

**THE STUDY AND ANALYSIS OF THE KAOLIN CLAY TOBACCO PIPE  
COLLECTION FROM THE SEVENTEENTH-CENTURY  
ARCHAEOLOGICAL SITE OF PORT ROYAL, JAMAICA**

A Dissertation

by

**GEORGIA LYNNE FOX**

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

**DOCTOR OF PHILOSOPHY**

**August 1998**

**Major Subject: Anthropology**

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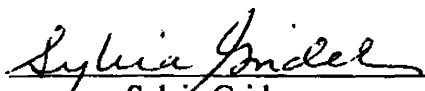
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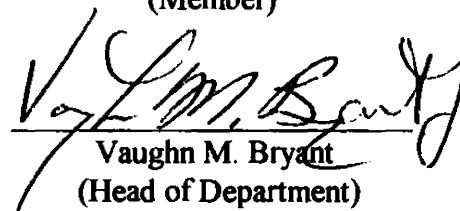
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Binford method was more reliable, because Heighton/Deagan dates were consistently off by 20 years or more.

The Port Royal pipes also reflect other trends within the context of 17th-century English economy and society. The desire for tobacco fueled a tobacco-growing economy in the Chesapeake colonies, which necessitated the manufacture of clay pipes in England. The production of clay pipes also reflects pre-industrial manufacturing and consumerism fueled by English colonization and trade, which eventually propelled England into a position of dominance in the world system. The desire for novel types of food and drink, as well as tobacco, resulted in the adoption of new customs and habits into English society, particularly in public institutions like the tavern.

## ACKNOWLEDGMENTS

For anyone who has experienced the joys and rigors of graduate school and writing a dissertation, long hours of research and time spent at the computer make scholarly pursuit seem like a very solitary journey, but in reality, no work is ever complete without the help and encouragement of mentors and friends along the way.

My life took a new turn the day I left Santa Barbara, California, for the fieldschool in Port Royal, Jamaica, in June of 1986. It is through the mentorship of Dr. Donny Hamilton, who directed that fieldschool, that I owe so much for all he has taught me over the years. I will always be grateful to Dr. Hamilton for his encouragement, patience, and support in my training as an archaeologist. Another mentor, Dr. Bruce Dickson, has figured importantly in my education and training. His humor, good advice, and friendship over the years have been instrumental in my development as a scholar and teacher. Dr. Sylvia Grider changed my whole perception of the material world and showed me how to discover the extraordinary in everyday life. Her graduate seminars were some of the best that I experienced in my education, and her rigorous standards of scholarship will serve as my guide in future endeavors. I am also indebted to Drs. Kevin Crisman and Jonathan Smith for their helpful suggestions in my research.

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## CHAPTER I

### INTRODUCTION TO THE STUDY AND METHODOLOGY

#### Brief Overview

On disembarking at Port Royal, English settlers found themselves “on one of the world’s greatest harbors, with the majestic Blue Mountains piling up on the horizon--a bigger harbor and taller mountains than any at home” (Dunn 1973:36). That vision changed as a devastating earthquake shook Port Royal to its very foundations shortly before noon on June 7, 1692. For Port Royal’s citizens, life would never be the same as more than half of their town sunk to the bottom of Kingston Harbor.

The earthquake marked the end of England’s most thriving port city in the Caribbean, but left as its greatest legacy thousands of well-preserved archaeological remains, which offer a glimpse into 17th-century society and culture. Among the artifacts, there is no other more ubiquitous than the English kaolin clay pipe. More than 20,000 pipes were recovered between 1981 and 1990, and their presence tells a story.

Clay pipes, when interpreted within the broader context of Port Royal and 17th-century English history, reflect the economic and social transformation of a society emerging from an economic crisis. In the transition from a feudal economy to a world system based on colonization and trade, Port Royal and England’s other American colonies figured prominently in England’s economic recovery. The colonies not only provided raw materials for export, but also required goods from the home country. Necessity, however, was not the only motivating factor in the exchange of goods; both at home and in the colonies, people desired new commodities. Exposure, through merchant activity, to a variety of foods and household goods, along with other items, provoked a wave of demand. This demand, in turn, helped stimulate pre-industrial manufacturing and colonial trade, ultimately contributing to England’s economic growth

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This dissertation follows the style and format of *Historical Archaeology*.

and predominance in the expanding world system.

No where is this better demonstrated than in the case of tobacco. Since its introduction to England in the mid-16th century, tobacco was adopted with a zeal that was unprecedented. Consumer demand for tobacco encouraged its cultivation and trade, as well as the manufacture of clay smoking pipes. That 21,575 clay pipes were found in the archaeological remains of Port Royal testifies to the popularity of smoking and its integration as a custom into daily life. As a commodity, clay pipes were one of the first items to be mass produced prior to the Industrial Revolution, and because they were made of fired kaolin clay, they preserve well in the archaeological record.

The aim of this study, therefore, is to demonstrate how the kaolin clay pipe collection from Port Royal reflects such developments both at Port Royal and within the broader historical context of the 17th century. This is accomplished in the next six chapters by the following approaches.

Following a background discussion of Port Royal in Chapter II, the Port Royal pipe assemblage is analyzed for its content and general trends in Chapter III. From the analysis, 61 pipe bowl types are presented in an expandable typology, following a discussion on the evolution of pipe bowl styles. Pipes with makers' marks and decorative elements are also examined.

In Chapter IV, intra-site comparisons of the pipes are presented through their distribution patterns. This analysis is pertinent in ascertaining building function and refuse patterns, and in reconstructing daily life at Port Royal.

Because Port Royal is an historical site, documentary research has played a key role in analyzing the pipes. By consulting port books and probate inventories, it was possible to assess the value and quantity of pipes being shipped to Port Royal from Bristol, England, as well as their retail value in Port Royal, as addressed in Chapter V.

In Chapter VI, the merits of formula dating clay pipe stems are discussed and tested against the 1692 earthquake. By using stem diameter ranges from the buildings and rooms at the site, it was possible to test and compare the Binford and

Heighton/Deagan methods, as well as establish relative dates for the various rooms and buildings at the site, using the Binford method.

Finally, the study of the clay pipes would be incomplete without a discussion of the social and economic factors that led to the adoption of tobacco and its ensuing material culture, as discussed in detail in Chapter VII.

### **Methodology**

The primary data used for this study are the 21,575 kaolin clay smoking pipes excavated during the 1981 to 1990 field seasons at Port Royal, Jamaica, directed by Donny L. Hamilton from the Nautical Archaeology Program at Texas A&M University (TAMU) and the Institute of Nautical Archaeology (INA) and in cooperation with the Jamaica National Heritage Trust. The term "pipes" used in this study refers to an overall collection comprised of whole pipes, bowls, and stem fragments, unless otherwise stated, as when only bowls are being discussed.

Pipes from the 1981-1986 field seasons are stored in the Old Naval Hospital in Port Royal, under the supervision of the Jamaica National Heritage Trust, and those recovered from 1987 to 1990 are housed in the Port Royal artifact collection in the Nautical Archaeology Program at Texas A&M University.

Pipes recovered from all field seasons were drawn and measured, and then recorded in a database file, so that an accurate assessment was possible, especially concerning bowl styles and makers' marks. The pipes recovered from the 1987-1990 field seasons, which represent those pipes recovered from the Building 5/4 complex, were counted, examined for makers' marks, bowl types, and smoked pipes. Similar information from the 1981-1986 field seasons was derived from Becky Jobling's (1992) previous examination, as well as the database file for those years. All the field notes, drawings, and photographs pertaining to pipes recovered from all field seasons were also consulted. Once this information was compiled for all 10 years of excavation, it was then carefully checked and cross-checked and combined in a large database comprised of 21,575 pipes. The database includes information regarding pipe

proveniences, makers' marks, pipe bowl types, stem diameter sizes, smoked pipes, and quantities. From the database, one data set of 18,537 pipes was extracted, representing only the pipes from Layer 3, the in situ 17th-century occupation layer.

From the total database, 61 bowl types were discovered and arranged in an expandable typology based on bowl shape and type of heel. Once completed, the typology showed a discernable evolution of bowl shapes and styles occurring within three centuries, with the greatest changes occurring between 1680 and 1710. Once the bowl types were established, the new bowl type numbers assigned in this study were added to the database in addition to the already existing numbers assigned to them in the field.

Thirty-nine makers' marks were also identified and are included in the catalog in Appendix A. The makers' marks are important for several reasons. First and foremost, they aid in ascribing pipes to specific pipemakers and production centers. In the case of Port Royal, most of the pipes come from Bristol, England, and the makers' marks confirm this; however, there are a few pipes from London, one from Broseley, one from Hull, three from Glasgow, Scotland, and three are Dutch.

Also, by identifying specific pipemakers, date ranges for specific styles and pipemakers can be placed into more discrete time frames. Finally, by examining makers' marks, parallels can be drawn from other sites. This aids in verifying attributions to certain pipemakers and in determining the extent of their export trade.

In determining pipe distribution patterns, counts from the database were taken for specific years and lot numbers of the various rooms and buildings on the site. The same approach was also used when evaluating the range of variation and distribution pattern of stem diameter ranges, smoked pipe bowls, and bowl types.

### **Archival Sources**

Documentary research has proven to be an effective tool in historical archaeology, as demonstrated by Stone (1970:73, 1988:205), Deetz (1977:8, 1993:161), Beaudry (1988:43), Hamilton (1992), and Shackel and Little (1994).

For the study of the Port Royal pipes, two types of documents were consulted; the Port Books for London and Bristol, England, and the Jamaica Probate Inventories. The Port Books were first established in 1428 to record, on behalf of the Exchequer, goods shipped from English ports and the amount of duty paid on them by the shippers, mainly in an effort to prevent fraud on customs. The main series of books were then organized between 1564 and 1565 (Clark and Franks 1938:52; Walne 1972:177).

As part of the Exchequer Series E 190, both the London and Bristol Port Books are housed in the Public Records Office in London, England; however, microfilm copies of the Bristol Port Book Series E 190 for 1682 and 1694-1695 are on file at the Nautical Archaeology Program, Texas A&M University. Some of the existing London Port Books in the London Public Records Office were consulted during a visit there in May 1996.

Overall, the London Port Books were useful in ascertaining when the earliest shipments of clay pipes were sent to the English colonies in North America. Because Bristol was the main production and export center for the Port Royal pipes, the Bristol Port Books proved invaluable in comparing quantities listed to those excavated from the site, in trying to determine the quantity and value of pipes being shipped from Bristol, England, to Jamaica and other colonies, as well as assessing the value of clay pipes during the 17th century. The retail value of the pipes at Port Royal were also assessed by comparing the figures listed in the Bristol Port Books to the values listed in the Jamaica Probate Inventories.

The Jamaica Probate Inventories were the second set of documents pertinent to the study. The inventories are housed in the Jamaica Public Archives office in Spanish Town, Jamaica, but are also available on computerized transcriptions and microfilm at the Nautical Archaeology Program, Texas A&M University. From this collection, 108 inventories from Volumes 2 (1679-1686) and 3 (1686-1694) were consulted. When discussed in the text, the probate inventories of specific individuals are followed by the volume number, folio number(s), and year.

The Jamaica Probate Inventories were most useful in assessing the value of clay pipes, in comparing the quantities of pipes in the archaeological record to the documentary record, in determining the possible retail value of pipes at their point of use in Port Royal, in the packing and storage of pipes, and in the types of smoking-related items used in 17th-century Port Royal.

In addition to the port book and inventories, a fruitful search was conducted at the George Arents Collection at the New York Public Library, which contains a significant number of original and rare source materials dating from the late 16th through 19th centuries on all aspects of tobacco and the social history smoking. The collection was consulted for the discussion on the introduction of tobacco into England and the social history of smoking, as discussed in Chapter VII.

The chief guide to the Arents Collection is the four-volume set by Brooks published in 1937, which was immensely informative to this study. An original copy of Fairholt (1859) in the collection, as well as social histories by Penn (1901) and Apperson (1916) were also useful. Rare anti-smoking tracts written by Brathwait (1617) and James I (1672), provided rich fodder for the discussion on the social history of smoking, as well as original German, Dutch, and French prints of genre scenes depicting pipesmokers in various poses and contexts.

### **Editorial Methods**

A number of 17th-century documents were consulted and quoted for this study. For easier readability, 17th-century letters such as the “f,” which represents an “s,” were replaced with modern-day letters; however, 17th-century spelling was maintained for accuracy, and to retain the flavor of the writing style characteristic of the period. When necessary, clarifications of words are placed in brackets following a word.

Seventeenth-century monetary amounts were spelled out as pounds, shillings, and pence. For journal style usage, units of measure follow the metric system, except for the excavation grid, which is in feet and tenths of feet.



## CHAPTER II

### PORT ROYAL, JAMAICA

#### **Background**

On May 10, 1655, the fleet of William Penn and Robert Venables captured Jamaica from the Spanish with little difficulty. The capture of Jamaica represents a phase in the English colonization of the Caribbean, more commonly known as Oliver Cromwell's "Western Design," which consisted of "a set of badly organized expeditions to the West Indies..." sent in an effort to secure control of the Caribbean (Hamshere 1972:60).

The capture of Jamaica was preceded by an attempted invasion of Hispaniola by Penn and Venables in 1654. Having been forewarned of the invasion, the Spanish easily defeated Penn and Venables. To maintain British honor and placate Cromwell, Penn and Venables then sailed to nearby Jamaica, where they captured the poorly defended island from the Spanish.

The base of English naval operations in Jamaica was the tip of a long sandspit which extended from the southeastern part of the island into what is now known as Kingston Harbor. This area, requiring immediate fortification, soon became the location for Fort Cromwell and the nascent Port Royal. Then known as Point Cagway, Port Royal was ideal for settlement with its deep water, safe anchorage, and flat topography (Figure 1; Pawson and Buisseret 1975:7; Taylor 1965:130-131). Once fortified, Port Royal's advantageous location prompted merchants, sea captains, and craftsmen to settle in Port Royal, so that between 1655 and 1692, Port Royal was the fastest growing colony settled by the English in the New World, and became the most economically important English port in the Americas (Hamilton 1992:40). Following the restoration of the monarchy of Charles II in England in 1660, the name Point Cagway was officially changed to Port Royal, and Fort Cromwell to Fort Charles (Taylor 1965: 131; Pawson and Buisseret 1975:9).

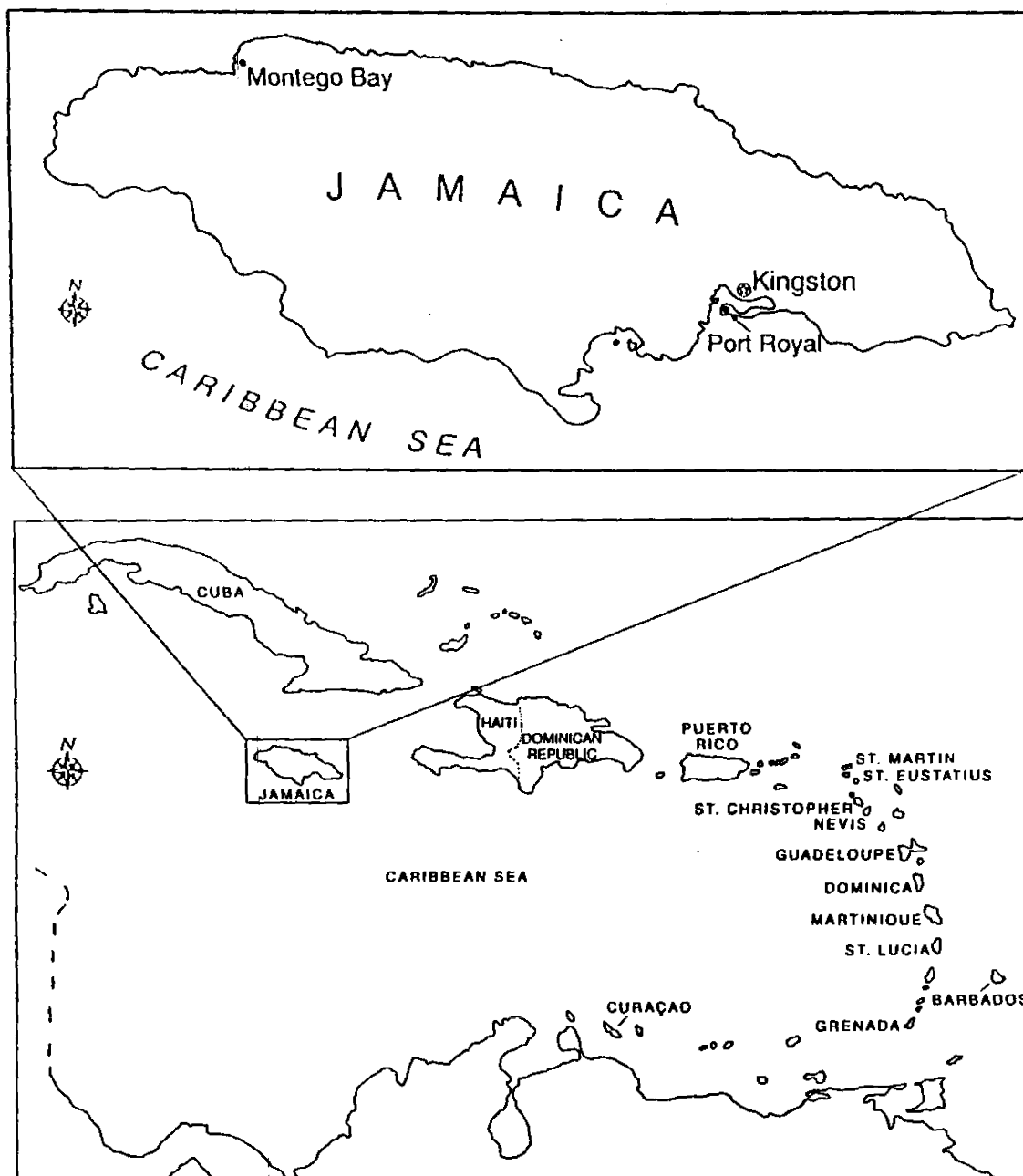


Figure 1. Location of Port Royal, Jamaica (Caribbean map after Dunn 1973: xiv).

### **The Settlement of Port Royal**

Port Royal soon became the headquarters for Colonel Edward D'Oyley, the first civil governor of Jamaica (Black 1979:57; Taylor 1965:131). Port Royal developed quickly, partly as a result of D'Oyley's decision in 1657 to invite English buccaneers from the island of Tortuga to dispose of their plunder at Port Royal (Taylor 1965:133). D'Oyley's clever decision was based on Port Royal's strategic location near Spanish trade routes between Cuba and the Spanish mainland. Although this made the town vulnerable to attack, it provided a unique opportunity to fill Port Royal's coffers quickly and generously. By encouraging buccaneers to make Port Royal their base of operations, the town was protected by their presence, and the inflow of booty from buccaneer raids on Spanish ships and settlements contributed handsomely to Port Royal's growing economy, as the booty was either distributed, sold, or spent in the growing town.

Unfortunately, colonization of Jamaica's interior was rife with disappointment and tragedy as famine, disease, and attacks by surviving resident Spaniards on English settlements took a toll on the early colonists. Following the deployment of British regiments around the island, the Spanish threat subsided and planting was encouraged, particularly through the efforts of Sir Thomas Modyford, who encouraged the immigration of 700 experienced planters from Barbados in 1664 (Sheridan 1973:95).

The types of crops planted on the island varied from provision crops such as peas, cassava, plantains, and yams to cash export crops that included ginger, pimento, cotton, tobacco, indigo, and sugarcane. It was sugar, however, that became Jamaica's leading export by the 1680s (Dunn 1973:168-169).

By 1668, about 800 houses had been built at Port Royal (Taylor 1965:135). By 1692, Port Royal occupied 51 acres and included 2,000 buildings, many constructed of brick (Hamilton 1992:40; Pawson and Buisseret 1975:98-99). Port Royal's appearance depended on one's point of view. For Henry Barham, an English medical doctor, the streets were "very Regular and the Houses Built with Brick and Beautiful with

Balconies after the Modern Way of Building in London and the rents are Dear...” (1722:177).

By 1692, Port Royal’s population comprised between 6,500 and 7,000 inhabitants. This included a large mix of immigrants from Barbados and Bermuda as well as New England and the British Isles. John Taylor (1688:260) described the population as “for the Most part English, the rest are Scotts, and Irish, also here are many Jewes...” An estimated 2,500 African slaves also contributed to Port Royal’s inhabitants, as well as indentured servants and prostitutes from the British Islands and Caribbean. The town also provided refuge for a transient population of buccaneers, sailors, and smugglers (Taylor 1965:134).

As the Caribbean’s busiest port, Port Royal was possibly clearing 150 to 200 vessels a year by 1680 (Zahedieh 1986:220). Given its thriving import/export trade and the amount of minted coinage available, Port Royal appeared as one of the chief bastions of financial opportunity for enterprising merchants and traders (Taylor 1965:134). For example, between 1664 and 1700, about 500 merchants at Port Royal financed many of the island’s plantations. The wealth of these merchants chiefly derived from the sale of imported commodities in Port Royal (Scammell 1989:131; Zahedieh 1986:221). Fortunes were also made through land acquisition, piracy, and smuggling to the extent that Jamaica’s elite was said to have all been “formerly rude and mean of birth” (Scammell 1989:179). Peter Beckford, a merchant and seaman, epitomized the Port Royal “rags to riches” story. Beckford arrived in Port Royal in 1661 as a man of modest means, and by the time of his death in 1710, he left behind a total of 20 plantations and 1,200 slaves (Scammell 1989:179)!

The presence of wealthy merchants not only initiated and encouraged active commerce, but also guaranteed that a wide range of goods were imported to Port Royal. These included basic necessities as well as luxury goods that ensured comfort, and an ever-present reminder of their links to an English society that many of them had left behind. Port Royal, like Boston, not only mimicked larger counterparts like

London, but epitomized a consumer society that played an equally significant role in the Caribbean trade with English-based merchants controlling the flow of goods.

In studying the tax lists of 1687 to 1771 for colonial Boston, James Henretta determined that Boston's merchants controlled 66 percent of the town's wealth in 1687 (1965:78). By the end of the 17th century, these merchant sea captains were among the city's wealthiest individuals. Their presence and commercial activities also contributed to a more diverse and complex city whose social structure was directly influenced by their trade and industry and where traditional patterns of behavior and consumption changed under the influence of their new ideas and lifestyles (Henretta 1965:75; Pendery 1992:64; Weatherill 1988:72).

Under these influences, people learned to use new goods and thereby introduced new modes of interaction among themselves (Weatherill 1988:89). Both the probate inventories (Thornton 1991; 1992) and archaeological evidence indicate a similar scenario at Port Royal. The remains of crystal drinking glasses, pewter plates, tankards and cutlery, objects of silver, Chinese porcelain, and other fine ceramics all testify to the variety in trade goods, consumer tastes, and to a rather sophisticated lifestyle. The probate inventories of several of Port Royal's merchants also indicate the extent of their financial success.

Unfortunately, Port Royal's glory days ended abruptly shortly before noon on June 7, 1692, when a devastating earthquake shook the town to "a heap of rubbish" (*Gentleman's Magazine*, 1750:212). Over 2,000 people perished during the earthquake, and another 2,000 died of disease, injuries, and exposure following the earthquake. In a letter dated June 19, 1692, John Pike, a Quaker living in Port Royal described the disaster to a friend:

The ground opened at Port Royal, where I dwell, with a shake and swallowed whole houses, nay, the street I dwell in was in less than 3 hours after 4 fathom under water...The shake opened the earth, the water flew up and carried the people in quick. I lost my wife, my son, a 'prentice', a white-maid and 6 slaves and all that I ever had in the world [Cadbury, 1971:20].

Besides the violent shaking, the earthquake

was attended with a hollow rumbling noise, like thunder...The shock was so violent, that it threw people down on their knees or their faces, as they ran about to seek a place of safety. The earth heaved and swelled like the rolling billows, and several houses, still standing, were shifted and moved some yards out of their places [*Gentleman's Magazine* 1750:212].

