM).

#1) 59986 (8/64): Near complete bowl w/ **crowned rose and I.H.** maker's mark on the heel (Dutch?).

- Exact duplicate in Oswald 1969 (no date, Dutch origin)
- crowned rose design in Oswald 1975 (1620-40)
- bowl shape date (1610-40), Atkinson & Oswald 1969

#2) 151671 (7/64): decorated stem with rouletting, diamond shapes and **LE** makers mark, attributed to **Lluellin Evans** (1661-1688).

- Oswald 1975 (1661-88)
- Camp 1982 (1661-1688)
- Faulkner 1987 (1661-86)

Event 9: Destruction of storehouse, Dutch 1673 (3 Maker's marks and 3 decorated stems).

- #1) **154184** (7/64): Multiple Fleur de Lys pattern on stem.
 - Pernambucano de Mello, in Davey 1983 (1634-54)
 - Bradley & DeAngelo 1981 (17th century date)
 - Oswald 1969 (no date, Dutch origin)
- #2) **154095** (7/64): Multiple Fleur de Lys pattern on stem.
 - Bradley & DeAngelo 1981 (17th century date)
 - Oswald 1969 (no date, Dutch origin)
- #3) **154109** (7/64): Moulded stem, Dutch?, **Raleigh pipe** stem fragment.
 - Oswald 1975 (1630-50)
 - Brongers 1964 (1620-40)
 - Duco 1981 (1635-65)
- #4) **44067** (no measurement): Pipe heel with **BA RVM** maker's mark.
 - attributed to Barnstaple by Oswald 1969 (no date)
 - bowl shape date (1660-1710) Pope 1988
 - Grant and Jemmett 1985 (1660-1710)
- #5) **73745** (7/64): Heart-shaped pipe heel w/ **WP** maker's mark.
 - ????
- #6) **30770** (7/64): Pipe heel with **BA RVM** maker's mark.
 - attributed to Barnstaple by Oswald 1969 (no date)
 - bowl shape date (1660-1710) Pope 1988
 - Grant and Jemmett 1985 (1660-1710)

Event 16: Destruction of storehouse, Dutch 1673 (2 Maker's marks).

- #1) **149342** (no measurement): Partial bowl with **BA RVM** maker's mark on the heel.
 - attributed to Barnstaple by Oswald 1969 (no date)
 - bowl shape date (1660-1710) Pope 1988
 - Grant and Jemmett 1985 (1660-1710)

#2) 48002 (7/64): Partial bowl with **WE** maker's mark on back of bowl.

- attributed to **William Evans** (c.1660) Camp 1982
- **WE** maker's mark dated by Oswald 1975 (1670-1700)
- Faulkner 1987 (1660-1697)
- Walker 1977 (1660-82)

Stratum 1a: Destruction layer discovered in 1986. Equivalent to Event's 9 & 16 (2 Maker's marks and 3 decorated stems).

#1) 7318 (no measurement): Pipe heel with **BA RVM** maker's mark.

- attributed to Barnstaple by Oswald 1969 (no date)
- bowl shape date (1660-1710) Pope 1988
- Grant and Jemmett 1985 (1660-1710)

#2) 3078a (7/64): Small stem fragment with single Fleur de Lys stamp.

- Bradley & DeAngelo 1981 (17th century date)
- Oswald 1969 (no date, Dutch origin)

#3-4) 27960/ 27961 (join) (6/64): Stem fragment with spiral fluting.

- Bradley & DeAngelo 1981 (late 17th century)
- Rutter & Davey in Davey 1980 (1700-60)

#5) 16421 (5/64): Near complete bowl w/ crowned suns on each side of the heel.

- bowl dates (1700-70), Atkinson & Oswald 1969
- illustrated in Oswald 1975 (no date)
- identified as crowned rosettes by Laws & Oswald in Davey 1981 (18th century)
- Mark 1968 (1700-40)

Event 45: Cowhouse occupation/destruction layer, French attack of 1696 (9 Maker's marks).