One of the more fortunate individuals, Mordecai Lloyd, survived dropping through the floorboards of his shop into the sand just as the building began to sink. The force of the house pushed aside the sand, carrying Mr. Lloyd away and eventually bringing him to the surface, as he described:

I was at that juncture of time in my shop when on a sudden the earth opened and let me in. Then I was carried under the earth and water a very considerable way until at last I got upon a floor of boards where multitudes lay about me most of them mortally wounded and I amongst them very little hurt. [Cadbury 1971:23].

The earthquake and ensuing seiche wave permanently altered Port Royal, as 33 acres or 66 percent of the town sank into Kingston Harbor (Hamilton 1992:40).

Although attempts were made to salvage what was lost during the earthquake, the town was now reduced from 51 acres to 25 acres of rubble and disarray (Pawson and Buisseret 1975:123). Figure 2 shows the 17th-century coastline in comparison to modern Port Royal.

The immediate inundation of about 65 percent of the town, along with minimal horizontal disturbance during the earthquake, is attributed to a geological process termed "liquefaction" (Hamilton 1990a:4). In this process, the prolonged vibration caused by the massive earthquake shook up the unconsolidated, heavily water-saturated sediments that lie beneath Port Royal. The sediment, comprised of sands, gravels, and silt, acted as a kind of quicksand, thus causing everything on the surface to either sink or float, depending on the density of the object (Clark 1995:37-38; Rapp 1986:367). This explains why the heavy brick buildings of Port Royal sank in situ, and why lighter materials floated, as one observer noted that "all the houses run down with the land into the sea" and that some people were "cut in pieces by timber floating" (Cadbury 1971:21).

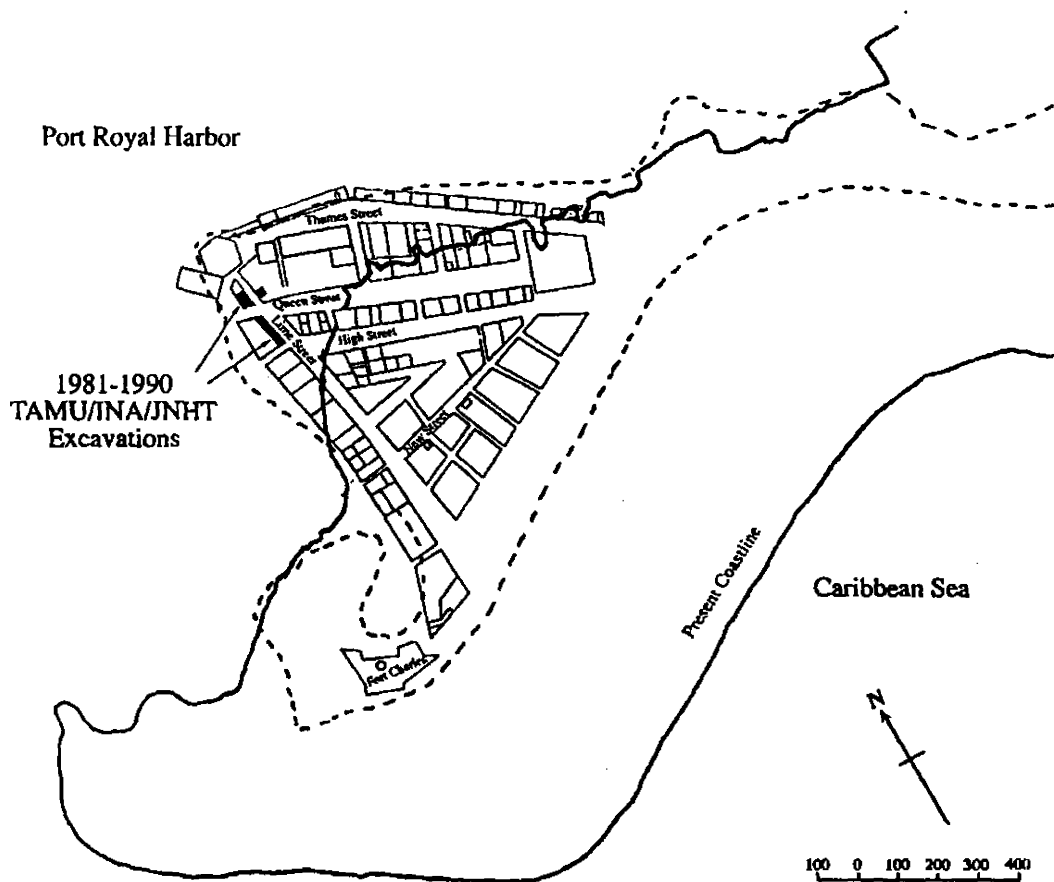


Figure 2. Map of Port Royal showing the intersection of Queen and Lime Streets and the location of the 1981-1990 excavations. The dotted line represents the pre-1692 coastline.

The Port Royal earthquake was only one of many that have plagued the region. As part of the West Indian chain of islands, Jamaica belongs to the Greater Antilles arc and the Nicaraguan Rise, which runs south of Jamaica. The Nicaraguan Rise runs along the boundary of two crustal plates known as the Cayman Trough (Arden 1975:656). When the plates shift, the end result is an earthquake. Adding to this plate activity are numerous faults that run throughout the Caribbean Basin, making this a tectonically unstable region.

In addition to the 1692 earthquake, the island was severely affected by earthquakes in 1770, 1812, 1824, 1858, 1867, and 1956, as well as several hurricanes and fires (Hamilton 1992:41). Present-day citizens of Port Royal and Jamaica generally live under the constant threat of earthquakes, and Port Royal's citizens are reminded of the devastation of 1692 by the annual commemoration of the earthquake every June 7th.

Sadly, the earthquake reduced Port Royal's status as the chief English port in the Caribbean, as the focus of Jamaica's commerce shifted across the bay to Kingston. Although Port Royal enjoyed a short-lived resurgence in the early 1700s, and was home to the British Navy until 1905, Port Royal's former glory days were reduced to memory, archival records, and buried or submerged archaeological remains.

## **Port Royal as an Archaeological Site**

### **Site Formation**

Although the earthquake was devastating to Port Royal's citizens, it ultimately created a "Pompeii" effect by preserving the site in situ, both beneath the sea and under the land. Underwater, the 1692 buildings and cultural remains were sealed off and consequently serve as a kind of virtual "time capsule" (Hamilton and Woodward 1984:38).

The destruction of Port Royal by the 1692 earthquake resulted in the formation of five distinct stratigraphic layers at the site (Figure 3). The bottom-most layer, Layer 5, consists of sterile coarse gravel overlain by coarse sand grading into gravel, upon which Port Royal was built. Resting on the sand is Layer 4, which represents the actual



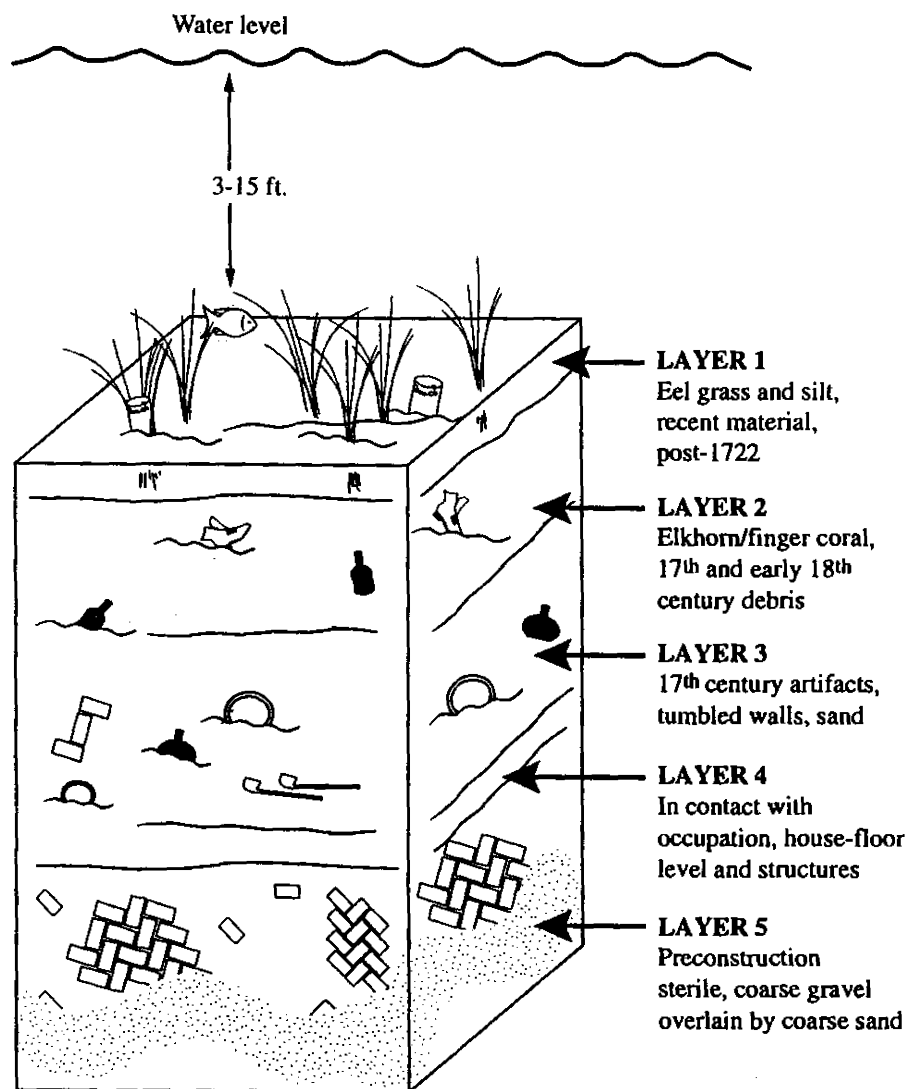


Figure 3. The five stratigraphic layers at Port Royal in the area of the 1981-1990 excavations.

floor level structures, where the remains of the 1692 brick floors were found. The layer above it, Layer 3, comprises a mixture of 17th-century artifacts and the rubble from brick walls collapsing from the earthquake.

Layer 2 consists of elkhorn coral fragments believed to have been deposited in the hurricane of 1722, and contains 18th- and 19th-century artifacts in its upper levels and admixtures of 17th-century artifacts in its lower levels, which often sit directly on the brick floors and walls of Layer 3 (Hamilton 1984:22; 1997, pers. comm.). This coral layer is particularly significant because it separates the 17th-century layers containing the earthquake debris and a scattering of early 18th-century material from the bulk of the 18th-century navy-base refuse found in the upper part of Layer 2. The top layer, Layer 1, consists of a combination of eelgrass and silt, plus post-1722 and 20th-century refuse from Port Royal and Kingston Harbor.

#### Archaeological Investigations

Despite a brief attempt to investigate the submerged site of Port Royal in 1859 by the British Navy diver, Jeremiah D. Murphy, there appeared to be little interest in the site until the 1950s, when the development of SCUBA made such investigations possible (Mayes 1972:9). An exploratory visit was made by Alexi Du Pont and his wife (of the Du Pont fortune) in 1954, where they reported the discovery of an arched doorway, a flight of stairs, and some artifacts located near Fort James (Mayes 1972:9).

The first serious attempt to excavate Port Royal began with the Link expedition in 1959 and was published in the February 1960 issue of *National Geographic*. Edwin Link, an American engineer and underwater explorer, and his wife Marion Link, first visited the site in 1956 and returned in 1959, where their ten-week search concentrated around the Fort James area and the King's Wharf (Link 1960:165, 168; Mayes and Mayes 1972:101).

The Links returned with the *Sea Diver*, a ninety-one-foot-long converted shrimp boat designed to accommodate 12 people (Link 1960:158; Marx 1967:89). The investigation resulted in the discovery of the remains of Fort James and sections of the

King's warehouse. During the Link excavation, a reasonably accurate map of the town plan, based on a number of 18th-century maps and property deeds from the Grantors Series (Jamaica Public Archives) was made by plotting land lots and plats onto a chart (Link 1960:152, 165, 168).

A brief stint by an American investigator, Norman Scott, followed the Link expedition in 1960, where Scott focused on the area around Fort Carlisle, turning up glass bottles, clay pipe fragments, tiles, and a wooden wheel possibly belonging to a gun carriage (Mayes and Mayes 1972:101; Pawson and Buisseret 1975:145). A major effort by Robert Marx (1968a:8-9) from 1966 to 1968 resulted in the excavation of a massive amount of artifacts covering an area of approximately 50,000 square feet that included pewter utensils, clay pipes, glass bottles, cannon, iron encrustations, ceramics, and a hoard of Spanish silver pieces-of-eight.

Briefly, from 1969 to 1970, British archaeologist Phillip Mayes conducted land excavations near the Old Naval Dockyard and at St. Paul's Church. He also established the first conservation facilities in the Old Naval Hospital (Mayes and Mayes 1972:110-111; Pawson and Buisseret 1975:146-147). Following Mayes, Anthony Priddy (1975) excavated the areas of New Street and an area around St. Peter's Church during 1971-1974.

Excavations of Port Royal from 1981-1990 were undertaken by Donny L. Hamilton of the Nautical Archaeology Program of the Department of Anthropology at Texas A&M University (TAMU), the Institute of Nautical Archaeology (INA), and in cooperation with first, the Jamaica National Trust Commission, and then the Jamaican National Heritage Trust (JNHT). Hamilton's excavations focused on Lime Street and the area where it intersects with Queen and High Streets, which was the commercial heart of the town (see Figure 2). As a result, knowledge about daily life in the town is increasing as the recovered artifacts are conserved, analyzed, and compared to the documentary evidence of the period. Figure 4 shows the areas excavated during the 1981 to 1990 TAMU/INA field seasons and Marx's excavations from 1966 to 1968.

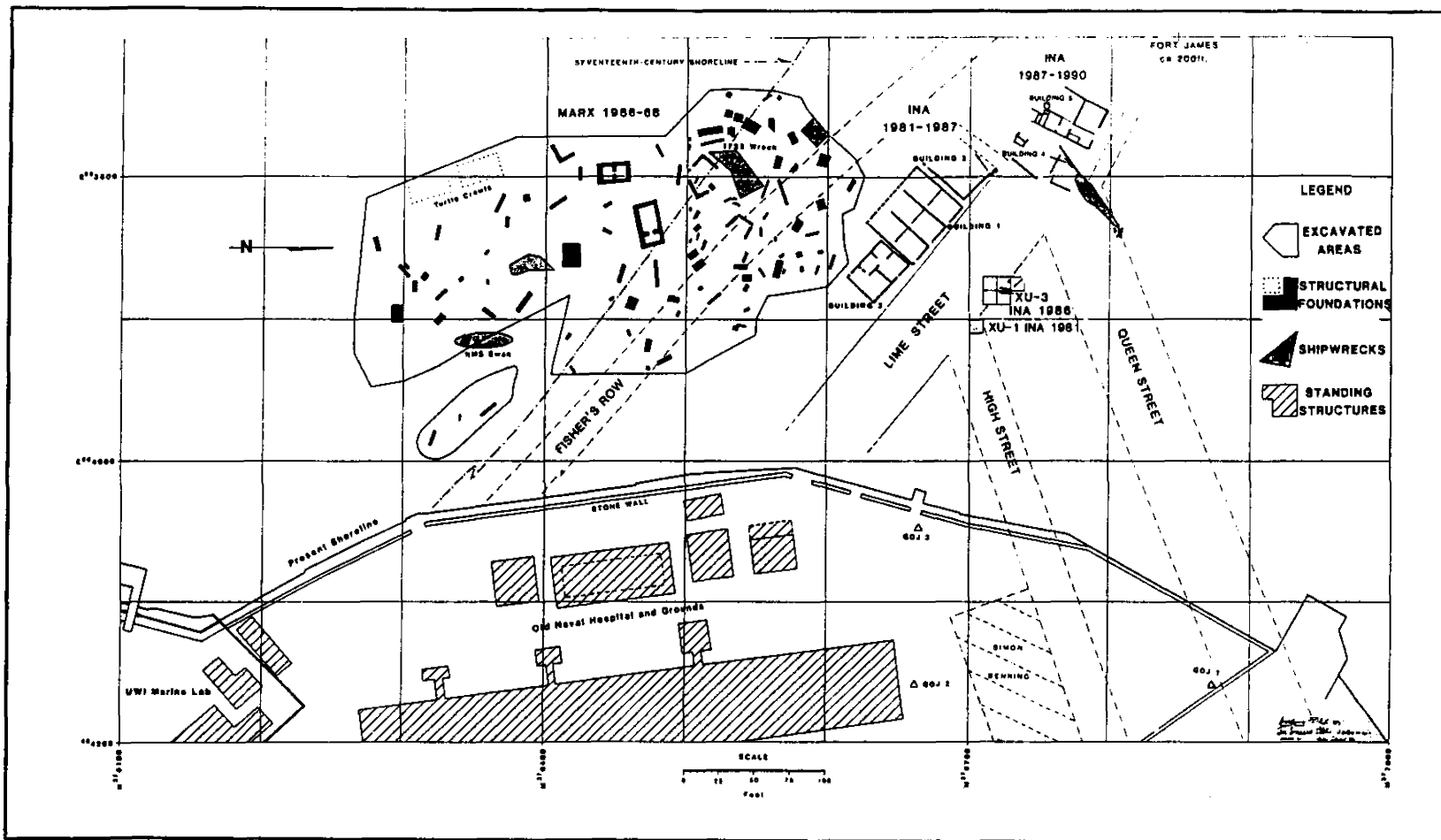


Figure 4. Site plan of areas excavated at Port Royal, 1981-1990. Courtesy of the Port Royal Project.

During 10 years of excavations, eight discrete areas were excavated. These include Buildings 1, 2, 3, 5/4, the yard areas of Buildings 6 and 7, a badly disturbed Building 8, ship remains (analyzed by Sheila Clifford, 1993), plus two test areas XU-1 and XU-3, as shown in Figure 5. Test area XU-1 yielded only a few artifacts, a large post, and a separate post hole identified by organic stains (Hamilton 1984:17; 1986:74).

The first building, Building 1, was excavated during the 1982-1985 field seasons. It measured 53 ft. across the front facing Lime Street and 47 ft. deep, and consisted of a well-built structure with brick floors that developed during two construction phases. The two phases resulted in six ground-floor rooms divided into three separate, two room combinations (Hamilton 1985:105, 1988:9). The brick floors in the front of the building were laid out in a herringbone pattern, whereas the floors in the back were laid end-to end (Hamilton 1985:105). The functions of the rooms include a possible combination wood turner/cobbler shop (Rooms 1 and 2), a tavern (Rooms 3 and 4; Hamilton 1984:21, 1985:105, 1986:74, 1992:44), and a wine/pipe shop combination (Rooms 5 and 6; Hamilton 1985:108, 1986:74, 1992:44).

Building 3, excavated during the 1985-1986 field seasons, lies to the east of Building 1, and was a small frame building with a backyard area. The building's dimensions are about 38 ft. across the front facing Lime Street by 27.2 ft. deep (Darrington 1994:91). The walls were built with raised sills on a mortar foundation, with interrupted wood floor sills at major intersections and at the corners. Both Rooms 1 and 4 had plastered floors, whereas Room 2 had a sand floor, and Room 3 had partly brick floors. Part or all of Building 3 was possibly a storage area for the various activities in the adjacent areas and nearby outdoor market (Hamilton 1988:9; 1997, pers. comm.).

Building 2, excavated in 1986, was a poorly preserved frame building built on a brick footing with a partly wood floor and at least one room having a plaster floor. Because much of the building was badly jumbled, its function remains unknown (Hamilton 1988:9). Also in 1986, a test excavation designated as XU-3, was conducted

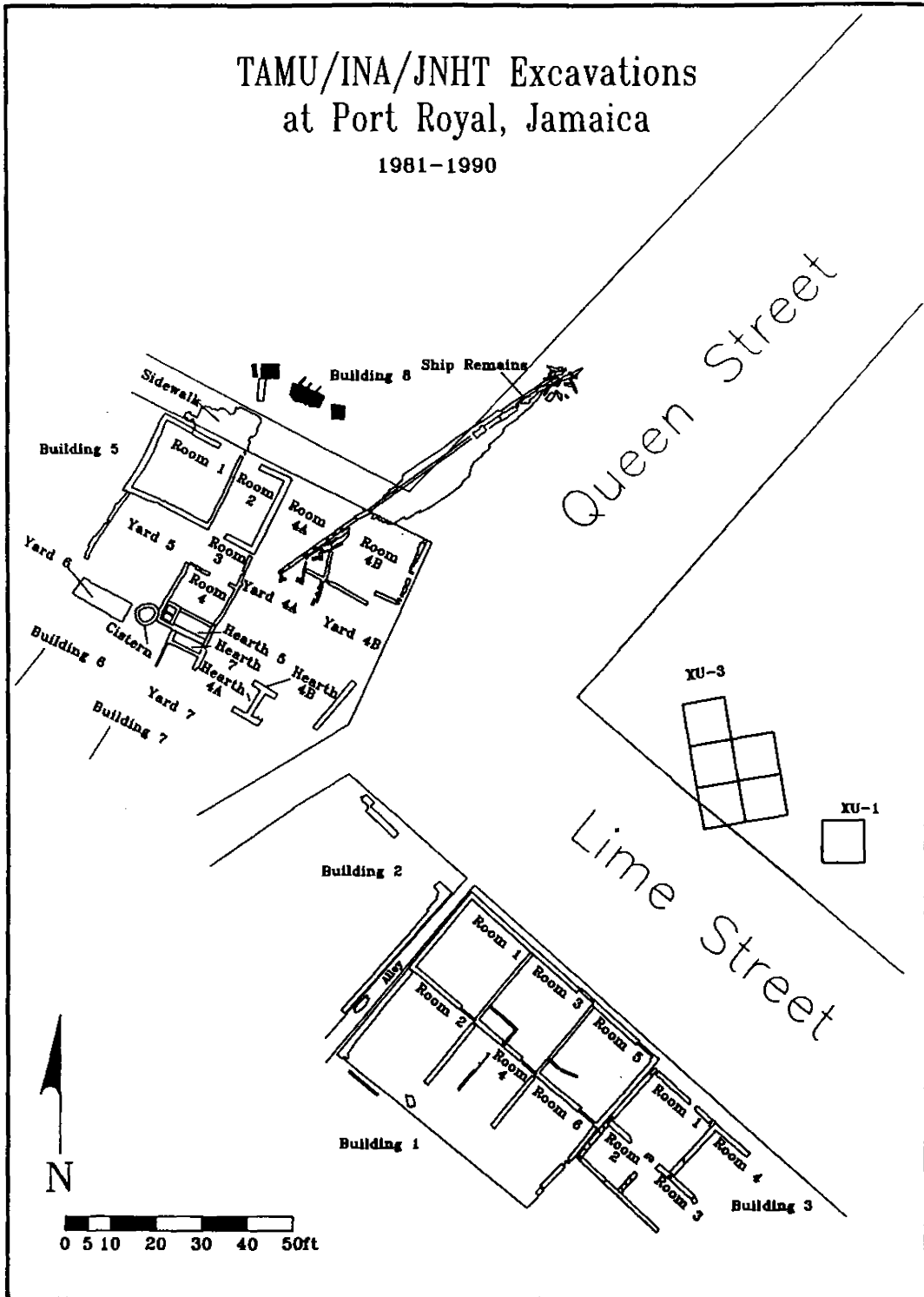


Figure 5. Site map showing the rooms and buildings excavated from 1981-1991. Modified from and courtesy of the Port Royal Project.

across Lime Street, near XU-1, which was tested in 1981.

From 1987-1990, Buildings 5/4, and 8 were excavated, as well as the yard areas of Buildings 6 and 7. Building 5 produced the most in situ artifacts at the site. Like Building 1, Building 5 was a well-built building with plaster walls, brick floors, and wooden door sills, and was assembled in two construction phases. The original building consisted of two ground-floor rooms and a second floor, and the hearth or kitchen area at the rear of the yard was connected to the building (Rooms 3 and 4). In a second construction phase, Building "4" was attached to Building 5, and is in effect an add-on to Building 5. This entire Building 5/4 complex is about 40 ft. deep and 65 ft. across the front of the building (Hamilton 1988:9, 1990a:4-6, 1992:44).

Two additional areas near Buildings 5/4, Yards 6, and 7, belong to two buildings south of them. The yard of Building 6 backed onto the yard of Building 5, both yards being separated by a wooden fence. The yard hearth of Building 7 backed up against the hearth of Building 5, and all three yards appear to have used the cistern located at their common border (Hamilton, 1990b:14; 1997, pers. comm.). At the opposite end, north of Building 5, is Building 8, near the intersection of Lime and Queen Streets, whose function remains unknown because it is so disturbed.

Artifacts found at the site were mapped and grouped into lots using a grid system composed of 10 by 10-ft. squares that were designated with lot numbers, further divided into four 5-ft. quadrants in the 17th-century occupation layers. The 5-ft quadrants were further subdivided into four 2.5 by 2.5-ft. squares. In terms of the buildings and their related features, grids sometimes overlapped, but computer generated X-Y coordinates were given to each lot or subdivision of a lot, and thus the overlapping of grids had no effect on the proveniences or locations.

## CHAPTER III

### THE PORT ROYAL KAOLIN CLAY PIPE ASSEMBLAGE

#### Introduction

From the time General Penn and Admiral Venables captured Port Royal from the Spanish in 1655 to the 1692 earthquake, Port Royal's citizens had witnessed 37 years of dramatic growth in tobacco pipe smoking. This growth is reflected in the thousands of kaolin clay pipes recovered from successive excavations at Port Royal in the form of whole pipes, bowls, stems, and miscellaneous fragments

Before the 1981-1990 excavations of Donny Hamilton of Texas A&M University, numerous kaolin clay pipes, in the form of whole pipes, bowls, and stem fragments, were recovered by various excavations at Port Royal. As near as can be determined from extant notes, from 1966-1968, Marx found 5,949 pipes (1968b:10-11, 1968c:9); Mayes (1972:111) 4,724 pipes during 1969-1970; and Priddy 2,148 pipes from the New Street excavations of 1971-1974 (Brown 1996:253-255). The combined Port Royal excavations, which do not include several small excavations including the work of Edwin Link in 1959 and Norman Scott in 1960 (Mayes and Mayes 1972:101), total more than 34,396 pipes, which is much lower than the total count.

In comparison to these findings, spectacular amounts have also been found at other North American sites. For example, at colonial Jamestown, over 50,000 pipes dating between 1620-1690 were recovered (Cotter, 1994). Although the exact amounts are currently unavailable, large collections of pipes typify other colonial sites such as Flowerdew Hundred (Deetz 1993) and Martin's Hundred (Noël-Hume 1982) in Virginia. The 17th-century shipwreck, the "Pipe Wreck," located at Monti Cristi, Dominican Republic, yielded about 25,000 Dutch clay pipes (Hall 1996:118).

#### The Clay Pipe Assemblage from the 1981-1990 Excavations

The Port Royal kaolin clay pipe collection represents one of the largest



collections of English kaolin clay pipes found in North America. The entire assemblage of white kaolin clay pipes from the Texas A&M University (TAMU) Port Royal collection comprises 21,575 bowl and stem fragments and whole pipes recovered from 1981-1990. This number represents kaolin clay pipes from the TAMU excavations, as well as an evolution in bowl styles ranging from 1655 to 1850. Disregarding for the moment various disturbances, pipes recovered from Layer 1 date after 1722, those from Layer 2 mostly from the late 17th and early 18th centuries, and pipes from Layers 3, 4, and 5 date to the 17th century. Because of the 1692 earthquake and subsequent disasters, some mixing in the different layers has occurred, so that it is possible to find an occasional pipe dating to the 17th century in Layers 1 or 2, or even an 18th- or 19th-century pipe in Layer 3.

The 21,575 pipes are recorded in a database that represents all the kaolin pipes recovered from all layers from each excavation field season. The total database was created by combining the databases from each year of excavation from 1981-1990. Information from each year of excavation was gleaned from direct computer entry during field excavation as well as from field notes, drawings, photographs, and examination of the pipes themselves.

From the database of 21,575 pipes, pipes from the 17th-century occupation Layers 3 through 5 were extrapolated, thus creating a data set of 18,537 pipes. In this data set, all pipes without known proveniences, and pipes from Layers 1 and 2 were totally eliminated. The data set was created because many of the interpretations in this study only concern the Port Royal occupation period, making this data set the most meaningful in terms of determining significant patterns and trends for the pipes in 17th-century Port Royal. Table 1 indicates the breakdown of pipes recovered by year for all layers from the database and from the data set representing the 17th century occupation period.

Most of the pipes in the Port Royal assemblage were manufactured in Bristol, England. One pipe was manufactured in the English town of Broseley, and possibly two

Table 1. Kaolin clay pipes recovered at Port Royal, 1981-1990.

Excavation Season	17th-19th Century Database	17th-Century Data Set
PR81	534	424
PR82	180	97
PR83	7,875	6,780
PR84	2,401	2,087
PR85	5,778	5,267
PR86	1,348	863
PR87	1,956	1,748
PR89	577	478
PR90	926	793
<b>TOTAL:</b>	<b>21,575</b>	<b>18,537</b>

or three pipes were produced in London. Six pipes in the collection are Dutch. This is important to consider because Dutch pipes cannot be dated in the same way that English pipes are dated. Unlike English-made pipes, Dutch pipes lack a systematic chronology; therefore it is important to know which pipes are Dutch-made to exclude them from the data sets dealing with pipe-stem dating discussed in Chapter VI. It is encouraging, however, to find that Dutch pipes appear in such low numbers that they do not affect statistical findings in any meaningful way, even if unidentified.

In addition to the white kaolin clay pipe assemblage from Port Royal, there is also a separate collection of 3,400 locally made red clay pipes recovered from the 1981-1990 excavations. These pipes are believed to have been made and used by African slaves and their descendants living in Jamaica. The red clay pipes are discussed in a Master's Thesis (Heidke, 1992), and are not included in this study.

### **Previous Related Research**

In any study of kaolin clay pipes, several key variables are worth considering,

particularly in developing clay pipe typologies; these include bowl shape and size and the type of heel. Using these variables, Adrian Oswald published the first typology of English clay pipes in 1951 (Noël-Hume 1982:119-120). In addition to his pioneering study, Oswald's numerous other works have formed the foundation of clay pipe research for historical archaeologists, particularly his *Clay Pipes for the Archaeologist*, published in 1975. Oswald's work was complemented by the research of D.R. Atkinson, who together with Oswald, published a valuable study on London clay pipes (Atkinson and Oswald, 1969).

Based loosely on Oswald's typology, Ivor Noël-Hume (1985:303) developed his own typology of English-made pipes found specifically on North American sites, as presented in Figure 6. This typology was used widely by archaeologists working on historic sites throughout the Americas, and it served as the basis for the Port Royal pipe typology. Noël-Hume's pipes types 1 through 30 are designated as types 11 through 40 for the Port Royal typology. Whenever possible, the Port Royal pipes were typed according to Noël-Hume's typology. In cases where new types were discovered and did not fit Noël-Hume's typology, they were assigned a number that represented that particular new bowl form.

Another key aspect to studying clay pipes is examining makers' marks that appear on the exterior of clay pipes. Because many of Port Royal's clay pipes were manufactured in Bristol, England, determining makers' marks from Bristol pipemakers has been an essential part of this study. The research of Jackson and Price (1974) and Walker (1977) has greatly contributed to the study of Bristol-made pipes. Another critical research tool in the study of clay pipes has been the British Archaeological Reports (BAR), a series that spans 16 volumes on clay pipes studies from all over the world. These volumes, which cover a variety of sites and time periods, have been especially valuable in determining parallels to the Port Royal pipes.

### **The Evolution of Clay Pipes, 1590-1900**

Because both pipe bowl shape and size evolved fairly quickly from the 1600s to

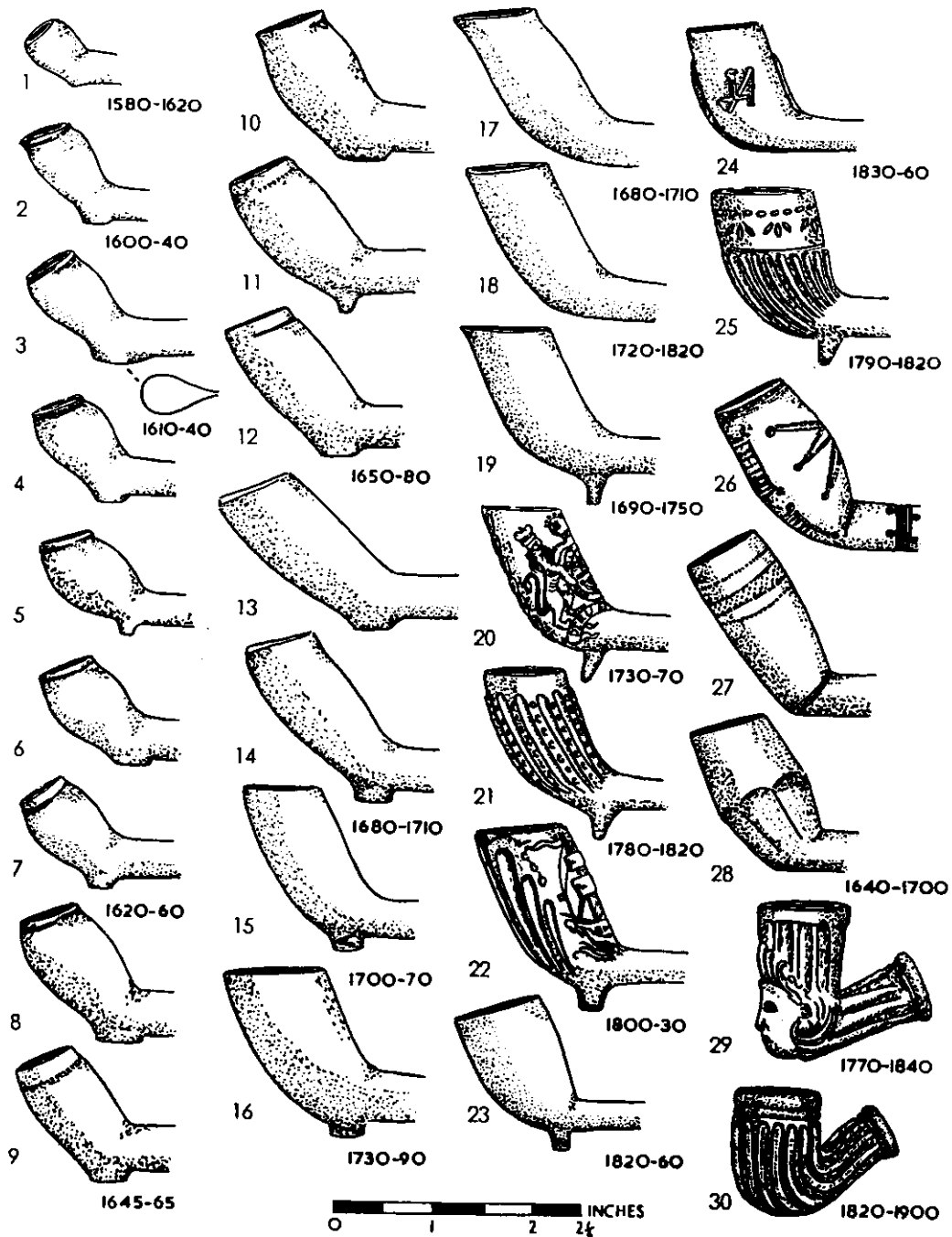


Figure 6. Noël-Hume's typology showing English clay pipes (By permission, 1985:303).

the 1800s into recognizable distinctive forms, both variables are useful in creating a clay pipe typology for historical sites such as Port Royal. Generally, bowl shape and size developed together, and both changed in response to changing prices in tobacco. After the 1620s when tobacco prices fell, clay pipe bowls became larger and more linear in shape, and stems became longer, ranging between 11 and 12 inches by the third quarter of the 17th century (Noël-Hume 1985:296). The earliest pipes from the late 16th and early 17th centuries were therefore small and short-stemmed with bulbous-shaped bowls that held very little tobacco at a time when tobacco prices were high. Some of these earlier pipes, designated as Noël-Hume's bowl Types 5 and 6 in Figure 6, were found at Port Royal and date primarily from 1620 to 1650; however, these bowl forms do not necessarily date exclusively to this time period, for earlier bowl forms were still being produced later in the century. This explains why these bowl forms appear between 1655 and 1692 and later at Port Royal.

After 1650, and until about 1730, noticeable changes in both bowl size and shape took place as tobacco prices fell (Alvey et al., 1979:249). The idea that pipe bowl size increased in accordance with the decrease in tobacco prices was first proposed by T.C. Coker in 1835, further developed by Fairholt in 1859 (Oswald 1975:29), and observed by W.S. Fowler (1955:15), who first noted that English pipes found at colonial Williamsburg revealed a similar evolutionary trend from smaller bulbous bowls to larger elongated bowls with longer stems.

As bowl shape and size evolved to accommodate changing tobacco prices, the heel appeared to develop from both aesthetic, and sometimes practical considerations. According to Walker (1977:12), the first heel appeared around 1620 as a solution for resting a pipe upright. Spurs on pipes developed sometime between 1620 and 1640 and became quite small and pointed by the late 17th century (Walker 1977:12), as shown in Figure 7, which illustrates the parts of a clay pipe.

The addition of spurs and flat heels may have been only a matter of personal preference by the pipemaker rather than as a matter of function, because neither heels

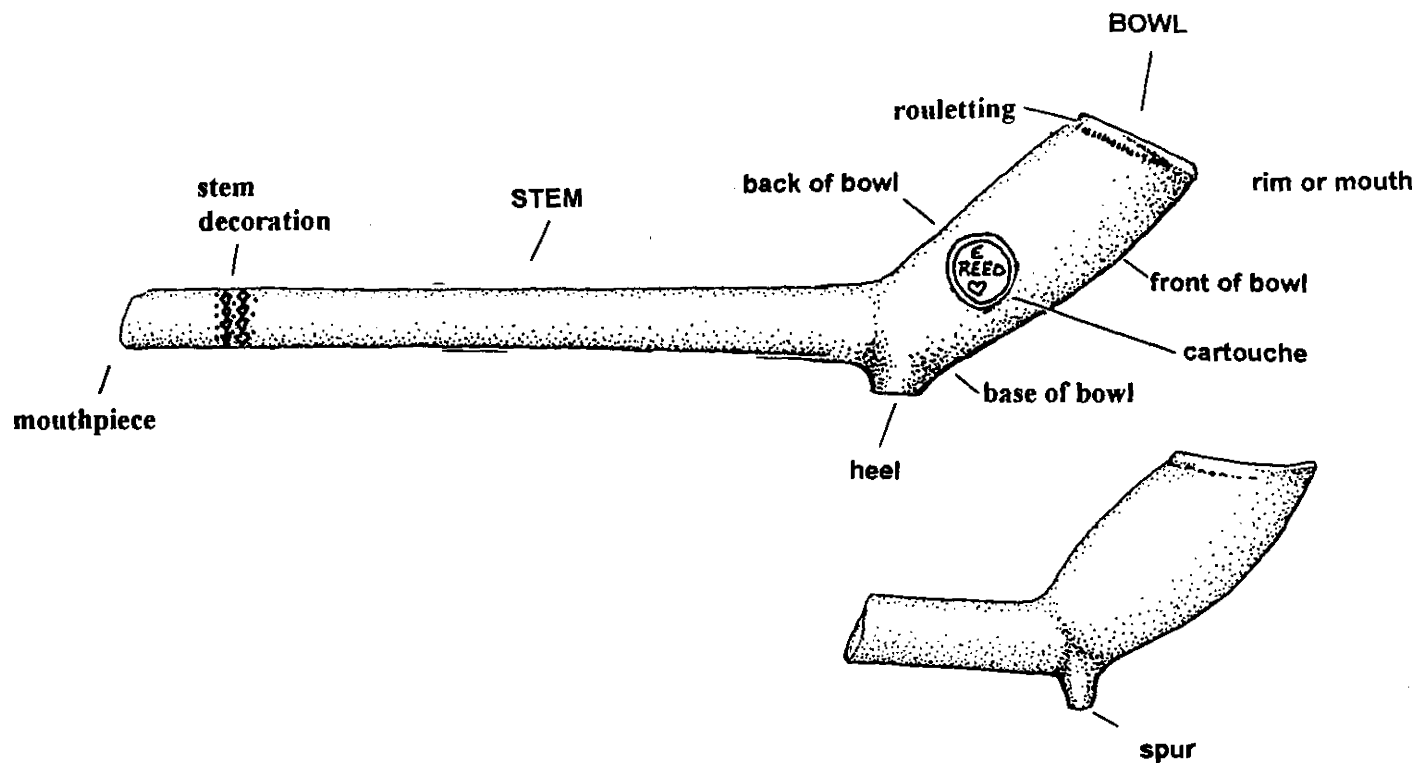


Figure 7. Parts of an English clay pipe.

nor spurs make it possible for pipes to rest upright without tipping over (Higgins 1981:196). Except for broad, flat heels that typified pipes made in the English town of Broseley, heels generally diminished in size by the late 17th century (Walker 1977:12), and by the mid-1700s, heels and spurs begin to disappear altogether in similar number.

### **The Port Royal Pipe Typology**

For the majority of pipes found at Port Royal, certain diagnostic features make a basic typology not only possible, but necessary, given the variety and sheer numbers of pipes in the collection. The typology developed for the Port Royal kaolin clay pipes initially followed the typology of Noël-Hume (1985:303; Figure 6), which was used in the field identification at Port Royal, particularly in the cataloging undertaken by Richard McClure and Becky Jobling, both of whom were instrumental in identifying a large number of the pipes.

Because English kaolin clay pipes are fairly homogeneous and their function is known, the Noël-Hume typology thereby “lumps” together pipe bowls in a typology that is partly stylistic and partly chronological (see Adams and Adams 1991:219-221), based on bowl size and shape, because pipe bowls became larger and more elongated over time. By applying Noël-Hume’s typology to all the identifiable pipe bowls recovered from all layers at Port Royal, and using the variable of heel shape, the final Port Royal typology thus resulted in 61 pipe types that fall within four main categories: 46 bowl types with flat heels, seven bowl types with spurs, three bowl types pipes with no heels (heelless “export” pipes) and five molded pipes, with the flat-heeled and spurred pipes types being further divided into more specific categories. The final result is a typology that represents the stylistic evolution of pipes over three centuries from about 1650 to 1850. This typology is “expandable,” meaning anyone using this typology can compare and determine where their pipes fit into the Port Royal typology. The Port Royal expandable typology is shown in the typology at the end of this chapter. The bowl forms are presented in life-size drawings to make it easier to use by simply placing pipe bowls to be compared on the outline to confirm identification. The typology is









expandable in that new types can be added or fine distinctions can be made by inserting similar types. For example, if a researcher finds a bowl type similar to 1.26, an intermediate bowl form 1.261 can be added, and so on. A completely different bowl form can be added at the end of the typology by assigning it the next consecutive number, such as 5.11.

Because not all pipes exactly fit Noël-Hume's typology, it was necessary to draw from other sources such as Atkinson and Oswald (1969), Oswald (1975), and Walker (1977). Generally, the bowl shapes from Port Royal are close to the typologies presented by these authors, but some vary slightly, as indicated in Table 2, which lists all the Port Royal pipe bowl types, their close parallels from other typologies, the original Port Royal field type designations, the bowl type numbers, the date ranges for the respective bowl types, and the numbers of each pipe bowl type found on the site from all layers. A complete listing of all bowl types and their proveniences is in Appendix A.

### **Trends in Pipe Bowls at Port Royal**

One of the goals in developing a typology is to not only to classify objects, but to also gain meaning from the ordering of types once the typology is completed. From the Port Royal typology, three basic trends emerged: (1) the majority of pipes fall within the occupation period closest to the earthquake, from 1680 to 1710; (2) the greatest proliferation of different bowl styles occurred during 1680-1710, which is also in keeping with the Noël-Hume typology; and (3) the most common bowl forms in the typology are represented by clusters of new, unsmoked pipes in the same areas of the site; namely in Room 5 of Building 1, and Room 2 of Building 3.

The first trend, that most of the pipes dating from 1680 to 1710 fall within the range of occupation, is confirmed by the high percentage of pipes bowl styles in the Port Royal collection that appeared during this period. Out of 2,618 identifiable bowl types, 2,577 or 98.4 percent dated between 1660 and 1710. Although the existence of nine bowl types (25 pipes) whose styles appear before 1650 were not included in this percentage, it is possible that these styles continued to be manufactured well into the

**Table 2. Port Royal bowl types.**

<b>PORT ROYAL BOWL TYPE</b>	<b>FIELD BOWL TYPE</b>	<b>DESCRIPTION</b>	<b>TOTAL AMOUNT</b>
<b>TYPE 1.0</b>			
<b>HEELED PIPES</b>			
<b>1.10</b>			
<b>Flat heel, bulbous bowl, 1620-1730</b>			
1.11	52	NH Type 2, Walker Type A, p. 1547*	7
1.12	43	Walker Type O, p. 1549*	14
1.13	16	NH Type 6	2
1.14	20	NH Type 10	3
1.15	14	NH Type 4	1
1.16	Broseley	Oswald Type 5a, P. 51	1
<b>1.20</b>			
<b>Flat heel, curved bowl, 1650-1770</b>			
1.21	62	Oswald Type 10, Fig. 3G, p. 39*	5
1.22	63	Oswald Type 10, Fig. 3G, p. 39*	7
1.23	72	Oswald Type 8, Fig. 3G, p. 39*	11
1.24	66	Oswald Type 9, Fig. 3G, p. 39*	7
1.25	68	Oswald Types 9/10, Fig. 3G, p. 39*	16
1.26	77	Walker Type 13, p. 1549*	1
1.27	47	Atkinson & Oswald Type 21, p. 180*	5
1.28	23	Walker Type 13, p. 1549*	19
1.29	73	Walker Type 12, P. 1549*	
<b>1.30</b>			
<b>Flat heel, straight-angled bowl, 1645-1680</b>			
1.31	22	NH Type 12	4
1.32	54	Oswald Type 6, Fig. 3G, p. 39*	1
<b>1.40</b>			
<b>Pronounced heel, bulbous bowl, 1640-1720</b>			
1.41	44	Walker Type a, p. 1429*	2
1.42	55	Walker Type a, p. 1455*	6
1.43	21	Walker Type 1, p. 1497*	21
1.44	75	Walker Type 6, p. 1535*	3
1.45	—	Oswald Type 8, Fig. 6, p. 49*	1
<b>1.50</b>			
<b>Pronounced heel, curved bowl, 1640-1710</b>			

Table 2. Continued.

PORT ROYAL BOWL TYPE	FIELD BOWL TYPE	DESCRIPTION	TOTAL AMOUNT
1.51	50	Oswald Types 9/10, Fig. 3G, p. 39*	5
1.52	8	Oswald Type 4, Fig. 6, bottom p. 49*	6
1.53	24	NH Type 14	14
1.54	56	Walker Type f, p. 1431*	2
1.55	—	Oswald Type 8, Fig. 9, p. 57*	1
1.56	71	Oswald Type 2, Fig. 11, p. 69*	1
1.57	—	Walker Type L, p. 1459*	1
<b>1.60</b>	<b>Pronounced heel, curved upright bowl, 1680-1750</b>		
1.61	25	NH Type 15	17
1.62	69	Atkinson & Oswald Type 25, Fig. 2*	8
1.63	9	Walker Type O, p. 1499*	75
1.64	26	NH Type 16	4
<b>1.70</b>	<b>Pronounced heel, s traight-angled bowl, 1680-1730</b>		
1.71	10b	Walker Fig. 6a-2, 2nd row, left, p. 1543*	2
1.72	10	Walker Fig. 6a-2, 2nd row, left, p. 1543*	61
1.73	3	NH Type 14	233
1.74	2	NH Type 13	669
1.75	2a	Walker Type 4, Fig. 5a, p. 1535*	4
1.76	60	Walker Type C, p. 1429*	1
1.77	1	Walker Type B, Fig. 11a, p. 1521*	840
1.78	4	Oswald Type 13, Fig. 3G, p. 39*	5
<b>1.80</b>	<b>Pronounced heel, upright bowl, 1660-1710</b>		
1.81	51	Oswald Type 6, Fig. 6, bottom, p. 49*	3
1.82	61	Walker Type 5, p. 1535*	2
<b>1.90</b>	<b>Pronounced heel, sloping bowl, 1680-1730</b>		
1.91	6	Walker Type 4, p. 1535*	48
1.92	42	Oswald Type 11, Fig. 5, p. 45	6
<b>TYPE 2.0</b>	<b>SPURRED PIPES</b>		

Table 2. Continued.