#1)40419 (7/64): Complete bowl w/ **BA RVM** maker's mark on the heel.

- attributed to Barnstaple by Oswald 1969 (no date)
- bowl shape date (1660-1710) Pope 1988
- Grant and Jemmett 1985 (1660-1710)

#2) 84416 (7/64): Complete bowl with **WE** maker's mark on the back of bowl.

- attributed to **William Evans** (c.1660) Camp 1982
- **WE** maker's mark dated by Oswald 1975 (1670-1700)
- Faulkner 1987 (1660-1697)
- Walker 1977 (1660-82)

#3) 41340 (6/64): Near complete bowl w/ maker's mark on the heel (**star surrounded by circles**), Dutch origin?

- Oswald 1969 (1680-1700)
- Pipe bowl style from last quarter of 17th century.
- Duco 1981 (1670-90)

#4) 41357 (6/64): Partial pipe bowl with only a portion of a maker's mark on the side of the bowl, appears to be **E REED**.

- Oswald 1975 identifies as **Edward Reed**, 1706-23)
- Walker 1977 (1706-23)
- Mark 1968 (1680-1730)

#5) 38870 (6/64): Partial pipe bowl with maker's mark **R/B** on sides of heel.

- Oswald 1969 identifies as **Rodger Browne** (c.1750)

#6-8) 149519, 41207, 41692 (5/64): Stem fragments bearing the mark **RVB SID NEY**.

- Possibly **Reuden Sydney** (1697-1748) as described in Oswald 1975.

#9) 40529 (no measurement): Bowl fragment with **RT** mark on the back of bowl.

- Alexander in Davey 1983 identifies this mark as **Robert Tippet** (1690-1725)
- Mark 1968 (1680-1730)

Event 33: Cowhouse occupation/destruction layer, French attack of 1696 (1 decorated stem).

#1) 38231 (7/64): decorated stem with line of dots within circles and progressively wider lines of rouletting (Dutch origin?).

- Alexander in Davey 1983 identifies this design as possibly Dutch (1700-25)
- Faulkner 1987 refers to this design as chain and dentate pattern (1650-1700's)
- similar style dating (c.1700) of Dutch manufacture, Oswald in Fairclough 1976
- Walker and Wells in Davey 1979 found these designs in a 1716-50 context

Event 53: Clay and shattered rock associated with Event 45 occupation/destruction (1 Maker's mark and 1 decorated stem).

#1) 149656 (7/64): decorated stem with rouletting, diamond shapes and LE makers mark, attributed to **Lluellin Evans** (1661-1688).

- Oswald 1975 (1661-88)
- Camp 1982 (1661-1688)
- Faulkner 1987 (1661-86)

#2) 152190 (7/64): decorated stem with diamond patterns.

- Faulkner 1987 refers to this design as open diamond chain, Dutch design (1650's-1700's)
- Oswald in Fairclough 1976, Dutch (1640-90)

Event 25: Early-mid 18th century occupation layer (6 Maker's marks).

#1) 42264 (5/64): Partial pipe bowl with only a portion of a maker's mark on the side of the bowl, appears to be **E REED**.

- Oswald 1975 identifies as **Edward Reed**, 1706-23)
- Walker 1977 (1706-23)
- Mark 1968 (1680-1730)

#2) 50638 (no measurement): Partial pipe bowl with only a portion of a maker's mark on the side of the bowl, appears to be **E REED**.

- Oswald 1975 identifies as **Edward Reed**, 1706-23)
- Walker 1977 (1706-23)
- Mark 1968 (1680-1730)

#3) 47083 (no measurement): Partial pipe bowl with only a portion of a maker's mark on the side of the bowl, appears to be **E REED**.

- Oswald 1975 identifies as **Edward Reed**, 1706-23)
- Walker 1977 (1706-23)
- Mark 1968 (1680-1730)

#4) 38018 (5/64): Stem fragment with the maker's mark **RVB SID NEY**.

- Possibly **Reuden Sydney** (1697-1748) as described in Oswald 1975.