PORT ROYAL BOWL TYPE	FIELD BOWL TYPE	DESCRIPTION	TOTAL AMOUNT
<b>Type 2.10</b>		<b>Spur, curved bowl, 1620-1710</b>	
2.11	15	NH Type 5	3
2.12	5	Walker Type b, p. 1461*	194
2.13	46	Walker Type a, p. 1509*	3
2.14	41	Walker Type b, p. 1433*	9
<b>2.20</b>		<b>Spur, straight-angled bowl, 1680-1710</b>	
2.21	45	Oswald Type 23, Fig. 4G, p. 41*	86
2.22	4a	Oswald Types 20/21, Fig. 4G, p. 41*	115
2.23	64	Oswald Type 22, Fig. 4G, p. 41*	5
2.24	70	NH Type 23	2
<b>TYPE 3.0</b>		<b>HEELLESS PIPES</b>	
<b>Type 3.10</b>		<b>"Export" heelless pipes, 1680-1820</b>	
3.11	7a	Oswald Type 25, Fig. 46, p. 41	2
3.12	7b	Oswald Type 27, Fig. 4G, p. 41	41
3.12	7c	NH 18	3
<b>TYPE 4.0</b>		<b>MOLDED PIPES</b>	
<b>4.10</b>		<b>Molded pipes, 1710-1880</b>	
4.11	Thistle	Le Cheminant, Type 19, Fig. 8	1
4.12	Leaf	Walker, Type 13, p. 1539	1
4.13	Tree Bark	Jackson & Price, p. 135	1
4.14	Turk's Head	Woodcock, Fig. 1, bottom, p. 326	1
4.15	IE & SON	NH 25, but without heel	1

Note: \* = approximate to the bowl shape, and does not refer to a specific geographic origin. References include Atkinson and Oswald (1969), Jackson and Price (1974), Le Cheminant (1981a), Noël-Hume (1985), Oswald (1975), Walker (1977), and Woodcock (1985).

1660s. Oswald (1985:5, 13) attributes this phenomenon to the continued use of brass clay pipe molds that were known to last 30 years or even longer (Oswald 1985:5, 13). This is particularly evident in the clay pipes manufactured by Bristol pipemaker Llewellyn Evans, whose pipes span a wide range of styles, and were manufactured from about 1661 to 1690 (See Appendix A; Jackson and Price 1974:42; Oswald 1975:152).

The second trend, that the greatest proliferation in bowl styles occurred between 1680 and 1710, attests to the variety both within the Port Royal kaolin pipe collection and in the styles manufactured during this period. In the Port Royal typology, flat heels predominate, followed by spurred heels, pipes with no heels, and molded pipes from the 18th and 19th centuries. Within this range of variation, certain bowl shapes prevail. By far, the most common bowl style is bowl Type 1.77, which has a flat heel and amounts to 840 pipes in the collection. Bowl Type 1.74 (669 pipes) was the second most common style, followed by bowl Type 1.73 (233 pipes); all three types have small, flat heels.

The next two bowl styles that appear in significant quantities are pipes with spurs, including bowl Types 2.12 (194 pipes), 2.22 (115 pipes), and 2.21 (45; 86 pipes). Three other bowl styles were noted for their frequency: Type 1.63 (75 pipes), Type 1.72 (61 pipes) and Type 1.91 (48 pipes). In the heelless "export" pipe bowl style, bowl Type 3.12 totals 41 pipes.

The third trend, that there is a definite correlation between bowl types and where they appear on the site, is valid for bowl Types 1.77 and 1.74. These bowl types were heavily concentrated in Room 5 of Building 1 (1.77, 563 pipes; 1.72, 131 pipes), which was probably a combination wine/ pipe shop, and Room 2 of adjacent Building 3 (1.77, 68 pipes; 1.74, 301 pipes), which was probably a storage area for clay pipes (Donny Hamilton 1997, pers. comm.). In both cases, most of these pipes were new, unused pipes. This implies that these bowl types were stored in large quantities for sale at Port Royal, and that *they represent the current retail stock at Port Royal*. This correlation also suggests that these bowl forms were either popular styles for export from Bristol to

Jamaica, or else the particular styles of pipemakers who were active in the Bristol-Jamaica pipe trade.

Bowl Types 3.11, 3.12, and 3.13, the heelless, export type pipes, appear only randomly on the site. According to Oswald (1959:59), heelless pipes were more likely to be exported to the American colonies because they were less prone to breakage during shipment than pipes with heels and spurs. The number of heelless pipes in comparison to pipes with heels and spurs at Port Royal and other North American sites, however, does not provide a convincing argument for Oswald's assertion. The sporadic appearance of heelless pipes thus suggests that this bowl form was not popular at Port Royal or other North American sites (Donny Hamilton 1997, pers. comm.).

### **Decorated Pipes at Port Royal**

Once the Port Royal clay pipe typology was established, other attributes were examined. These included decorative elements that appear on the exterior of the pipe, such as rouletting around the rim of the mouth, patterns that appear on the stem, pipes with specific decorative motifs, and most importantly, pipes with makers' marks.

Generally, decorations on pipe bowls and stems were less common in the 17th century when compared with the more elaborate pipes of the 18th and 19th centuries (Oswald 1975:96). For the earlier pipes of the 17th century, decorative elements often consisted of simple incisions such as rouletting or milling around the bowl rim (see Figure 7). Roulette marks were created with a denticulated knife, tooth wheel, or disk before the pipe was fired (Oswald 1975:19). Rouletting was typical of both English and Dutch pipes, although rouletting disappears on English pipes by the early 18th century, but is found on Dutch pipes well into the 19th century. Most of the rouletted kaolin clay pipes found at Port Royal were only partially rouletted, because the roulette marks were applied in quick strokes, thus resulting in partially decorated rims. Partial rouletting is often an argument for inferior pipes being sent to the British colonies, but the fact that clay pipes were manufactured in such large numbers, with many of the finishing and decoration steps performed by unskilled labor, such as apprenticed



children, offers a better explanation for this occurrence.

Other decorations were created through molds such as raised dots in a pattern, a rose motif, a fleur-de-lis pattern, and/or stem decorations usually found in a combination of diamond and dot patterns. Decorated stems mostly occur at the beginning of the early 18th century. Next to rouletting, pipe stems with alternating diamond/dot patterns are the most common form of decorated pipe found at Port Royal. These designs are typical of Bristol-made pipes, and such pipe stems have been recovered at Port Royal as shown in Figure 8. From the database covering all layers at the site, there are 78 decorated stems, 26 of which have makers' marks on them. From the data set of Layer 3, 68 decorated stems were recovered, including 24 with makers' marks. Decorated pipe stems have been found at Nominy Plantation (Mitchell 1983:19-27) in Virginia, St. Mary's City, Maryland (Riordan 1991:97), the St. John's Site, Maryland (Hurry and Keeler 1991:56-68), and other North American sites dating to the late 17th and early 18th centuries.

Another mark found on English and Dutch pipes is the "Tudor rose," which was often depicted as a five-petaled rose on the heel, and became the "hallmark" of good quality pipes (Brongers 1964:33). The Tudor rose mark originated during the reign of Elizabeth (1558-1603), and became associated with Protestant pipemakers who adopted this design, signifying their allegiance with the House of Tudor during the reign of James I (1603-1625). This was especially the case for English pipemakers who fled to Holland for religious and economic reasons (Duco 1981:376). One Port Royal pipe shows the crowned rose mark (284-2) on the heel and is probably Dutch (Appendix A).

The Tudor rose motif was also represented by clusters of three to seven raised dots located on the sides of pipe bowls. Two such pipes have been recovered from Port Royal, and both are probably Dutch (Appendix A). One pipe (256-1) has seven dots forming a Tudor rose pattern on the side of the bowl, with two more dots continuing down the heel. Another pipe fragment (956-4) has two dots located on the heel, probably a continuation of a Tudor rose pattern on the bowl.

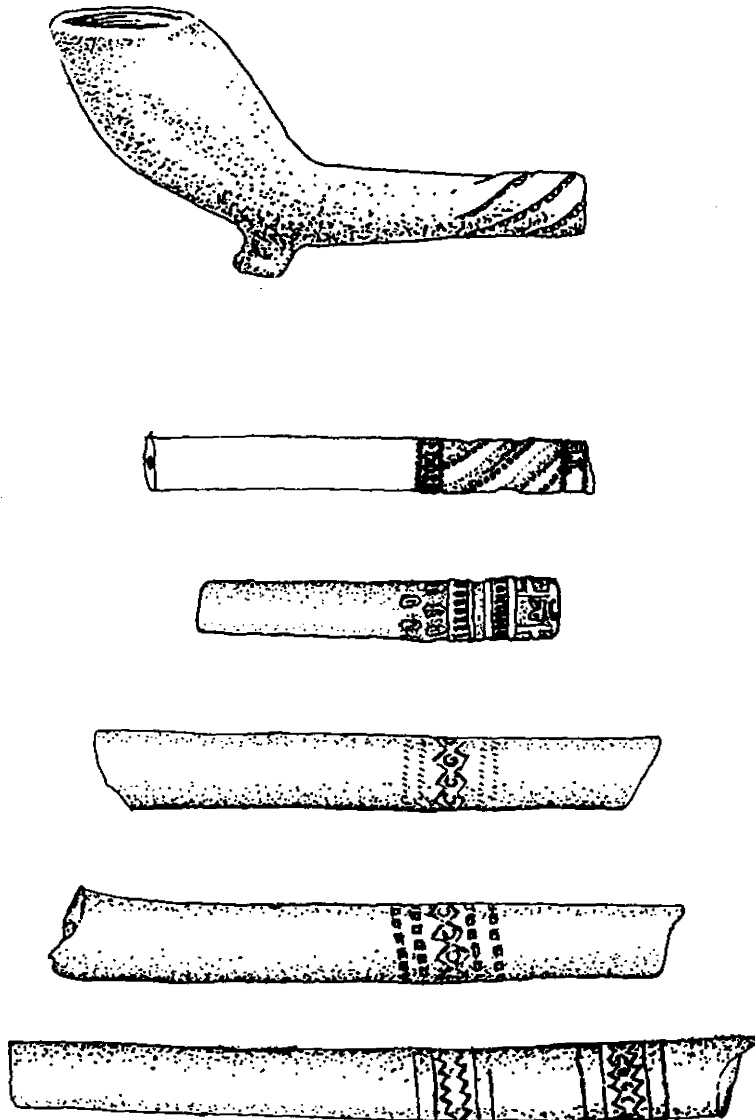


Figure 8. Sample of decorated pipe stems from Port Royal excavations, 1981-1990.

Besides the Tudor rose, another mark, the fleur-de-lis, is also associated with high quality English and Dutch pipes. Known as the heraldic symbol of the French monarchy, the fleur-de-lis is believed to be an iris centered in a diamond, which is often enclosed in a circle. The fleur-de-lis mark is less commonly found on New World sites and is absent from the Port Royal collection.

In addition to these decorative patterns, six pipes found at Port Royal illustrate imaginative and playful motifs and designs that were more common after the 1700s (see typology and Appendix A). Often these pipes were made from two-piece molds with the decoration located along the molded seam. Elaborate molded decorations were first relegated to the stem during the first part of the 18th century, but by mid-century, bowls were also decorated (Oswald 1975:97). A good example of one of these early molded decorations appears on the “Wheel” pipe found in 1984 in Building 1, Layer 3 (618; bowl Type 2.23), which has a raised spoked wheel design on the side of the bowl. Similar pipes probably date between 1710 and 1750 and may be an intrusion from Layer 2 (Appendix A).

Another decorated pipe, the “Thistle” pipe, was recovered in 1987 in Building 8, Layer 1 (531-1; bowl Type 4.11), and represents the gradually increasing decorative features on 18th-century molded pipes. The pipe is distinguished by an attractive thistle motif with leaves on the bowl, also known as the “Scottish thistle” (Appendix A). The “Thistle” pipe closely resembles a pipe recovered from Paul’s Wharf near Blackfriars, London, dating to the mid-18th century (Le Cheminant 1981a: Fig. 8, No.19).

Another pipe (506-1; bowl Type 4.15) found in 1983, probably dating to the 19th century, has a vine motif decorating the top of the pipe where the maker’s mark “IE & SON” is located (Appendix A). The maker is unknown, but the pipe is typical of this time period.

By the 19th century, decorated molded pipes had reached their full flowering, and many of the decorative styles shared a marked resemblance, suggesting that pipemakers had pattern books available for customers (Oswald 1975:110). Nature

motifs, particularly plants, were popular at this time. Two examples of these pipes have been found at Port Royal. One is the “Leaf” pipe, recovered in 1985 in Layer 1 (545-3; bowl Type 4.12), which has an attractive, raised leaf pattern running along the molded seam of the pipe (Appendix A). An identical pipe is pictured in Ayto (1994:7), which he dates between 1840 and 1870.

The other is the “Tree Bark” pipe that was found in 1987 in Building 2, Layer 2 (302-7; bowl Type 4.13). This pipe has a high relief pattern resembling tree bark with raised bumps, and is surprisingly lightweight (Appendix A). An identical pipe pictured in Jackson and Price (1974:135) was recovered from a 19th-century site in Bristol.

Besides nature motifs, human designs such as famous personages or generic portraits were also popular. One such example is the “Turk’s Head” pipe found in 1984, Layer 2 (617; bowl Type 4.14; Appendix A). The letters “AICA” appear on one side of the stem, which probably refer to the word “JAMAICA.” The “Turk’s Head” design has been assigned to a single pipemaker, William Hensell of Norwich, whose pipes date from about 1825 to 1853 (Woodcock 1985:325).

Marx (1968b, 1968c), recovered a large number of 19-century molded pipes, including portraits in a similar vein to the “Turk’s Head” pipe. A good example of this is the molded head of an African man, shown in Figure 9, probably a product of Thomas Davidson, a prominent Glasgow firm (Gallagher and Price 1987:117).

### **Makers’ Marks**

A more common feature than decorative marks on Port Royal pipes is the maker’s mark, in the form of the pipemaker’s initials. In terms of diagnostic features, makers’ marks are useful for relative dating and tracing a pipe’s geographical origin. Makers’ marks appeared early on, often stamped at the base of pipe’s heel, or on the side of heels, as with early London-made pipes. After the mid-17th century, makers’ marks often appeared on the backside of the bowl, which is the case for most of the Port Royal marked pipes. After 1670, makers’ marks become more common on kaolin clay pipes. Some marks were enclosed in an oval or circle, called a “cartouche,” which

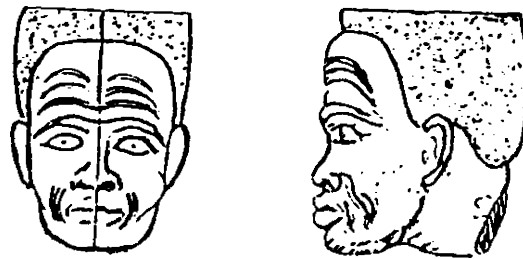


Figure 9. "African Man" decorated pipe from the 19th century (Marx 1968b:63).

is often found on the side of the bowl (see Figure 7). Other marks were placed on the front and back of the bowl, on the heel, or, in some cases, on the stem.

Makers' marks were mostly stamped on the pipe or, less commonly, applied by hand with a knife, after the pipe was trimmed and prepared for firing (Crossley 1990:279). Although there is little evidence for pipe stampers, two were recovered in England; one a wooden stamper with the initials of "WB" and the other made of pipe clay with the mark "GEO WEBB IN CHARD" (Le Cheminant 1981b:90-91).

There are 39 distinct makers' marks that are catalogued in Appendix A, and a total of 299 identifiable marked pipes in the Port Royal collection. Of the 39 marks identified from the 1981-1990 excavations, 20 marks have been positively identified as being Bristol made, six are tentatively from Bristol, one is traced to Broseley, three are probably from Glasgow, three possibly from Hull or London, three are Dutch (plus three more that are only decorative) and six have unknown origins.

A close examination of the marked Port Royal pipes demonstrates that certain marks appear on given bowl styles with some regularity. The most common bowl types for the marked pipes include: Type 1.73 (52 pipes), Type 1.74 (42 pipes), Type 1.91 (20 pipes), and Type 1.63 (17 pipes). These bowl styles predominated either because Bristol pipemakers preferred these styles, or because they were more popular among smokers.

Of the 39 marks, the most frequently occurring makers' marks from all layers at Port Royal are "LE" (141 pipes), "IB" (30 pipes), and "WE" (22 pipes). The "LE" marked pipes are attributed to Llewellyn Evans, a Bristol pipemaker who apprenticed to James Fox and worked between 1661 and 1684, and died by 1688/1689. During his lifetime, Evans trained a number of other well-known Bristol pipemakers such as Devereaux Jones I. After his death, his wife Elizabeth took over the business, apprenticing two journeymen, Thomas Owen in 1688/89, and Robert Hodge in 1690 (Walker 1977:1132). The pipes of Owens and Jones have also been recovered at Port Royal.

The "LE" mark is most often found stamped on the back of the bowl, but there are six stems which bear the incised "LE" mark incorporated into the decorative stem diamond and dot patterns. The "LE" marked pipes all fall within the accepted date range for Llewellyn Evan's active period of pipemaking and were most commonly found on bowl Types 1.73 (47 pipes) and 1.74 (29 pipes).

"LE" pipes are evenly distributed on the site, with the greatest concentrations in Room 5 of Building 1 and Yards 4A/ 4B. Examination of pipes by lot number support these findings, as 32 "LE" pipes were recovered in Room 5 of Building 1, 40 from Yard 4B, 20 from Yard 4A, and the remaining "LE" pipes from other areas of the site. Most of the pipes in Building 1, Room 5 were new pipes, whereas most pipes from Yards 4A/4B were probably refuse and consist of smoked and broken pipes, although new "LE" pipes were found as well.

Parallels to the Port Royal "LE" pipes can be found at Nominy Plantation, Virginia, where they compose the bulk of marked pipes. Of the fifty-five "LE" pipes found at Nominy Plantation, 39 have the mark incised on the stem, whereas 16 are located on the backside of the bowl (Mitchell 1983:19). The Nominy Plantation sites date from 1649 to 1773, and reveal that the "LE" mark on the stems are more common at the end of the 17th and beginning of the 18th centuries. This is because after his death in 1688/89, his wife hired new apprentices who continued Evans' line of pipes.

“LE” pipes were also found at the St. John’s Site in St. Mary’s City, Maryland, which dates from about 1638-1720. The site served in several capacities: as a tobacco plantation, the residence of the colony’s governor, a meeting place, public inn, and a government records storage office (Hurry and Keeler 1991:37). Thirty-nine “LE” pipes were found with the marks on the bowl, and 49 had the “LE” located on the stem (Hurry and Keeler 1991:69).

Eight “LE” pipes (stamped on the bowl) were also found at the late 17th-century Smith’s Townland Site in St. Mary’s City, Maryland. Consisting of four buildings, including an inn, this site yielded almost 200 marked pipes (Riordan 1991:89, 93). Four “LE” pipe stems also were found at 17th-century colonial sites at St. Inigoes Manor, Maryland (King 1991:110). “LE” pipes also have been recovered from the Green Spring Plantation site in Virginia (Crass 1988:84).

“LE” marked pipes have been found in New Brunswick, Canada, and colonial sites along the American eastern seaboard (Walker 1977:657-658). That “LE” pipes appear on so many North American sites suggest that Llewellyn Evans and the Evans family were one of Bristol’s most successful clay pipe manufacturers whose business relied heavily on the colonial export trade. The occupation time span of each of the sites where “LE” pipes are common correspond to the known production period of Llewellyn Evans and his apprentices who succeeded him after his death in 1688/89.

The second most frequently marked pipe to appear at Port Royal is the “IB” pipe. Thirty-five “IB” pipes were found; 34 are incised on the back of the bowl and one is a cartouche. The “IB” mark is predominantly found on bowl Types 1.91 (15 pipes) and 1.74 (7 pipes), and 11 of the 35 “IB” pipes were recovered from Building 3, Room 2, the storage area. The “IB” marked pipes fit within the accepted date range for several potential Bristol pipemakers, although this mark has not been positively identified to any one pipemaker. The most likely candidates include the father, John Bladen I, or his sons, John Bladen II and James Bladen. Other possibilities include James Bull or Joseph Butt; all these pipemakers were active between the 1680s and

1690s (see Appendix A). An “IB” pipe bowl with a crown-like shape was found at Martin’s Hundred, Virginia, although no positive identification was given (Noël-Hume 1979:20-21).

The third most commonly marked pipe, the “WE” pipe, was found at all areas of the site, and some were found smoked. There are 22 “WE” pipes, comprising seven bowl fragments, four stems, and 10 incised “WE” initials on the backside of the bowl, as well as two cartouches on the backside of the bowl. The “WE” mark appeared a mixed number of bowl types, the more common being bowl Type 1.74 (4 pipes). The two pipes with the more elaborate cartouche was bowl Type 2.14.

The “WE” marked pipes can be ascribed to either William Evans I, or his son, William Evans II, both of whom were engaged in pipemaking sometime during 1660-1697; the datable “WE” pipes fall within this range. Because of this, it is often difficult to distinguish between the pipes of father and son (Walker 1977:1133, 1432). They appear to have used the same marks on their pipes, a practice not uncommon for father/son craftsmen, as with Simon Benning, a pewterer at Port Royal, whose son, Symon, probably took over the business sometime after his father’s death in 1687, and continued to use the distinctive pineapple-motif stamp bearing Simon Benning’s initials (Hamilton 1992:51).

“WE” pipes have been recovered at a number of colonial sites. For example, 13 “WE” pipes were found at Nominy Plantation, eight marked on the stems, and five on the bowl (Mitchell 1983:21). At the St. John’s Site in Maryland, six marked bowls and nine marked stems revealed the “WE” mark (Hurry and Keefer 1991:69). One bowl and two stem fragments bearing the “WE” mark also were discovered at the St. Inigoes Manor Sites (King 1991:110).

## **Conclusion**

The assemblage of kaolin clay pipes at Port Royal is striking in its diversity of pipe bowl styles that encompass almost three centuries, thus chronicling the evolutionary development of clay pipe design and technology. Using Noël-Hume’s



typology, a typology for the Port Royal pipes was developed, representing pipes from all layers at the site. From this typology, it was determined that the majority of pipes fell within the occupation period close to the time of the earthquake, between 1680-1710. It was also clear that the greatest diversity in pipe bowl styles occurred during 1680-1710, and that the most common bowl forms were found in Room 5 of Building 1 and Room 2 of Building 3.

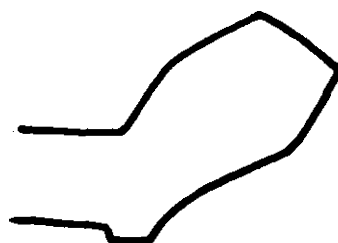
After the typology was established, other physical attributes such as decorative elements and makers' marks, were evaluated. From this, two main conclusions were drawn. First, certain pipe bowl styles prevailed at the site, directly correlating with where they appeared on the site, and the types of makers marks that appeared on them. Second, pipe bowl styles in conjunction with decorative elements reveal the changing tastes in pipe design and the improved technology that made such changes possible.

The first conclusion, that certain pipe bowl styles predominated at Port Royal, is indicated by the frequency of bowl Types 1.77, 1.74, 1.73, 2.12, and 2.22. These same styles also showed the heaviest concentrations as unused pipes in Building 1, Room 5, possibly a wine/pipe shop combination, and Building 3, Room 2, probably a storage area. These particular pipes were thus retail stock to be sold in Port Royal, and that they were probably the most popular styles for the colonial market, particularly at Port Royal.

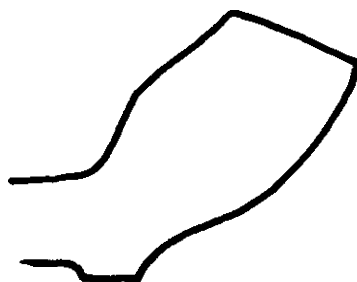
This is further confirmed by the presence of makers' marks on these pipes, specifically the marks of Bristol pipemakers, such as the Evans family ("LE" and "WE") and another pipemaker, possibly James Bladen and his family ("IB"), who probably specialized in pipes for the colonial export trade. What remains unknown is how influential consumer tastes were at Port Royal and the other colonies in the manufacture and popularity of these styles, or whether this aspect was completely under the control of the pipemaker. Interestingly, bowl Type 52, the heelless "export" pipe, was not the most popular of designs, so its advantages for shipping (less breakage) were outweighed by personal preference, either by the pipemakers, consumers, or both.

The second conclusion, that pipe bowl style in conjunction with decorative elements signaled changing tastes in pipe design and technology, was supported by the obvious changes present in the Port Royal typology, based on findings gleaned from the total database, which represents all levels of the site. The Port Royal typology confirms the growing historical trend toward greater stylistic changes between 1680 and 1710, as well as increasing sophisticated and more complicated decorative elements through the use of molded pipes toward the latter half of the 18th and 19th centuries. This evolution clearly indicates a preference for more elaborate pipes, which reflects the desire for greater diversity in commercially made products well into the 19th century.

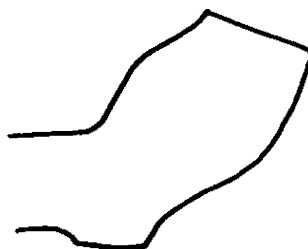
That clay pipe design also increased in complexity also indicates the high level of moldmaking and mass production achieved since the 17th century. Still, the remarkable numbers of 17th-century pipes found at Port Royal and other colonial sites testifies to the ability to mass produce clay pipes as early as the 1660s, so that the clay pipe is one of the first mass-produced, disposable commodities, as discussed in Chapter VII.

**PORT ROYAL EXPANDABLE PIPE TYPOLOGY****TYPE 1.0 HEELED PIPES****1.10 Flat heel, bulbous bowl, 1620-1730**

1.11

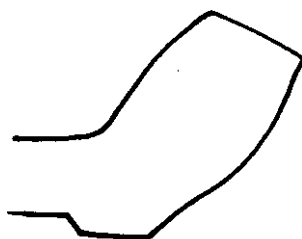


1.12

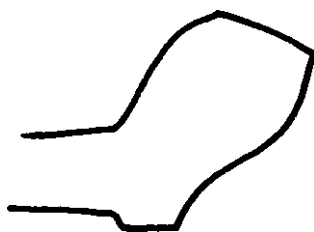


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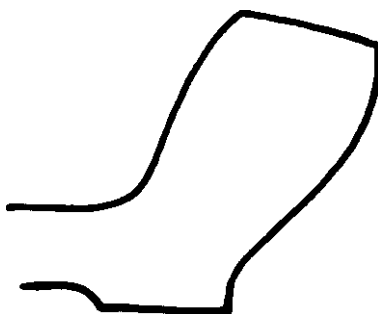




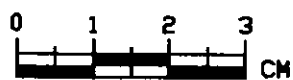
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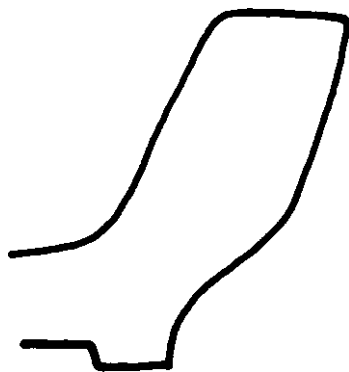


1.15

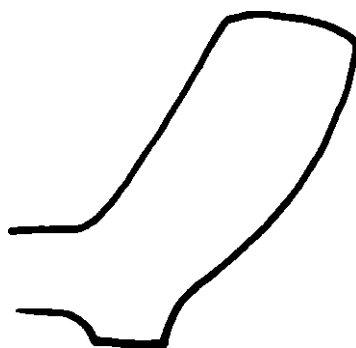


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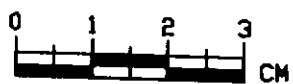


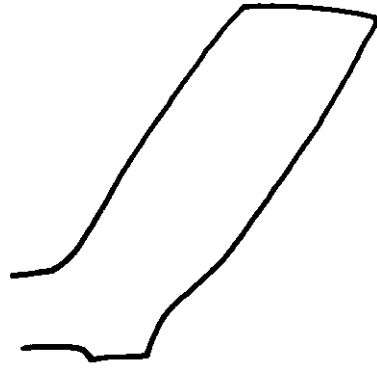
**1.20 Flat heel, curved bowl, 1650-1770**

1.21

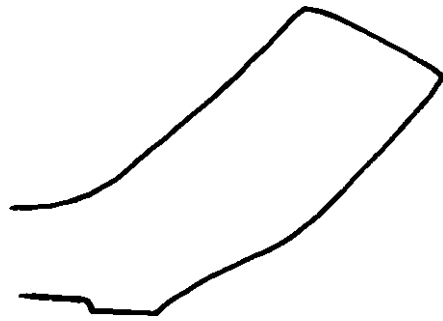


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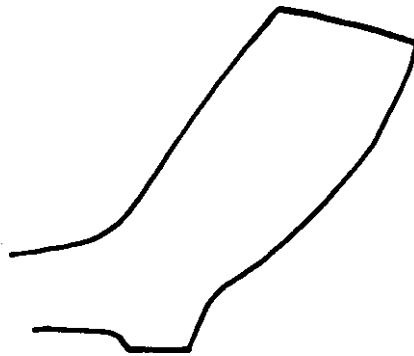




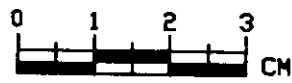
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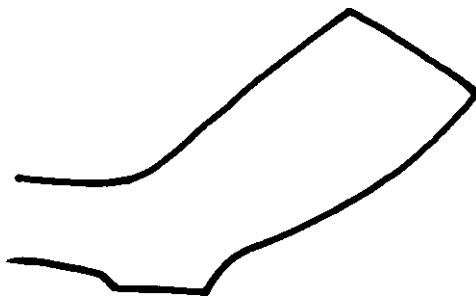


1.24

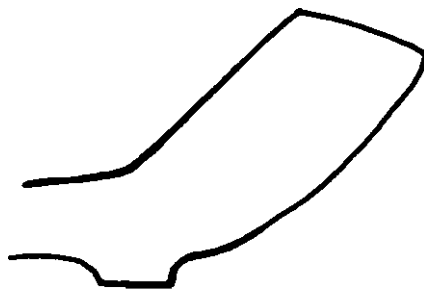


1.25

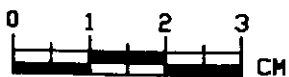


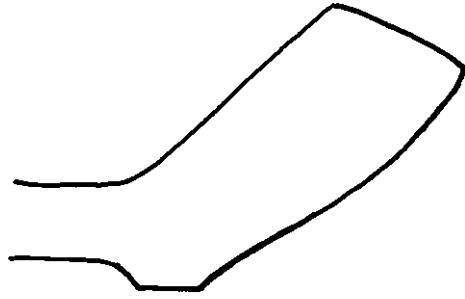


1.26

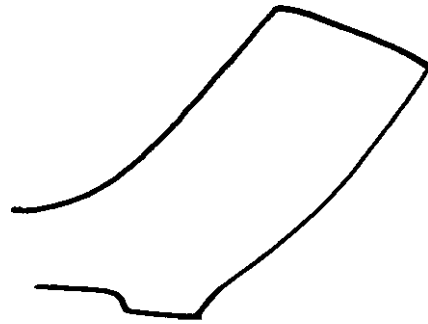


1.27

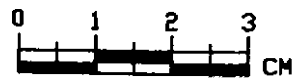




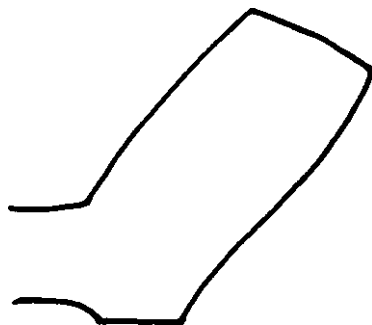
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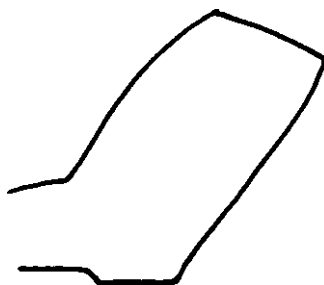
1.29



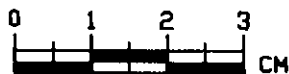


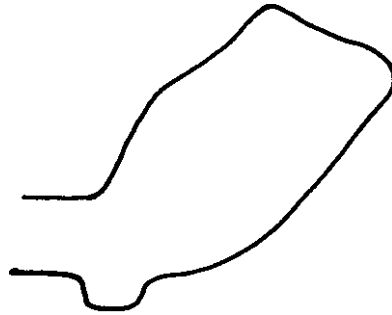
**1.30 Flat heel, straight-angled bowl, 1645-1680**

1.31

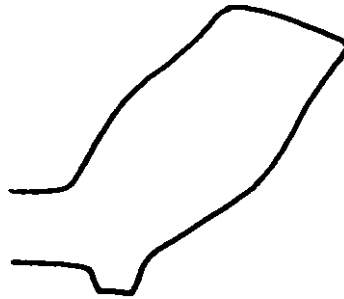


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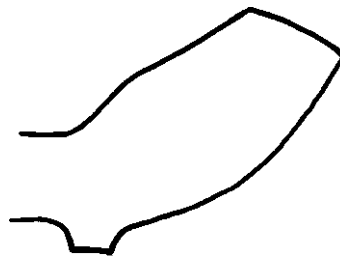


**1.40 Pronounced heel, bulbous bowl, 1640-1720**

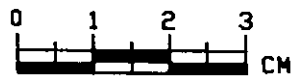
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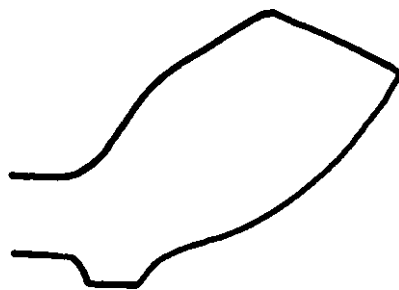


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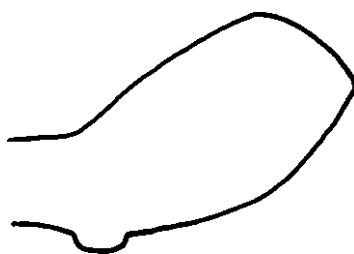


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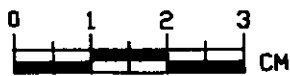


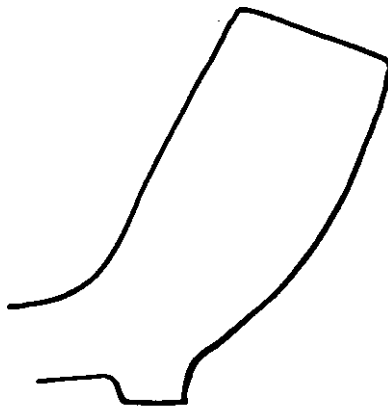


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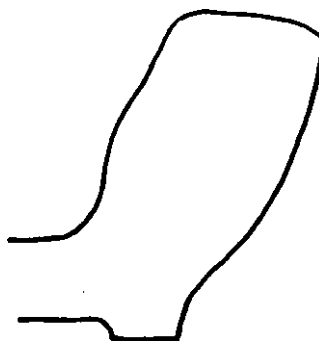


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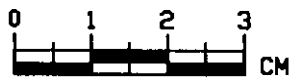


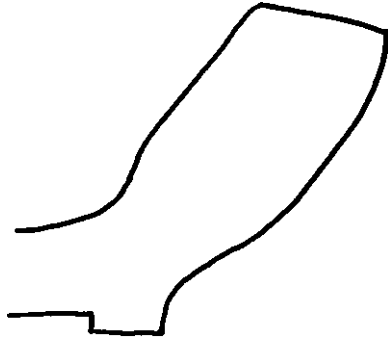
**1.50 Pronounced heel, curved bowl, 1640-1710**

1.51

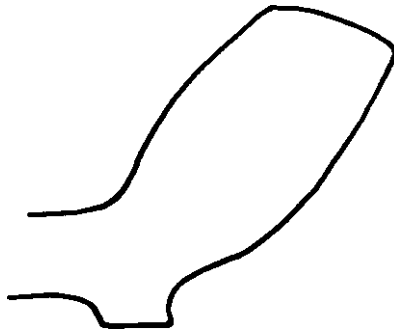


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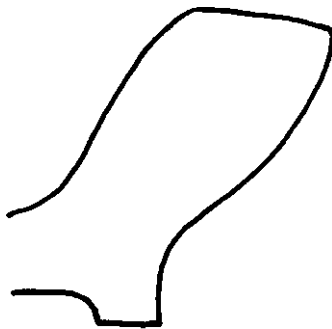




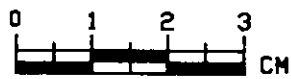
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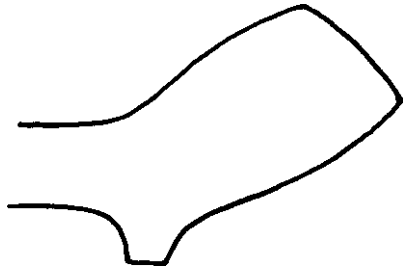


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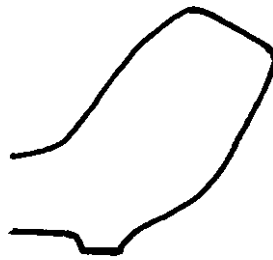


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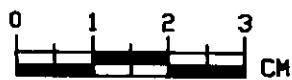


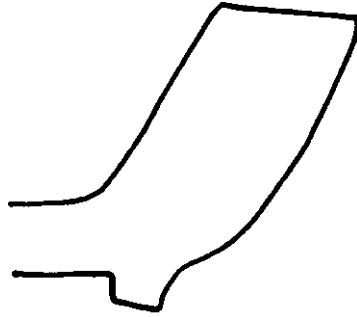


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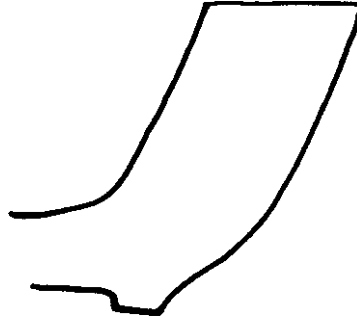


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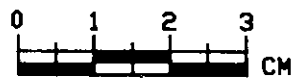


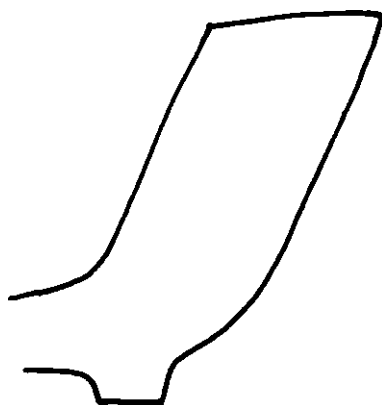
**1.60 Pronounced heel, curved upright bowl, 1680-1750**

1.61

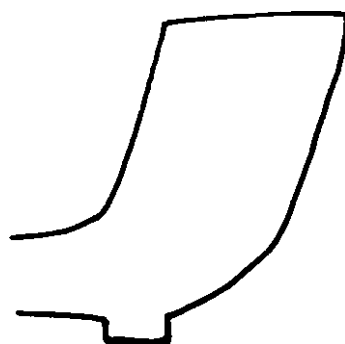


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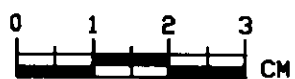




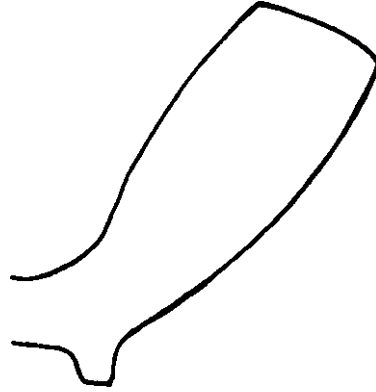
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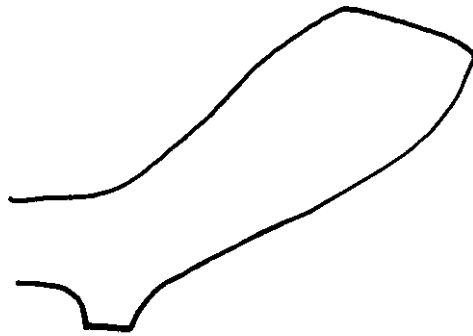
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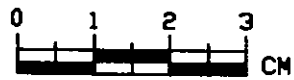


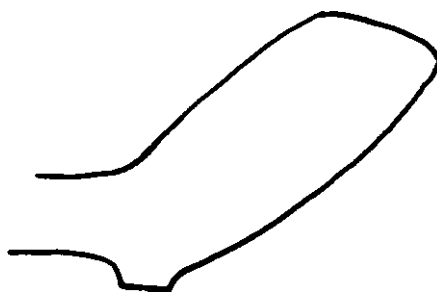
**1.70 Pronounced heel, straight-angled bowl, 1680-1730**

1.71

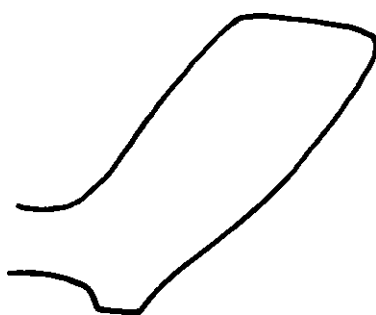


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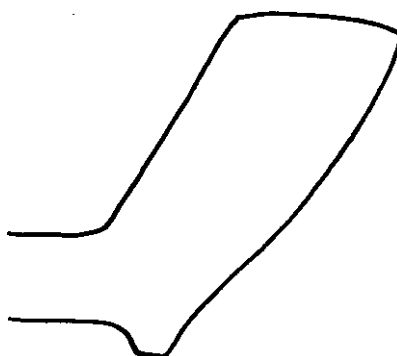




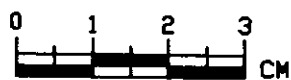
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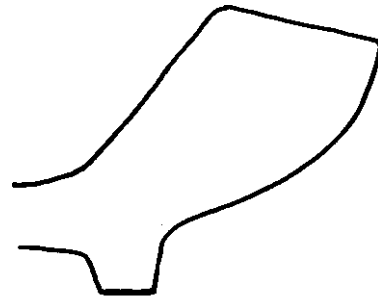


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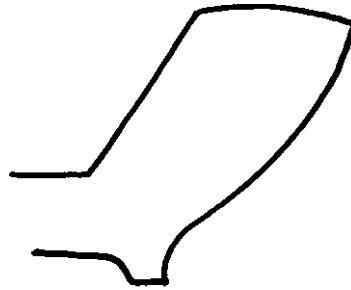


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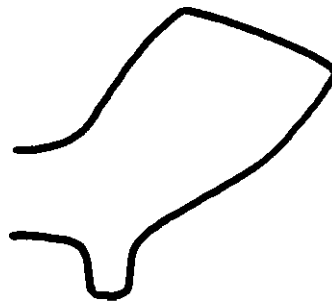




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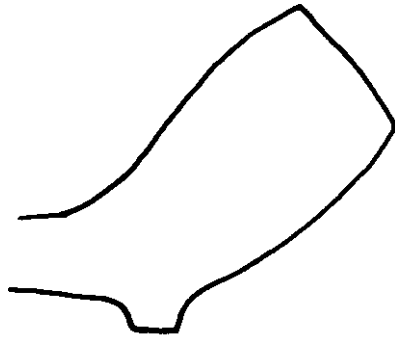


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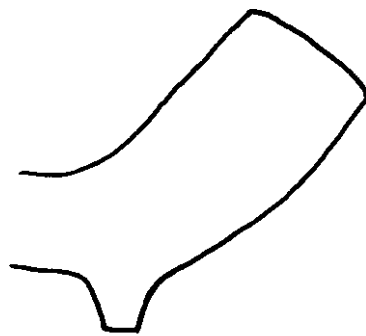


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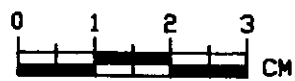


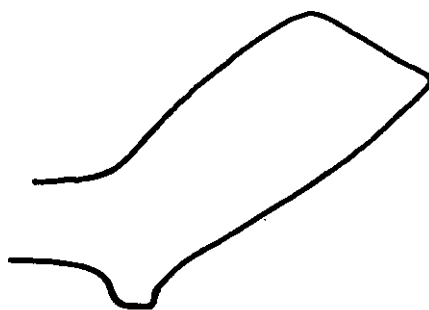
**1.80 Pronounced heel, upright bowl, 1660-1710**

1.81

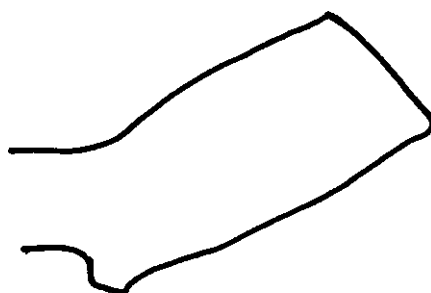


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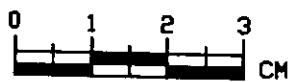


**1.90 Pronounced heel, sloping bowl, 1680-1730**

1.91

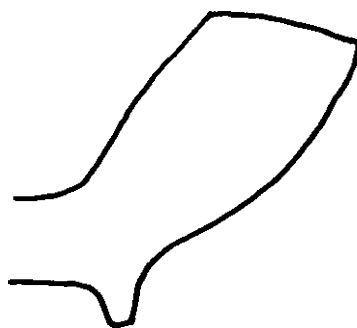


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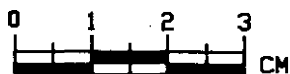


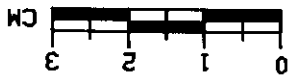
**2.0 SPURRED PIPES****2.10 Spur, curved bowl, 1620-1710**

2.11

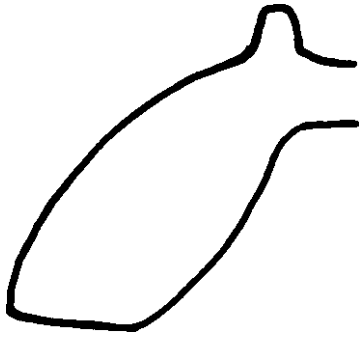


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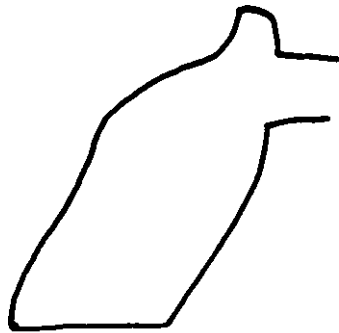


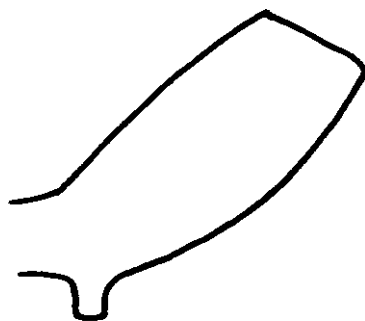


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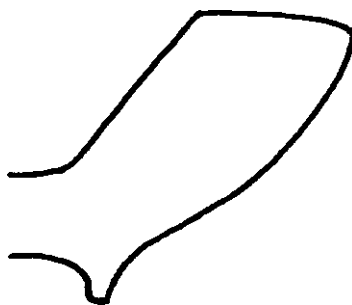


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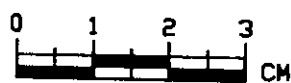