#5) 45012 (5/64): Stem fragment with the maker's mark **RVB SID NEY**.

- Possibly **Reuden Sydney** (1697-1748) as described in Oswald 1975.

#6) 40327 (6/64): Pipe bowl fragment with maker's mark **IB** on the side of the bowl.

- Oswald 1975 **John Bryant** (1716-1749)

APPENDIX C

AREA C ROOF SLATE DISTRIBUTION

(According to Event and excavation unit: including both complete slates and fragments)

Event 16

E74 N34= 1	E84 N39= 28
E80 N31= 1	E85 N31= 1
E80 N33= 42	E85 N33= 54
E80 N34= 14	E85 N34= 27
E81 N24= 1	E85 N36= 12
E81 N31= 1	E85 N35= 1
E81 N32= 1	E85 N39= 1
E81 N33= 31	E86 N33= 28
E81 N34= 48	E86 N34= 5
E82 N16= 13	E86 N35= 3
E82 N31= 74	E86 N36= 1
E82 N32= 2	E86 N39= 33
E82 N33= 77	E87 N30= 33
E82 N35= 78	E87 N31-2= 6
E83 N16= 1	E87 N34= 19
E83 N23= 2	E87 N35= 5
E83 N31= 64	E87 N36= 5
E83 N32= 2	E87 N37= 4
E83 N33= 74	E87 N38= 28
E83 N35= 60	E87 N39= 18
E83 N39= 16	E88 N30= 30
E84 N32= 1	E88 N34= 1
E84 N33= 1	E88 N35= 23
E84 N34= 158	E88 N36= 1
E84 N35= 60	E88 N40= 40
E84 N36= 25	E89 N35= 1
E84 N38= 25	E89 N40= 1

Total roof slates in Event 16: **1,282**

Event 9

E71 N31= 1
 E73 N24= 1
 E73 N25= 1
 E73 N29= 5
 E74 N27= 2
 E74 N35= 4
 E76 N30= 15
 E76 N32= 41
 E76 N33= 8
 E76 N34= 38
 E76 N36= 4
 E77 N27= 3
 E77 N31= 47
 E77 N32= 22
 E77 N34= 1
 E77 N35= 1

E78 N21= 19
 E78 N24= 1
 E78 N31= 9
 E78 N32= 20
 E78 N33= 86
 E78 N33-5= 2
 E78 N35= 3
 E78 N39= 1
 E78-9 N21= 36
 E79 N31= 8
 E79 N32= 13
 E79 N33= 2
 E79 N34= 63
 E79 N35= 40
 E79 N37= 1
 E80 N24= 1

Total roof slates in Event 9: **499**

Event 6

E70 N34= 1
 E72 N34= 36
 E73 N33= 19
 E73 N34= 45
 E74 N24= 1
 E74 N31= 1
 E74 N33= 10

E74 N34= 95
 E75 N34= 20
 E78 N33= 1
 E78 N34= 1
 E80 N33= 36
 E80 N34= 39

Total roof slates in Event 6: **305**

Event 19

E76 N32= 1
 E79 N32= 1
 E82 N31= 52
 E84 N38= 9
 E85 N30= 2
 E85 N34= 94

E85 N38= 2
 E87 N29= 1
 E87 N35= 2
 E87 N37= 2
 E89 N34= 7

Total roof slates in Event 19: **173**

Event 44

E81 N31= 1
 E82 N32= 1
 E83 N31= 2

E87 N34= 2
 E88 N34= 1
 E88 N37= 1

Total roof slates in Event 44: **8**

Event 45

E82 N26= 2
 E84 N23= 27
 E88 N35= 1
 E89 N35= 51

Total roof slates in Event 45: **81**

Event 47

E77 N33-5= 10
 E81 N26= 39
 E83 N25= 16
 E83 N27= 4
 E84 N24= 1

E84 N26= 1
 E84 N29= 21
 E85 N30= 3
 E86 N28= 1

Total roof slates in Event 47: **96**

MISCELLANEOUS EVENTS**Stratum 1 (1986)**

E 72 N34= 10

Stratum 1a (1986)