**2.20 Spur, straight-angled bowl, 1680-1710**

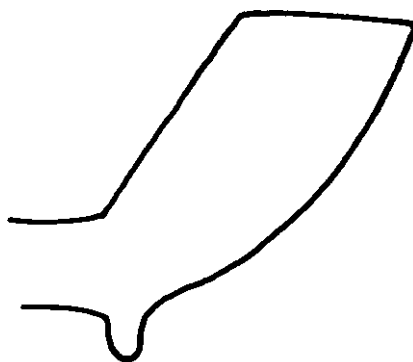
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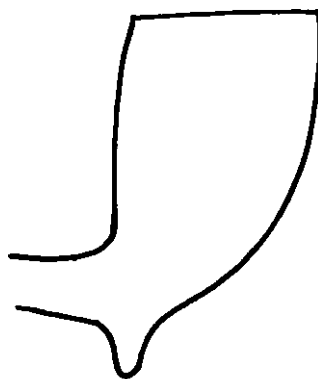
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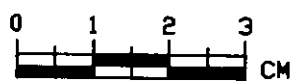




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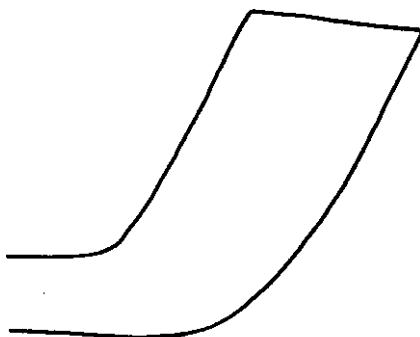


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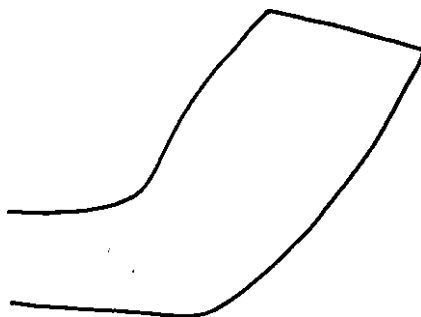


### 3.0 HEELLESS PIPES

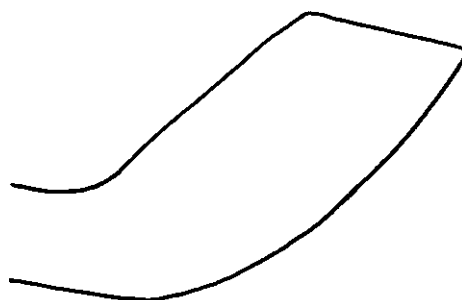
#### 3.10 "Export" type pipe, 1660-1820



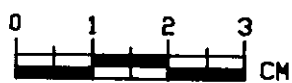
3.11



3.12



3.13

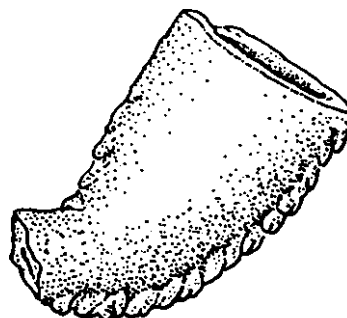


## 4.0 MOLDED PIPES

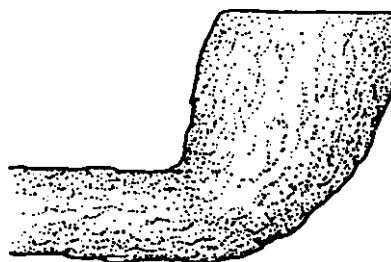
### 4.10 Molded pipes, 1710-1880



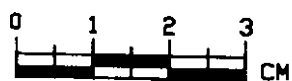
4.11 Thistle



4.12 Leaf

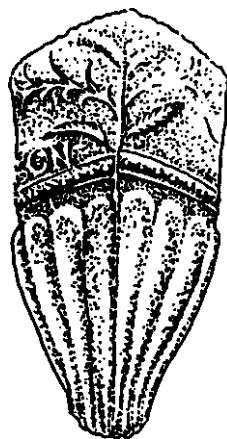


4.13 Tree Bark

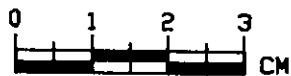




4.14 Turk's Head



Type 4.15 IE & SON



## **CHAPTER IV**

### **THE DISTRIBUTION PATTERNS OF THE PORT ROYAL KAOLIN CLAY PIPES**

#### **Introduction**

Understanding site patterns is fundamental to any archaeological interpretation of past lifeways, but for historical archaeology, this requires a slightly different approach. Unlike prehistoric sites, the relationship between artifacts and structures at historical sites is more highly visible, where structures are often located close to artifact fills comprised of soil and refuse (Deetz 1977:14-15).

Because of these specific conditions, Stanley South (1977) proposed a new model for understanding the relationship between artifact distribution patterns at historical sites and how they reflect human behavior. South based his idea on the similar patterns he observed from 18th-century British-American sites in the Carolinas, particularly the site of Brunswicktown, North Carolina. From these sites, South (1977:47-48) determined that at British-American colonial settlements, people often dumped their refuse next to the buildings they occupied, mostly at the back door, in the yard, and outside the front door, thereby creating heavy concentrations of refuse in these areas. Although periodic scattering by animal and human activity modified these fills, the concentrations were sufficient enough to develop his model, the "Brunswick Pattern" of adjacent secondary refuse disposal (South 1977:48). South then applied this model to other British-American colonial sites in the Carolinas and found it to be a good indicator for artifact patterning at such sites.

As a model, South's "Brunswick Pattern," although simplistic in nature, has been useful to historical archaeologists working on British colonial sites, and it is somewhat useful to understanding the distribution of kaolin clay pipes in the Port Royal excavations. Generally, the clay pipes at Port Royal form two distinct patterns. One is the heavy concentration of pipes found in the yard areas of Buildings 5/4, and the other consists of

clusters of primarily in situ pipes found in Buildings 1 and 3.

### **Methodology and Approach**

To examine and interpret the distribution of clay pipes at Port Royal, two contour maps were generated that reveal the overall distribution patterns of the pipes for all layers and then just for Layer 3. Figure 10, which was generated from the database, shows the distribution of pipes from all layers at the site. Figure 11, generated from the data set, illustrates the distribution of pipes from Layer 3, the 17th-century occupation layer. For the remainder of the analysis, only the pipes from Layer 3 were used. From the contour maps and pipe counts, it was then possible to try to interpret the distribution of kaolin clay pipes for their meaning as it applied to building function, culture behavior, and daily life in 17th-century Port Royal (see Figure 5, Chapter II, for the specific building and room numbers at Port Royal).

### **The Distribution of Smoked Pipes at Port Royal**

Because of the throw-away nature of clay pipes, within Port Royal's 37-year occupation period, piles of broken, discarded, and smoked pipes have accumulated in specific areas of the site. Examining the distribution of smoked pipes is especially instructive because smoked pipes can offer clues to an area's function. Smoked pipes are evident from the blackened insides of pipe bowls, therefore the smoked and unsmoked pipes *bowls* were tallied separately for Layer 3. This tally revealed a total of 3,647 pipe bowls for the major buildings and rooms on the site. The breakdown of smoked vs. unsmoked pipe bowls for Layer 3 is shown in Table 3.

The greatest concentrations of smoked pipe bowls appeared in Building 1, Room 5; Building 3, Rooms 1/2; and Yards 4A/4B as shown on the contour map in Figure 12. Similar patterns were first evident when the distribution of pipe bowl styles was examined in Chapter III.

In Building 1, Room 5, there were 607 smoked pipe bowls out of 1,191 pipe

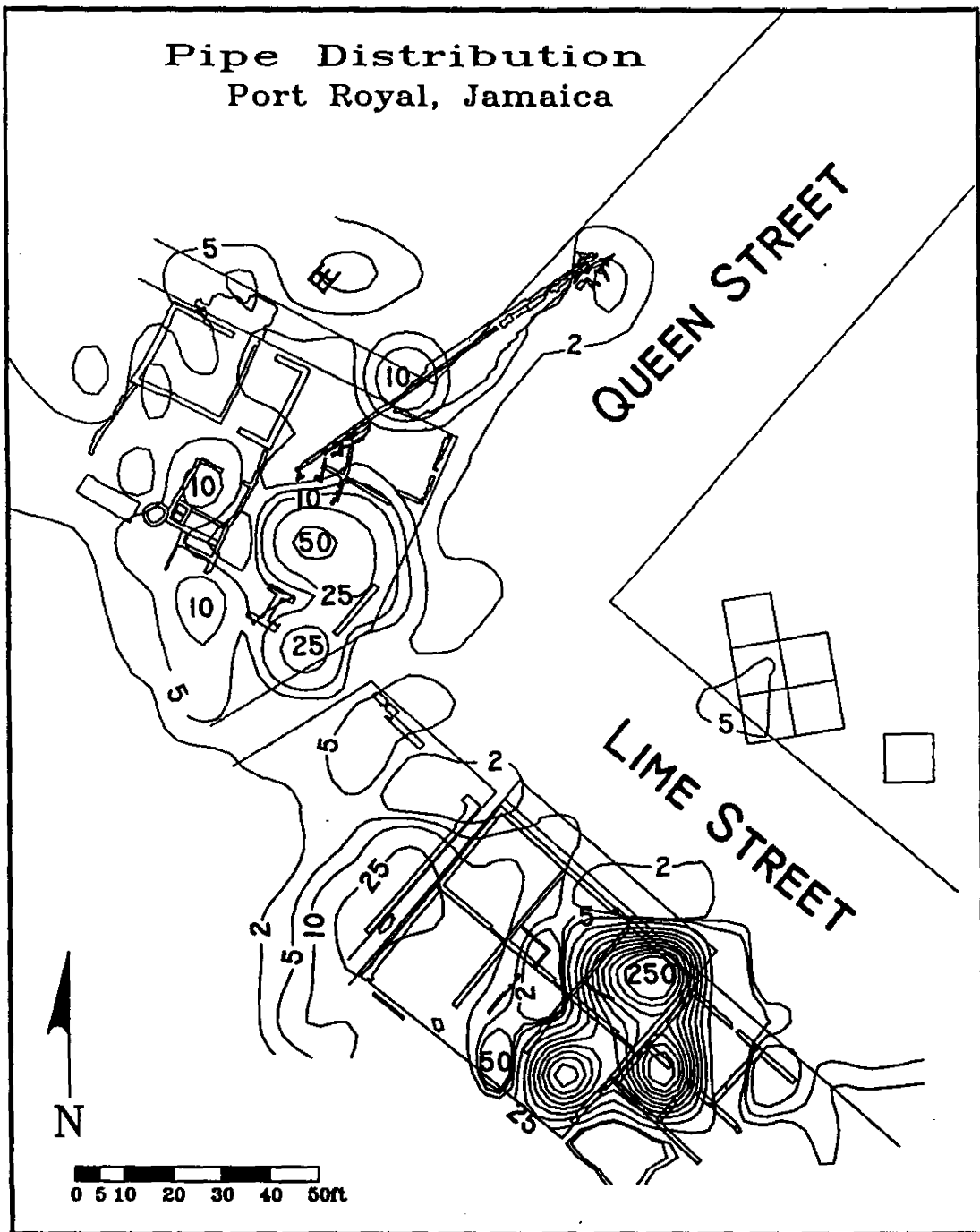


Figure 10. Distribution of 21,575 pipes from all layers of the site.

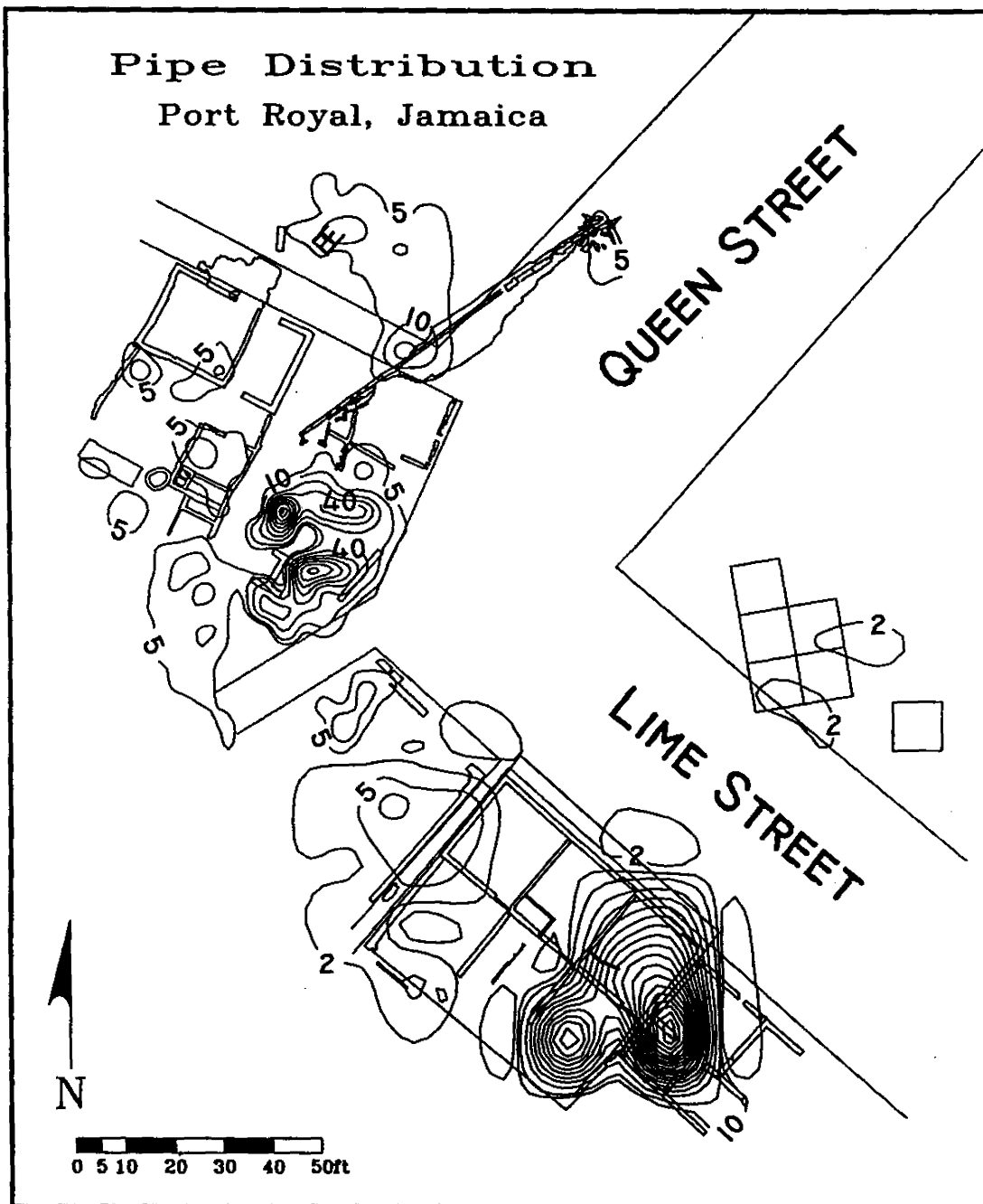


Figure 11. Distribution of 18,537 pipes from Layer 3.



Table 3. Comparison of smoked vs. unsmoked pipe bowls, Layer 3.

LOCATION	SMOKED BOWLS	UNSMOKED BOWLS	TOTAL BOWLS
Building 1, Room 1	8	13	21
Building 1, Room 2	34	18	52
Building 1, Room 3	—	—	—
Building 1, Room 4	2	16	18
Building 1, Room 5	607	584	1191
Building 1, Room 6	35	100	135
Aley	18	16	36
Building 2	21	67	88
Building 3, Room 1	179	322	501
Building 3, Room 2	397	546	943
Building 3, Room 3	35	32	67
Building 3, Room 4	1	8	9
Building 4	6	23	29
Building 5, Room 1	2	25	27
Building 5, Room 2	6	35	41
Building 5, Room 3	—	8	8
Building 5, Room 4	—	—	—
Yards 4A/4B	111	324	435
Yard 5	12	3	15
Yard 6	4	7	11
Yard/Hearth 7	9	11	20
Totals:	1487	2158	3647

Note: Bowls include bowls with stems, whole pipes, bowl fragments, and bowls without stems.

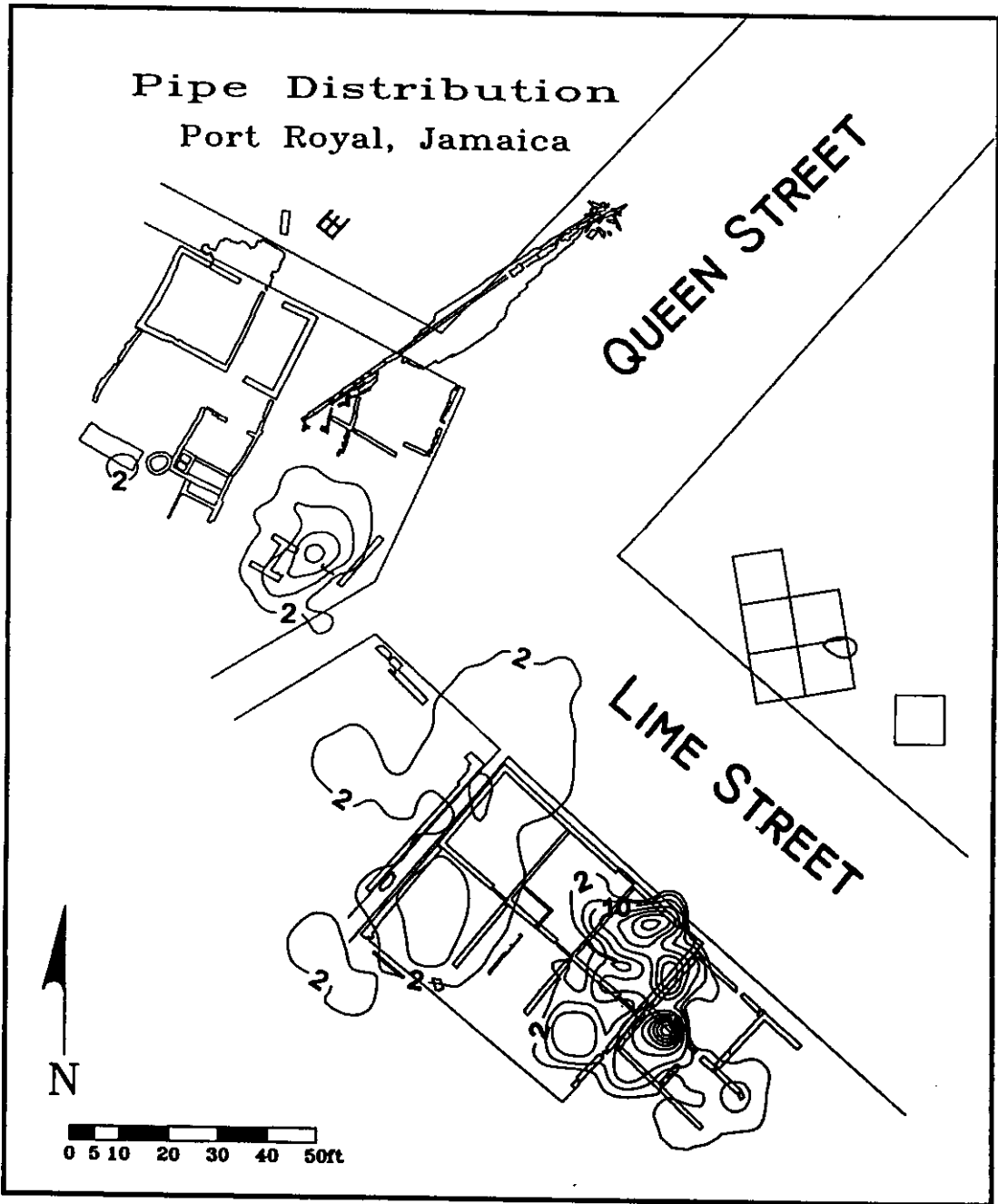


Figure 12. Distribution of smoked pipes, Layer 3.

bowls or 51 percent of smoked bowls recovered from that room. For the whole building, 686 smoked pipe bowls or 48 percent were recovered out of 1,417 pipe bowls. If Rooms 5 and 6 served as a combination wine/pipe shop, then pipesmoking was probably a common activity in these rooms, as such shops functioned as places for smoking in addition to carrying new pipe stock to sell to customers. Because Room 5 had fallen brick walls covering a brick floor, the association of smoked and unsmoked pipes in the same room is assured because the fallen walls served as a barrier to intrusive material.

In Room 1 of Building 3, there were 179 smoked pipe bowls out of 322 bowls or 55 percent smoked bowls for that room. For Room 2, there were 397 or 42 percent smoked bowls out of 943 bowls. This agrees with the total of 612 smoked pipe bowls or 40 percent out of 1,520 pipe bowls recovered from Building 3. These figures may suggest that this was mainly a storage facility for current retail stock, since less than half of the bowls were smoked, although there is still an association of large quantities of smoked and unsmoked pipes. This is because this room had a fractured plaster floor, where some contamination with refuse from below the floor might have occurred. Large amounts of smoked pipe bowls were also found in Yards 4A/4B. From this area, 111 smoked bowls, or 25 percent of 435 bowls were recovered in addition to numerous broken and discarded stems.

## **Distribution of Pipes by Building**

### **Building 1**

Building 1, like Buildings 2 and 3, faced the intersection of Lime and Queen Streets, the commercial heart of Port Royal. The functions of these buildings therefore were public, and Building 1 was no exception. A well-built brick structure that was multipurpose in nature, Building 1 is especially intriguing because this is where one of the largest concentrations of kaolin clay pipes (6,894 pipes) was found along with Building 3 and the yard areas of Buildings 5/4.

In Rooms 1 and 2, there is strong evidence linking these rooms to woodworking, leathermaking, and some butchering activity (Hamilton 1985:105). The 369 pipes found

there suggest that a typical scenario that might include workers who smoked as they labored, then tossed their used pipes on the floor without much regard, as part of the day's refuse, along with scraps of wood, leather, and animal bone that were found on the site.

In Room 3 of Building 1, which was probably affected by a ship thrown against the building during the earthquake, 205 pipes were recovered. The function of Room 3 remains unknown, so the presence of clay pipes is not very revealing in this regard; however, because Room 4 may have been a tavern---based on over 60 wine bottles recovered there--- Room 3 possibly served a similar function as it provided access to Room 4 (Hamilton 1984:21; 1997, pers. comm.). Room 4 only had 47 pipes.

On the other hand, the clay pipes found in Rooms 5 (5,622 pipes) and 6 (657 pipes) play a central role in determining the function of these two rooms. Together, Rooms 5 and 6 comprise a wine/pipe shop combination, where large quantities of unsmoked pipes, along with over 100 onion bottles, seven to eight pewter dishes, and two brass candlesticks were found (Hamilton 1985:108). Such items clearly indicate that tobacco and alcohol were central to the activities of these rooms (Hamilton 1985:108).

### Building 3

Alongside Building 1 is Building 3, which yielded 5,956 pipes. By far, Rooms 1 (2,594 pipes) and 2 (2,975 pipes) contained the largest amount of pipes in the building. Most of the pipes in Room 2 were unused and found lying end to end, as well as numerous uncorked onion bottles, thus strongly suggesting that Room 2 was a storage area for sales stock at Port Royal. Figure 13 shows a group of these unused pipes found in situ in Room 2 during the 1985 field season. Rooms 2 and 3 (282 pipes) probably served as yard areas to Rooms 1 and 4 (105 pipes), with Room 2 containing a hearth (Donny Hamilton 1998, pers. comm.; Darrington 1994:97). To avoid fire hazards, heat, and smoke, hearths and cooking areas were usually located in the yards behind buildings at Port Royal, where the yards functioned as walled off "outdoor" rooms for various activities. In addition to the hearth in Room 2, several broken pestles belonging to



Figure 13. New clay pipes found in situ in Room 2, Building 3.

mortars, ceramics, and barrel hoops were found, indicating multi-purpose activities. The thousands of unused clay pipes found in Room 2 were thus probably stored in a corner of the yard (Donny Hamilton 1998, pers. comm.). In Room 3, the yard area to Room 4, scattered remains included a balance pan scale and several lead weights used to measure large bulky items, as well as ceramics, pieces of wood, and onion bottle fragments.

#### Building 2

Building 2, adjacent to Building 1, contained 380 pipes, and because the building was so poorly preserved, its function remains unknown. The alley adjacent to Building 2 contained 274 pipes.

#### Building 5

Located on an extension of Lime Street is Building 5, which was a well-built brick structure with a sidewalk at the front of the building (Hamilton 1990a:4, 6). Building 5, together with Building 4, were possibly used for a variety of functions, although it may

have been one large complex dealing with food preparation, also known as a “victualing” house, an archaic British term for what would be considered a restaurant by modern-day standards (Hamilton 1991:93, 1990a:4; per. comm., 1997).

Room 1 of Building 5 contained 98 pipes, including one pipe bowl (574-3) in 1987 that appeared to contain tobacco residue in the form of carbonized and uncarbonized plant tissue still in the pipe. Another pipe bowl (688-2) with possible tobacco residue was discovered in Room 2 in 1989. Because of the infusion of seawater into the residue, positive identification was not possible (John Jones 1997, pers. comm.).

Along with 61 pipes, Room 2 contained a stack of pewter plates. Because it was so small and narrow, Room 3 was probably used as only a passageway and for storage (Donny Hamilton 1998, pers. comm.), which may explain why only 24 complete pipes were found there. Room 4, possibly a kitchen, contained eight pipe remains. The yard to Building 5, which was paved in brick, yielded 124 pipes. All in all, in comparison to Buildings 1, 3, and 4, relatively few pipes were found associated with Building 5.

#### **Building 4**

Building 4, the additional structure that shared a common outside wall with Building 5, contained 143 pipes: 65 pipes in Room 4A and 78 pipes in Room 4B. In contrast, the yards outside this structure was full of pipes. Yards 4A/4B and their respective hearths together contained 1,795 pipes. Yards 4A/4B were not paved and therefore comprise a mixture of earlier occupations, but the numbers are still impressive.

#### **Yards 6 and 7**

Yards 6 and 7 were located across the backside of Buildings 5/4. A wooden fence separated Yard 5 from Yard 6, and a cistern in the southeast corner of Yard 5 was possibly shared with Yards 6 and 7 (Hamilton 1990b:14). Both Yards 6 and 7 were brick paved; Yard 6 contained 55 pipes, and Yard 7 had 45 pipes clustered around a brick hearth that backed up to the hearth of Building 5.

### **The Meaning of the Pipe Distribution Patterns**

In any discussion of distribution patterns, it has been common for recent historical archaeology reports to discuss the “Brunswick Pattern” of adjacent secondary refuse disposal and the Carolina Pattern (South 1977). Only the Brunswick Pattern is potentially relevant in the study of pipes and their disposal, so it was investigated in relation to the distribution of pipes at Port Royal.

Overall, the distribution of kaolin clay pipes at Port Royal shows two distinct patterns: (1) heavy concentrations of predominantly new pipes were found in Buildings 1 and 3; and (2) the patterns that emerge for Buildings 5/4 and their adjacent areas clearly indicate that more pipes were found outside rather than inside the buildings, indicating that refuse was swept and then dumped out the back door into the yard areas of the Building 5/4 complex.

That so many new pipes were recovered from Buildings 1 and 3 (see Figure 11) suggests two closely related scenarios. First, certain areas of these buildings were primarily storage facilities for the current retail stock in pipes, which was considerable. This also suggests that great quantities of clay pipes were shipped to Port Royal, providing a ready supply of sales stock to be sold in the shops and taverns around town. This is substantiated in Chapter V, where the documentary evidence in the form of port records and probate inventories supports this assertion, and in Chapter VII, which discusses the popularity of smoking and the consumer demand for items like tobacco and clay pipes.

The second pattern, which indicates concentrations of clay pipes in the yard areas of the Building 5/4 complex is somewhat analogous to South’s “Brunswick Pattern,” which states:

On British-American sites of the eighteenth century a concentrated refuse deposit will be found at the points of entrance and exit in dwellings, shops, and military fortifications [South 1977:48].

What this statement indicates is that the Brunswick Pattern deals with concentrations of refuse at points of entry and exit to buildings on British-American sites.

All told, only 334 pipes were found inside the Building 5/4 complex, but outside in *all* the yard areas combined, there were 2,019 pipes, most of which are associated with the two yards of Building 4 at the back of the building (see Figure 11). This suggests that people were taking their refuse and dumping it outside the back door into the yards, as demonstrated at other English colonial sites.

For example, the distribution pattern of artifacts at the Public House-Tailor Shop at Brunswicktown, South (1977:71) indicated that clay pipes and wine bottles formed a major concentration in a yard area at the rear of the structure, not far from the kitchen. The lowest percentage of refuse was found inside the building, whereas the highest percentage appeared outside at the rear of the building. Only 3.6 percent of clay pipes was found inside the Public House-Tailor Shop, whereas 8.9 percent was found in the yard. This also applied to kitchen refuse, where 21.3 percent was contained inside and 62.1 percent in the yard (South 1977:111).

The Brunswick Pattern was also evident at two other British colonial sites. At the Great House at Drax Hall on the north coast of Jamaica, 97.9 percent of the pipe fragments were found in the kitchen midden in the yard compared with the inside of the house where only one pipe was found (Armstrong 1990:205). The Country's House Site in St. Mary's City, Maryland, revealed similar patterns, where large accumulations of refuse were found immediately adjacent to the front and back doors of the building. In fact, this pattern persisted throughout the 17th century, regardless of the building's functions. During the early part of the century, the building served as a private residence, and then functioned as a public inn, or "ordinary" after 1660 (Miller 1994:66, 74, 80).

Although the Brunswick Pattern might explain the concentrations of artifacts as secondary removal at these other sites, at Port Royal, it is not definite. Instead, sheet refuse predominated throughout the exterior of the buildings in the roads and alleyways, so that the Brunswick Pattern was not validated one way or the other. The one exception to this was found at the exterior of the front of Building 1, Room 1, where some trash was discovered in the form of bone fragments and leather scraps (see Figure 11). These



remains correspond to the activities inside Rooms 1 and 2, and possibly represent the disposal behavior associated with the Brunswick model. Yet, the brick sidewalk found in front of Building 1 was probably swept on a regular basis so that the refuse was further displaced and scattered into the street, rather than being thrown right outside the front door of the building and left there to accumulate, as the Brunswick Pattern dictates.

In contrast, the yard areas of Building 3 and the Building 5/4 complex reflect a completely different scenario, where the accumulation of artifacts was the result of multiple activities rather than the refuse behavior associated with the Brunswick model. The hearth located in Room 2 of Building 3, along with the artifacts found in Rooms 2 and 3 indicate such multiple activities as food preparation, weighing and measuring, and storage. In Yards 4A/4B, 5, 6, and 7, the combination of smoked and discarded pipe remains with other artifacts also demonstrate multi-purpose activities. For example, Yard 5 contained a number of objects related to cooking and food preparation, including cast iron pots, iron skillets, ceramic bowls, pewter plates and a three-legged grinding stone known as a *metate* (Hamilton 1990b:14). Animal bones were recovered in Yard 4B, suggesting butchering activity, and cooking pots, bowls, pewter plates, and metal objects were found in Yards 6 and 7 (Hamilton 1990b:14). These areas therefore represent the remains of various activities concentrated in walled off yards, rather than secondary refuse behavior. Walled off yards assured more privacy, where hearths and cisterns were located as well as the latrine, or “house of office” (Pawson and Buisseret 1975:106). In fact, any refuse deposits found at Port Royal were discovered underneath the brick floors at the site. These deposits were probably associated with previous structures and occupations (Donny Hamilton 1998, pers. comm.).

The Brunswick Pattern indicates a world view that was informal and communal (Deetz 1977:39-40; Miller 1994:81), whereby untidy yards were accepted and tolerated in the 17th century. In the case of Port Royal, however, this was less likely, simply because the city was so crowded together, that yards provided important areas of extended work spaces as well as affording privacy from the neighbors.

Finally, significant amounts of clay pipes in the outdoor areas reflect more the throw-away nature of clay pipes, rather than the disposal behavior of the Brunswick model. As clay pipes were cheap and plentiful, they were probably easily tossed aside once the stem broke or if the pipe had a short stem. Broken and short stems made clay pipes simply too hot to smoke. The throw-away nature of clay pipes also signaled new attitudes toward the acquisition and use of goods and the dawn of a pre-industrial consumerism that will be discussed in Chapter VII.

**CHAPTER V**  
**THE DOCUMENTARY EVIDENCE AND ITS RELEVANCE**  
**TO THE PORT ROYAL KAOLIN CLAY PIPES**

**Introduction**

As a body of artifacts, the clay pipes from Port Royal can be placed in a broader context reflecting daily life in Port Royal and socioeconomic changes of the late 17th century. This is not immediately apparent, but with the aid of historical documents, the pipes begin to acquire new life and meanings.

Using documents in historical archaeology has been advocated by Stone (1970:73, 1988), Deetz (1977:8, 1993:161), Beaudry (1988:43), and Shackel and Little (1994). Documentary research can either complement or contradict the archaeological record, depending on the questions being asked by the researcher (Little 1992b:4)

For the Port Royal kaolin clay pipes, the role of documentary research was both complementary and interdependent. By comparing documentary sources from the 17th century, namely the Jamaica Probate Inventories and the Bristol Port Records, and to a lesser degree, the London Port Records, to the pipe collection, it was possible to investigate questions concerning: (1) the earliest shipments of clay pipes to the English colonies in North America; (2) the quantity and value of pipes being shipped from Bristol, England, to Jamaica; (3) the methods used to pack and ship clay pipes to Jamaica and the colonies; (4) the value of clay pipes for retail sale at Port Royal; and (5) the types of tobacco and smoking-related items that could be found in the shops and households of Port Royal. Following this approach, it was possible to see how the Port Royal pipes could be placed in their cultural context, both in daily life at Port Royal and in the broader historical developments of the 17th century, discussed in Chapter VII.

## **The English Port Records**

### **Background**

Most statistics regarding British commerce for the 17th century are derived from the Port Books of the Office of the Exchequer, Series E 190, housed in the Public Records Office in London, England. First initiated in 1428, the Port Books' original purpose was to record, on behalf of the Exchequer, goods shipped from English ports and the amount of duty paid on them by the shippers, mainly in an effort to prevent fraud on customs. The main series of books were fully inaugurated during 1564-1565 (Clark and Franks 1938:52; Walne 1972:177).

The London and Bristol port records comprise handwritten entries of goods being shipped from English ports to their destinations, and the cargoes are either itemized or grouped together with one assigned value for the whole shipment. Fortunately, in most cases, the cargos were itemized, thus making it possible to determine the quantities by gross (144 pipes) of pipes being shipped to Jamaica, as well as their values from the Bristol Port Records for 1682 and 1694-1695. Copies of these records are available on microfilm in the Nautical Archaeology Program at Texas A&M University. The Bristol Port Book records were used because most of the kaolin clay pipes at Port Royal were manufactured in and shipped from Bristol, England, during the 17th century. To gain information on the earliest shipments of pipes to the English colonies, I consulted in the London Port Books housed in the Public Records Office in London, England, during May of 1996.

### **Determining Quantity from the Port Records**

That so many kaolin clay pipes were found at Port Royal testifies to the popularity of smoking, which early on necessitated shipments of clay pipes to colonists in North America and the Caribbean. The first mention of clay pipes for export appears in a London Port Book entry for 1627 (PRO E 190 31/1), where clay pipes are included in a shipment bound for Virginia on the ship *James* of London. Clay pipe remains, including some from Bristol, have been found in the earliest phases of occupation at the

Virginia settlement of Martin's Hundred, dating from 1619 to 1622 (Noël-Hume 1979:3-8) and colonial Jamestown (Cotter 1994, c.f. pg. 210). A sampling of the London Port Book entries between 1662 and 1668, indicates that shipments of pipes were exported in small amounts along with household furnishings, earthenware, children's toys, wine, spirits, and other goods that colonists desired.

After mid-century, as Bristol's port grew in importance, pipes were shipped in sizeable amounts. In determining the amounts of pipes being sent to Jamaica before and after the 1692 earthquake, both the 1682 and 1694-1695 Bristol Port Records were highly instructive. Eighteen shipments of clay pipes from Bristol to Jamaica in 1682 totaled 405 gross, or 58,320 pipes, whereas 26 shipments from Bristol to Jamaica in 1694-1695 amounted to 3778 gross, or 544,032 pipes (see Tables 4 and 5). Given that probably not all shipments were recorded, this amount may be even lower than what was actually received at port.

In addition to shipments to Jamaica, amounts shipped to the North American and Caribbean colonies were also examined, not only for comparison, but also in consideration of the triangular trade where some of these shipments may have been bound for Jamaica as well. For the British North American colonies--which includes New England, Boston, New York, Pennsylvania, Maryland, and North Carolina--a total of 2,921 gross, or 420,624 pipes were counted for 49 shipments in 1682. For 1694-1695, the amount was similar, totaling 2,901½ gross, or 417,816 pipes for 48 shipments. Shipments to the Caribbean islands of Barbados, Nevis, Antigua, and St. Lucas, sometimes via Ireland, amount to 445 gross in 1682, or 640,080 pipes in 17 shipments and 4,176 gross, or 601,344 pipes in 80 shipments, which only slightly exceeds the number of pipes exported to Jamaica alone for 1694-1695. Such large shipments explain why clay pipes are so plentiful in the archaeological record at Port Royal.

Table 4. Shipments of pipes from Bristol to Jamaica, 1682.

DESTINATION	YEAR	AMOUNT	L	S	P	PENCE/GROSS
Jamaica	1682	35 gr.		1	9	12
Jamaica	1682	25 gr.		1	3	12
Jamaica	1682	8 gr.			5	12.5
Jamaica	1682	12 gr.			8	13.3
Jamaica	1682	40 gr.		2		12
Jamaica	1682	20 gr.		1		12
Jamaica	1682	60 gr.		3		12
Jamaica	1682	15 gr.			9	12
Jamaica	1682	24 gr.		1	3	12.5
Jamaica	1682	10 gr.			6	12
Jamaica	1682	16 gr.			10	12.5
Jamaica	1682	20 gr.		1		12
Jamaica	1682	15 gr.			9	12
Jamaica	1682	12 gr.			8	13.3
Jamaica	1682	18 gr.			11	12.2
Jamaica	1682	45 gr.		2	3	12
Jamaica	1682	10 gr.			6	12
Jamaica	1682	20 gr.		1		12

Notes: L = pounds, S = shillings, and P = pence for Tables 4 and 5.

Table 5. Shipments of pipes from Bristol to Jamaica, 1694-1695.

DESTINATION	YEAR	AMOUNT	L	S	P	PENCE/GROSS
Jamaica	1694	30 gr.				no value listed
Jamaica	1694	100 gr.				no value listed
Jamaica	1695	400 gr.		1		no value listed
Jamaica	1695	800 gr.				no value listed
Jamaica	1695	750 gr.		7	5	2.3
Jamaica	1695	60 gr.		3		12
Jamaica	1695	20 gr.		1		12
Jamaica	1695	24 gr.		1	2	11.6
Jamaica	1695	20 gr.		1		12
Jamaica	1695	14 gr.			8	11.4
Jamaica	1695	200 gr.		10		12
Jamaica	1695	410 gr.	1		6	12
Jamaica	1695	65 gr.		3	3	12
Jamaica	1695	11 gr.			7	12.7
Jamaica	1695	100 gr.		5		12
Jamaica	1695	300 gr.		15		12
Jamaica	1695	80 gr.		4		12
Jamaica	1695	60 gr.		3		12
Jamaica	1695	10 gr.			6	12
Jamaica	1695	14 gr.			8	11.4
Jamaica	1695	16 gr.			9	11.2
Jamaica	1695	60 gr.		3		12
Jamaica	1695	10 gr.			6	12
Jamaica	1695	100 gr.		5		12
Jamaica	1695	100 gr.		5		12
Jamaica	1695	24 gr.		1	2	11.6

### Determining Value from the Port Records

The quantity of kaolin clay pipes recovered during the 1981-1990 excavations at Port Royal, suggests that clay pipes were both cheap and plentiful, if not one of the first disposable commodities that was “manufactured, imported, smoked, and thrown away, all within a matter of a year or two” (Noël-Hume 1985:296).

Part of the challenge in determining the value of clay pipes is the obvious barrier to understanding the value of 17th-century currency by modern standards. The other challenge comes from locating contemporary sources that record the value of pipes.

The Bristol Port Records were especially helpful in determining the value of clay pipes because they list shipments of clay pipes along with their corresponding shipment or taxable value (Tables 4 and 5). Based on the London Port Books, Grant and Jemmett (1985:462) attempted to assess the value of clay pipes. For example, they determined that clay pipes were valued at 1 shilling (or 12 pence) per gross, which numbered 12 dozen, or 144 pipes. Thirty gross, or 4,320 pipes would thus be valued at 1 pound, including the 5 percent duty charged for shipping the pipes. Another researcher determined that clay pipes were valued at 12 pence (1 shilling) per gross for 1660, 18 pence per gross in 1697, and 12 pence per gross from 1698 until 1825 (Schumpeter 1960:72).

Overall, Grant and Jemmett’s assessment agreed with the valuations listed in the Bristol Port Books, although there were a few discrepancies. For example, in contrast to Grant and Jemmett’s value of 1 pound per 30 gross of pipes, entries for 30 gross in the Bristol records for 1684-1685 show a much lower value of 1 shilling, 6 pence. Even in the Bristol Port Records, the same amounts were sometimes listed at different values. This was evident in a shipment bound for Nevis in 1682, where one entry valued 30 gross of pipes at 1 shilling, 6 pence, but another listed 30 gross at 1 shilling, 11 pence.

Although such discrepancies exist, the majority of the values were consistent in both the 1682 and 1694-1695 Bristol records. Two of the most consistent valuations were the entries for 10 gross of pipes, which was almost always listed as 6 pence, and



20 gross of pipes, which was listed at 1 shilling, regardless of destination and year. From these entries, it appears that 12 pence was the average value of a gross of pipes in the 17th century. To test this assumption, calculations were applied to other entries listed in the Bristol Port Books.

For example, an entry for 60 gross of pipes was listed at 3 shillings. If a gross of pipes is multiplied by 60, this equals 8,640 pipes. When dividing 12 pence into 8,640, you arrive at a figure of 1 pence per 720 pipes. Twelve pence equals 1 shilling, therefore 3 shillings equal 36 pence, which is then divided into the 720 pipes. This results in a factor of 20, the missing value that could be used to test the rest of the entries listed in the Bristol Port Records. The missing value of 20 is then calculated for each entry. The final result is a value of 12 pence per gross or a close approximate for most of the entries, as shown in the last column in Tables 4 and 5. This essentially means that 12 pence was the average price per a gross of pipes in the 17th century, and that the amount or value placed in the Bristol Port Records represents either a tax or a shipping charge that is equivalent to 1/20 of the value of the shipment.

The Bristol Port Records proved to be an asset in trying to determine the value of clay pipes in the 17th century at the point of shipment, but a cross-check was needed to determine the value of the pipes in Jamaica and Port Royal. For this and for other comparisons, the most useful set of documents was the Jamaica Probate Inventories as discussed below.

## **The Jamaica Probate Inventories**

### **Introduction**

Probate inventories have been used by historical archaeologists within the last 30 years (Stone 1970; Brown 1973; Beaudry 1988; Benes and Benes, 1989; Little 1992a; Hamilton 1992; Shackel 1992:205). Probate inventories are proving to be an invaluable rich source for historical archaeologists, particularly because they are “person, time, and place specific” (Benes and Benes 1989:13). A probate record is essentially the list of deceased individual’s property at the time of death and often provides detailed

descriptions and valuations of household possessions or other types of property. For historical archaeologists, the value in using these records lies in their usefulness in making cultural and historical reconstructions. Some examples include spatial and functional analyses in reconstructing colonial houses and buildings, analyses of debris fills and archaeological features, and studies involving issues of status and power through the ownership of goods.

For example, Steven Pendery's (1992) study of consumer behavior in Charlestown, Massachusetts, from 1630 to 1760, traces the growing relationship between the legitimization of status and the acquisition of certain goods through the use of probate records. His study also provides a valuable comparison to consumer behavior at Port Royal as discussed in Chapter VII.

For the study of the Port Royal kaolin clay pipes, the Jamaica Probate Inventories were helpful in assessing the value of clay pipes, in comparing the quantities of pipes in the archaeological record to the documentary record, the possible retail value of pipes at their point of use in Port Royal, their packing and storage, and the types of smoking-related items that may have been in use in 17th-century Port Royal. Copies of the Jamaica Probate Inventories from the Jamaica Public Archives office in Spanish Town, Jamaica, are available on microfilm as well as computerized transcriptions at the Nautical Archaeology Program, Texas A&M University. From this collection, 108 inventories from Volumes 2 (1679-1686) and 3 (1686-1694) were consulted. The probate inventories of specific individuals are followed by the volume number and page number(s) when discussed in the text.

#### Determining Quantity from the Jamaica Probate Inventories

The Jamaica Probate Inventories hint at the extraordinary quantities of kaolin clay pipes being shipped to Jamaica, and in fact, complement the findings from both the Bristol Port Book entries and the archaeological record. As with the port books, the amounts of pipes are sometimes listed in the thousands. For example, 80 gross, or 11,520 pipes were recorded in the probate inventory of Port Royal merchant Michael

Baker (V3/F602-606/1693). For Port Royal merchant Joseph Brown (V2/F202/1686), 6 barrels of 158 gross, or 22,752 pipes were listed, but even more impressive was the 258 ½ gross of pipes packed in 12 chests, or 37,224 pipes in the inventory of ship Captain Nicholas Verbraack (V2/110-112/1685).

These considerable amounts of pipes reflect more the occupation of merchants and sea captains and their commercial enterprises rather than ownership of personal possessions. The number of pipes found in the household inventories provide a sharp contrast to these numbers. For instance, the household inventory of William Haynes (V2/150-151/1685), a cooper at Port Royal, listed 8 gross or 1,152 pipes. The household inventory of Thomas Evans (V3/453/1692) was even less at 3 gross or 432 pipes, and the inventory of Mary Grubb's (V3/507/1693) listed only 1 ½ gross or 216 pipes. Although these household inventories are much smaller, the Jamaica Probate Inventories of the merchants complement the Bristol Port Records and the large numbers of pipes found on the site, and squarely place the pipes in both commercial and place-of-use contexts at Port Royal.

#### Determining Value from the Jamaica Probate Inventories

The probate inventories were helpful in assessing the value of clay pipes, especially in cross-checking the results gleaned from the port records. In comparison to the port records, there was slightly more variation in clay pipe values between 1685 and 1693, both before and after the Port Royal earthquake. For example, in Michael Baker's (V3/F602-606) inventory in 1693, kaolin clay pipes are listed as 2 shillings per gross. The next highest assigned value was from the 1686 inventory of John Ellis (V2/F189-190), where the pipes were valued at 18 pence per gross. The pipes listed for Port Royal merchant Joseph Brown (V2/F202) in 1686 were assessed at 15 pence per gross. From there, the values lessen to 10 pence per gross in Captain Nicholas Verbraack's (V2/F110-112) 1685 inventory, and finally to 6 pence per gross for Port Royal merchant John Tull (V3/F321-322) in 1690.

Although the differences in values in the probate inventories are minimal when

compared to the amount of 12 pence per gross arrived at from the Bristol Port Books, these slight differences may represent the retail mark up of 3 to 12 pence to establish a market value of the pipes as they reached the shops and storehouses of Port Royal. It is thus hypothesized that the value of clay pipes during a probate inventory reflects the current retail value for pipes in Port Royal. The slight variance could be affected by the generous flow of foreign currency, particularly gold coins (i.e., the Spanish Piece of Eight) at Port Royal, which often accounted for fluctuations and adjustments in currency values from 1670 on (Chalmers 1972:98-100, 102). This would also affect the value placed on objects during an inventory, so that the year the inventory was taken may be significant in this regard.

Also, the retail value of clay pipes could be slightly affected by the necessary requirements for different export markets. An entry in the Book of the Tobacco Pipe Makers for 1710 stated that Bristol pipemakers were to adhere to the different size requirements for the export trade or else they would be fined “the sume of Twelve Pence per Gross for every gross of such pipes...” (Jackson and Price 1974:81-82). In other words, they would be fined value for value.