E72 N32= 15

E72 N33= 33

E72 N34= 14

E72 N35= 1

Feature 1

No Event= 748

Feature 1a (Privy)

Event 49= 4

Event 50= 2

Event 114= 1

Event 128= 12

No Event= 3

Event 0

E67 N16= 1

E81 N30= 16

E86 N36= 1

Event 5

E70-1 N36-7= 3

Event 8

E81 N26= 23

Event 22

E84 N32= 1

Event 29

E80 N26= 15

E80 N27= 2

Event 30

E81 N28= 11

E85 N30= 1

Event 38

E77 N31= 1

Event 39

E80 N23= 13

Event 67

E66 N32= 21

E66 N33= 1

Event 156

E68 N34= 1

Event 195

E86 N39= 1

E87 N30= 2

E87-9 N28= 11

E88 N27= 43

E89 N30= 1

Total roof slates in Misc. Events: 1,012

NO EVENTS

FLD-C= 51
E69 N17= 1
E69 N21= 28
E70 N33-5= 7
E71 N33= 41
E71 N34= 7
E77 N33= 2
E82 N26= 1
E83 N25= 97
E84 N34= 1
E84 N39= 3
E85 N34= 2

Total roof slates with no Events: **241**

TOTAL ROOF SLATES (both whole and fragmentary) FROM AREA C: 3,697

ANALYSIS OF COMPLETE ROOF SLATES

The following results are from the analysis of complete roof slates (207) excavated at Area C. Slates were sorted according to length and width.

Four different slate lengths were used to roof the storehouse. When each length group was nailed to the roof, it was necessary to have a variety of different widths because every slate had to cover the junction of the two slates below it. Therefore, each length group also contained a variety of widths.

6 INCH RANGE (length range from 6 to $6\frac{3}{4}$ inches; three different widths)

- $3\frac{1}{4}$ to $3\frac{3}{4}$ inches wide (5 slates)
- 4 to $4\frac{3}{4}$ inches wide (24 slates)
- 5 to $5\frac{3}{4}$ inches wide (12 slates)

TOTAL SLATES IN 6 INCH RANGE = 41

7 INCH RANGE (length range from 7 to $7\frac{3}{4}$ inches; six different widths)

- $3\frac{1}{4}$ to $3\frac{3}{4}$ inches wide (7 slates)
- 4 to $4\frac{3}{4}$ inches wide (23 slates)
- 5 to $5\frac{3}{4}$ inches wide (31 slates)
- 6 to $6\frac{3}{4}$ inches wide (29 slates)
- 7 to $7\frac{1}{4}$ inches wide (5 slates)
- 8 to $8\frac{1}{4}$ inches wide (3 slates)

TOTAL SLATES IN 7 INCH RANGE = 98

8 INCH RANGE (length range from 8 to $8\frac{3}{4}$ inches; seven different widths)

- $3\frac{1}{4}$ to $3\frac{1}{2}$ inches wide (2 slates)
- 4 to $4\frac{3}{4}$ inches wide (9 slates)
- 5 to $5\frac{3}{4}$ inches wide (14 slates)
- 6 to $6\frac{1}{2}$ inches wide (16 slates)
- 7 to $7\frac{1}{2}$ inches wide (14 slates)
- 8 to $8\frac{3}{4}$ inches wide (3 slates)
- 9 to $9\frac{3}{4}$ inches wide (2 slates)

TOTAL SLATES IN 8 INCH RANGE = 60

10 INCH RANGE (length range from $10\frac{1}{4}$ to $10\frac{3}{4}$ inches; four different widths)

- 5 to $5\frac{3}{4}$ inches wide (3 slates)
- 8 to $8\frac{1}{2}$ inches wide (3 slates)
- 12 inches wide (1 slate)
- $14\frac{1}{2}$ inches wide (1 slate)

TOTAL SLATES IN 11 INCH RANGE = 8