Finally, clay pipes could also vary in price according to quality. Finishing techniques such as milling and burnishing or the production of longer stems, also increased a pipe’s value (Crossley 1990:277). An English treatise of 1693 noted that ordinary pipes were sold for 18 pence per gross, whereas glazed pipes cost 3 shillings (or 36 pence) per gross (Houghton 1727-1728:203 [1692-1694]). Two pipes with glazed stems were recovered from Port Royal in 1987 (575-2) and 1990 (200).

The Tobacco Pipe Makers of Westminster stipulated in the 1619 charter that the best quality pipes were to cost “twoe at the least for a penny.” Only pipes of extraordinary workmanship were to cost more (Walker 1977:418). Some of the pipes at Port Royal display slightly crooked stems or incomplete milling around the rim of the bowl, which could represent inferior quality pipes or “seconds.” Although pipes did vary in quality, there is no conclusive proof to support the idea that inferior pipes were

purposely shipped to Port Royal and the other colonies. Such imperfections were probably the result of mass-production rather than varying grades in quality.

#### Evidence for the Packing, Shipping, and Storage of Clay Pipes

The large quantities of clay pipes being exported to the British colonies raises questions as to how this was accomplished. More than likely, pipes were easy cargo for the hold of a ship and were packed in a variety of containers. Some clues for how pipes were packed and stored can be found in the Jamaica Probate Inventories. The inventories of Port Royal merchant Michael Baker (V3/F602-606/1693), John Hennekyne (V3/F475-476/1693), and Mary Hill (V3/F424-425/1693) all indicate that boxes were used to pack and store pipes. Based on Michael Baker's inventory, 80 gross of pipes packed into four boxes amounted to about 2,000 or more pipes to a box.

These probate listings are complemented by findings from the archaeological record. For instance, an intact box of 223 new Dutch pipes was discovered during the 1972 excavation of the Dutch East India Company ship, the *Vergulde Draeck*, wrecked off the coast of Western Australia, and dated to 1656. Although the box was fragile and did not survive recovery, the pipes were recorded in situ as packed head-to-tail in what appeared to be buckwheat (Green 1977:152).

A similar find from the 17th-century Monte Cristi shipwreck, the "Pipe Wreck," located off the northern coast of the Dominican Republic, revealed 12 clay pipes that were discovered laying alternately end-to-end underneath the southwestern portion of the shipwreck (Hall 1996:152). Organic material found inside the pipe bowls was conclusively identified as husks of buckwheat, and small pieces of wood located near where the majority of the pipes were found also suggest a wooden box or crate for transporting the pipes (Hall 1996:154). The discovery of clay pipes in Building 3, Room 2, lying alternately end to end also suggests something similar at Port Royal, although no packing materials survived (Donny Hamilton 1996, pers. comm.).

The Jamaica Probate Inventories also mention other types of storage containers. Pipes were shipped and stored in "barrells" also known as hogsheds or casks, and are

mentioned in the inventories. Although it is difficult to ascertain how many pipes were actually packed in a barrel, simple calculations based on amounts mentioned in the probate inventories indicate amounts somewhere between 1,500 and 3,500 pipes per barrel. The amount probably depended on the size of the order and the bulkiness of the packing materials used.

Other containers noted in the inventories also include a chest of pipes, which possibly held about 3,000 pipes, and a parcel or “parcel” of pipes is mentioned in the probate inventories of James Phelps (V2/F200-201/1685), David Price (V3/F399-400/1692) and Matthew Wymondesold (V2/F122-123/1685), although no amounts were given.

#### Smoking-Related Items in the Jamaica Probate Inventories

To signify wealth and style, more well-to-do individuals were likely to include smoking-related items as part of their pipesmoking habit, either carried on their person or kept in their homes. Curiously, no smoking-related items were recovered during the 1981-1990 Port Royal excavations, but information gleaned from the Jamaica Probate Inventories reveals that smoking-related items were part of the tobacco user’s repertoire in Port Royal (Table 6).

A silver tobacco box valued at 19 pounds and three shillings was listed in the probate inventory of Port Royal merchant Michael Baker (V2/F130-132/1693). A tobacco knife, along with a silver tobacco box, valued at two pounds, five shillings, was recorded in the probate inventory of William Haynes (V2/F150-151/1685), a Port Royal cooper. For Port Royal merchant Robert Fourth (V2/F82/1685), a pair of tongs, along with two rolls of tobacco, a brass tobacco box, and a razor and sieve, were listed and valued at three shillings. The probate inventory for Robert White (V3/F237/1688) lists a brass tobacco box along with two burning glasses. Similar items are mentioned in the English 1609 play, *Everie Woman in her Humour* (Apperson 1916:29; Brooks, 1937:I:465 [1609]), where a gentleman’s pockets are described.

**Table 6. Tobacco and tobacco-related items from the Jamaica Probate Inventories.**

NAME	VOL/FOLIO DATE	CLAY PIPES	TOBACCO	ACCESSORIES	VALUE
Atkinson, John	V2/130-132 1685		141 lb. @ 12d		2:04:00
Baker, Elizabeth	V3/398-399 1692	4 casks @ 44 gr.			4:02:06
Baker, Michael	V3/602-606 1693	4 boxes @ 80 gr. @ 2s gr.		silver tobacco box	8:00:00 19:03:00
Bright, Joshua	V3/362-366 1690	broken pipes			2:00:00*
Brown, Joseph	V2/202 1686	6 barrels of pipes/158 gr. @15p per gr.			9:07:06
Bullock, William	V3/271 1689	4 gr. pipes			3:05:00
Collomb, James	V2/88 1685		350 lb., 1722 lb.		12:02:00
Conner, Matthew	V3/337-338 1690		1094 lb. @ 23p 100 lb.		12:02:00
Craddock, Thomas	V2/78-81 1685		6 lb.	2 tobacco boxes gold spring for a snuff box	00:03:00
Daynes, Rebecca	V3/296 1689	part of a box			
Duclaise, Stephen	V3/318-321 1689/90		3 hoggheads and a remnant of tobacco		5:13:00
Evans, Thomas	V3/453 1692	3 gr.			00:08:00*
Ellis, John	V2/189-190 1686	5 gross @ 18p per gr.			00:07:06
Ewings, John	V3/143-154 1688		2 boxes	1 tobacco box 1 snuff box	2:06:10½ for tobacco
Flowry, Robert	V3/507 1693	4 pipes/ and almost a gr.	some tobacco in a box	1 tobacco box	
Fourth. Robert	V2/82 1685		2 roles	pair tongs, brass tobacco box, 1 razor, 1 sieve	00:03:00

Table 6. Continued.

NAME	VOL/FOLIO DATE	CLAY PIPES	TOBACCO	ACCESSORIES	VALUE
Gubb, Mary	V3/469-471 1693	1½ gr.			00:03:00*
Hammett, John	V2/186-189 1686		50 lb. Virginia tobacco, 10 lb. rowle ditto		
Harris, Elizabeth	V3/425 1693	pipes	1 paper		
Haynes, William	V2/150-151 1685	8 gr.		1 silver box tobacco knife 1 silver taster	2:05:00 for objects
Heath, Thomas	V3/494-495 1693		89 papers of tobacco @ 3s		13:07:00
Hennekyne, John	V3/475-476 1693	tobacco pipes and ¼ box			15:15:00 00:15:00
Hill, Mary	V3/424-425 1693	2 boxes			1:00:00*
Hipperson, John	V2/123-124 1685		parcell of tobacco not wheeled		6:00:00
Jessopp, Charles	V2/98-102 1685			silver tobacco box	1:07:06*
John, Charles	V3/457-458 1693	pipes		tobacco	2:01:09
Kelway, Robert	V3/452 1693		parcell of tobacco		2:13:04
Lamburne, Samuell	V3/281 1689	4 lb.			
Lynch, Sir Thomas	V2/93-97 1685			gold snuff box	
Moore, James	V3/334-335 1689		parcell of tobacco		1:00:00
Moore, William	V3/327-329 1690			Silver tobacco box	9:10:00
Phelps, James	V2/200-201 1686	1 parcell			
Phillpott, John	V3/285-290 1689		2 rowled tobacco		



Table 6. Continued.

NAME	VOL/FOLIO DATE	CLAY PIPES	TOBACCO	ACCESSORIES	VALUE
Phipps, John	V3/600-602 1693			tobacco knife	00:10:00
Price, David	V3/399-400 1692	small parcel			
Rawlins, Robert	V3/514-515 1693	12 gr. @ 2s per gr.			
Sackley, Edward	V3/465-466 1693	2 gr.			1:04:00*
Thomas, Christopher	V3/265-267 1689		3 lb. tobacco (chamber) 20 lb. tobacco in leafe (cookroome)		00:15:00 00:03:04
Tull, John	V3/321-322 1690	10 gr. 4:6p gr.			2:05:00
Verbraack, Nicholas	V2/110-112 1685	12 chests, 258½ gr. @ 10p gr.			10:15:05
Wells, John	V2/69-75 1685			2 snuff boxes 1 silver tobacco box	
White, Robert	V3/F237 1688			brass tobacco box 2 burning glasses	
Wyndesold, Matthew	V2/122-123 1685	1 parcel broken pipes			00:03:00

Notes: \* = Value includes other items in the inventory. P = pound, s = shilling, and p = pence. In the "Value" column, values are listed as pounds, shillings, and pence, respectively.

## **Conclusion**

By applying historical documents to the study of the Port Royal kaolin clay pipes, it was possible to place them in a broader historical context. For example, the London Port Records indicate that clay pipes were shipped to the English colonies as early as 1627. This signifies smoking's popularity by this time and the necessity of clay pipes for those who already acquired a tobacco habit. By mid-century, large shipments of clay pipes were being sent to the English colonies and Jamaica, as revealed by the Bristol Port Records and Jamaica Probate Inventories.

Because they were so plentiful and expendable, clay pipes were a cheap commodity that were bought and sold in bulk, usually by the gross, at 12 pence per gross, with some slight variations. Such variations may reflect retail prices at Port Royal that were dictated by fluctuations in currency, different requirements for export markets, or quality. Bulk quantities of pipes were then packed, shipped, and stored in a variety of ways, mostly in casks that could hold thousands of pipes at a time.

Finally, as tobacco smoking gained popularity throughout the 17th century, pipes were often accompanied by accessories that usually signified wealth and status. Although there was no evidence for this in the archaeological record at Port Royal, the Jamaica Probate Inventories helped fill the gap. Listings of tobacco boxes, tongs, and other items help convey that idea that Port Royal's citizens were no less different in their smoking practices than their counterparts elsewhere at this time (see Chapter VII).

With the use of historical documents like the Bristol Port Books and the Jamaica Inventories, the clay pipes at Port Royal acquire new meanings, and enable us to imagine what daily life was like in Port Royal. It helps us to imagine a gentleman strolling the streets of Port Royal, pipe in hand, which he just purchased from a shopkeeper who received a large box of pipes that morning, containing 20 gross of pipes valued at 12 pence per gross. Our man then enters a tavern for lunch, opens his pouch, and removes a delicate silver box filled with fresh tobacco leaves, calmly packs his pipe, lights it, and deeply inhales, filling the room with the sweet aroma of tobacco.

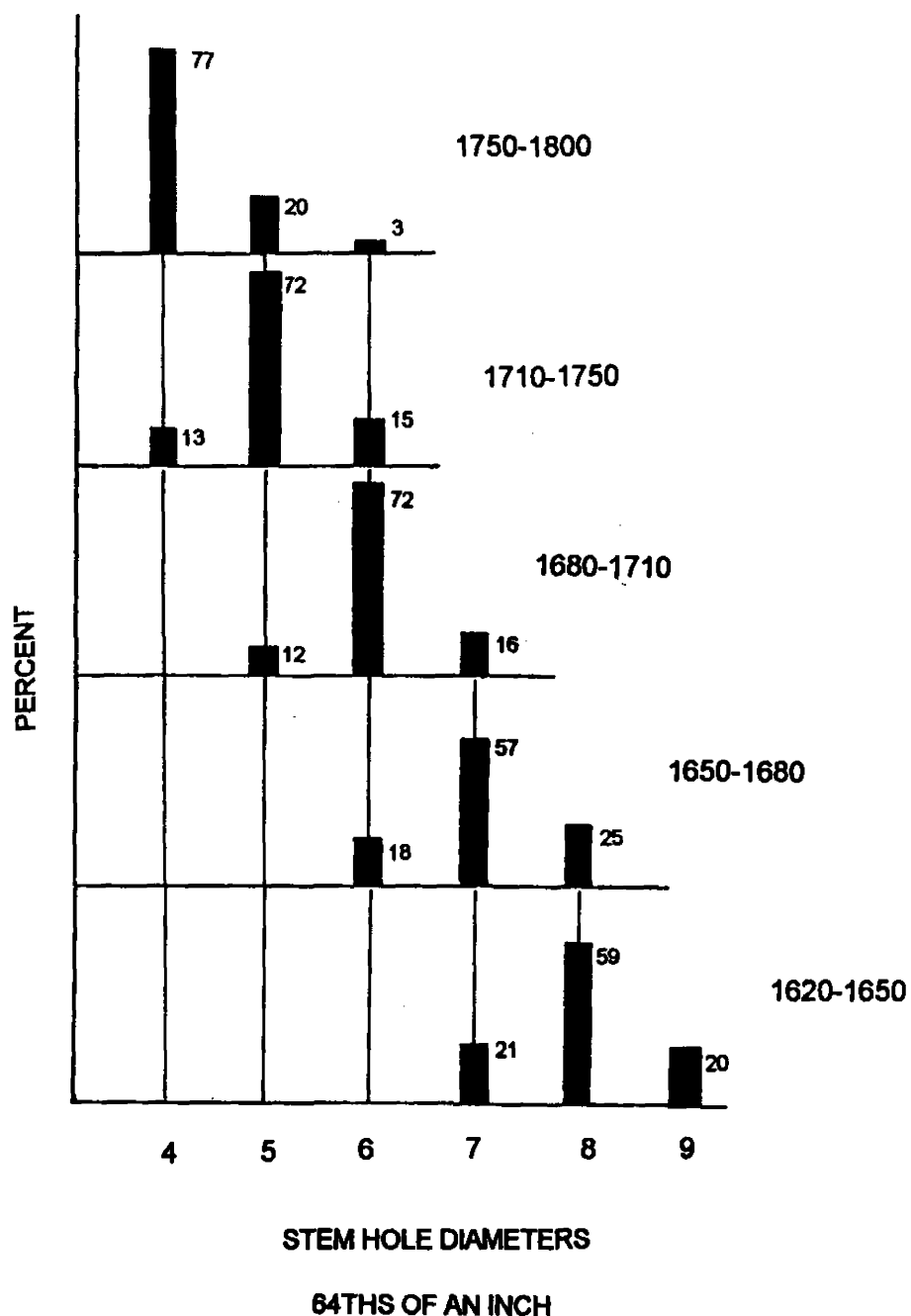


Figure 14. Harrington's histogram showing date ranges developed from measuring the stem diameters of English clay pipes, and the percentages of pipes within those ranges (after Harrington 1954:14 and Noël-Hume 1985:298).

any assemblage of pipe fragments recovered from a site. Although Binford's method has been used successfully by a number of archaeologists, his formula was criticized by Lee Hanson in 1969, who claimed that bore diameters do not follow a straight-line regression, but change at different rates at different times. Shortly afterwards, in 1972, Hanson retracted his argument. Also in 1972, Robert Heighton and Kathleen Deagan proposed a logarithmic computational equation to replace Binford's formula, arguing that an exponential curve produced more accurate results than a straight-line regression. Although useful, this method has been criticized for the inherent discrepancies existing in the original sampling from various North American colonial sites, as well as the sample size, which only consisted of 26 stems from 14 sites (Heighton and Deagan 1972: 221; Hanson 1972:256).

### **Methodology**

In view of these arguments, the large number of pipes found at Port Royal provided the opportunity to test the effectiveness of formula dating in the relative dating of historical sites. First, by counting the stem diameters for each building and their respective rooms, it could be determined which dates predominated and how well they correlated with what we know about the functions of the various rooms and buildings. To test this hypothesis, counts of stem diameters were made by lot number for Layer 3 and are listed in Table 7, along with their totals and means, based on Binford's method.

Second, the large sample size of the Port Royal collection, plus the 1692 earthquake also provided the ample opportunity to test how the Heighton/Deagan method of formula dating compared to Binford's method. This was done by applying both methods to pipes from all layers, from Layer 3, from Room 5, Building 1, Room 2, Building 3, and all "LE" pipes recovered in Layer 3. The pipe stem diameter frequencies for Room 5 in Building 1, which had an intact floor and a large concentration of new pipes, for Room 2, Building 3, which was possibly a storage area for the current retail stock in pipes, and the frequency distribution for all the pipes found in Layer 3, were also plotted in three bell curves.

Table 7. Stem diameter frequencies, Layer 3.

LOCATION	9/64	8/64	7/64	6/64	5/64	4/64	Total	Date
B 1, R 1	0	2	20	13	3	1	39	1692.3
B 1, R 2	0	19	68	55	9	0	151	1677.8
B 1, R 3	1	15	36	14	6	0	72	1673.6
B 1, R 4	0	3	10	17	12	0	42	1698.8
B 1, R 5	0	93	373	1657	165	11	2299	1696.1
B 1, R 6	3	21	116	268	38	4	450	1691.9
B 2	2	44	133	100	45	3	327	1681.6
Alley	14	40	108	57	2	0	221	1662.8
B 3, R 1	7	129	512	1390	90	1	2129	1689.6
B 3, R 2	1	103	488	2104	101	1	2798	1694.2
B 3, R 3	0	20	64	167	9	2	262	1688.9
B 3, R 4	1	12	31	49	9	0	102	1683.9
B 4, R 4A	0	2	29	19	9	0	59	1686.9
B 4, R 4B	1	3	32	26	10	2	74	1688.5
Yard 4A	0	19	183	214	12	4	432	1684.7
Yard 4B	1	74	406	370	25	2	878	1679.3
Hearth 4A/4B	1	29	199	92	14	0	335	1674.3
B 5, R 1	0	7	43	26	8	1	85	1681.2
B 5, R 2	0	2	5	28	3	0	38	1696.1
B 5, R 3	0	0	8	7	5	0	20	1696.5
B 5, R 4	0	0	2	4	2	0	8	1702.2
Yard 5	0	15	57	30	12	0	114	1677
Yard 6	0	6	24	12	5	0	47	1677
Yard/Hearth 7	0	4	17	16	2	0	39	1679.7
B 8	0	14	37	10	4	0	65	1666.3
XU-3	2	51	226	94	31	9	413	1675.9
<b>Totals:</b>	<b>34</b>	<b>727</b>	<b>3227</b>	<b>6839</b>	<b>631</b>	<b>41</b>	<b>11,499</b>	<b>1684.5</b>

As a final test, the Binford method was applied to the five most common bowl types from Layer 3, and to the makers' marks, "IB" and "WE," which are the next two most frequent makers' marks that occur on the site after "LE."

In correlating stem diameter frequencies for the buildings and rooms at Port Royal and testing the Binford and Heighton/Deagan methods, the Binford formula was used by applying a straight-line regression formula ( $Y = 1931.85 - 38.26X$ ) originally proposed by Binford in 1962. The number of pipes for each stem diameter range are multiplied by the stem diameter number, then the totals for each stem diameter range are added. The straight-line regression formula is then applied to the total, thus resulting in a mean date.

### **Stem Diameter Frequencies of Buildings and Rooms**

#### **Building 1**

In 10 years of excavations at Port Royal, Building 1 yielded 6,894 kaolin clay pipes; the largest number of pipes recovered for any one building at the site. Although pipe counts for Rooms 1 through 4 were not as spectacular as they were for Rooms 5 and 6, which had the greatest number of pipes, the date ranges for all the rooms pipes provided enough information to make correlations between room function and the mean date arrived at for each room, and for the building in general.

Because Rooms 1 and 2 were multipurpose areas that had relatively intact brick floors that were probably swept regularly, the pipes found in these rooms should then date close to the 1692 earthquake. Tabulations for Room 1 supported this assumption. The Binford pipe-stem diameter date range for Room 1 is 1692.3, as close a date range that is possible to the Port Royal earthquake. On the other hand, the mean date for Room 2 was 1677.8. This earlier date can be explained by the room's sloping floor that allowed for the inclusion of older, discarded pipes.

Rooms 3 and 4 indicated a similar pattern, although Room 3, which had an intact floor, also contained mostly ship debris. The mean for Room 3 is 1673.6, and for Room 4, 1698.8. If Room 4 was a tavern, then the later date could be explained by the

presence of new pipes to be sold in the tavern. The wide gap in the mean dates for these two rooms was probably affected by both the presence of older, discarded pipes, and the massive disruption probably caused by the impact of a ship to this part of the building during the earthquake.

The correlations for Rooms 5 and 6 were important to determine simply because this was probably a wine/pipe shop that contained a sizeable current stock of new pipes to be sold to customers who patronized the establishment. Because so many new pipes were found in the northwest corner of Room 5, a date range close to the time of the earthquake was expected. This proved to be the case as Room 5 had a mean of 1696.1 and Room 6 had a mean of 1691.9, both dates relatively close to 1692. Finally, all the means for each room were tallied to determine the mean for the whole building, which ended up being 1688.4, five years within the range of the Port Royal earthquake.

### Building 3

After Building 1, Building 3 had the second largest amount of pipes found at the site. Because all or part of Building 3 was possibly a storage area for the various activities in the adjacent areas and nearby outdoor market, a date close to the 1692 earthquake was expected to account for in situ, well provenienced unused pipes; in fact, Room 1 had a mean of 1689.6, and Room 2 had a mean of 1694.2.

Room 3, having a mean of 1688.9 was also close to 1692, however, the mean of 1683.9 for Room 4 indicates the presence of discarded pipes. As Room 4 had a plastered floor, it is possible that some intrusive, older pipes were mixed in with newer pipes. The mean date for the entire building is 1689.1, close to the time of the earthquake.

### Alleyway and Building 2

Essentially the pipes found in Building 2 and the alleyway between Buildings 1 and 2 were a jumble of discarded, older pipes. This was expected because alleyways were often areas where trash accumulated, and also because Building 2 was poorly

preserved and had a dirt floor, where intrusive material was anticipated. The dates for the alleyway and Building 2 confirmed these expectations, as the alleyway had a date of 1662.8, and Building 2 had a date of 1681.6. Although not included in this mean, the alleyway also had a large percentage of red clay pipes that generally dated to a pre-1690 time period (Donny Hamilton 1997, pers. comm.), which is in keeping with the overall results.

#### Buildings 5/4

Overall, the Building 5/4 complex may have been an eating establishment. The mean dates for the pipes recovered in the interior rooms were therefore close to the time of the earthquake, with the mean for the interior of Building 5 being 1694, and for Building 4, 1686.9, both within almost a five-year range of the earthquake.

As mentioned in Chapter IV, the yards to these buildings revealed larger quantities of pipes. Yards 4A/4B were areas of multiple activities, including food preparation, and because they were not brick paved, they represent accumulations of both discarded and unused pipes. Given this scenario, the means for Yards 4A/4B were expected to reflect such conditions. The means were 1684.7 (Yard 4A), 1679.3 (Yard 4B), and 1674.4 (Hearths 4A/4B), the combined mean being 1679.4. These findings correlate well to the yards' various functions and intrusive, earlier debris.

In contrast to Yards 4A/4B, Yard 5, being brick paved, was, for the most part, sealed off from the pipe debris underlying the brick floor. Additionally, as a brick floor, Yard 5 was more likely to be swept regularly, thereby removing any traces of broken discarded older pipes in contrast to areas that had unpaved, disrupted floors subject to intrusive debris from the underlying subfloors (Donny Hamilton 1997, pers. comm.). Because of this, a date close to the 1692 earthquake was expected; however, this was not the case. A mean of 1677 was strongly influenced by the presence of 15 older pipes that had a stem diameter of 9/64, which may have come from a crevice that crossed the brick floor.

Yards 6 and 7 were also brick paved and relatively intact, thereby being subject



only to intrusions from Layers 1 and 2, as they were sealed off from the subfloors beneath them. Yet, like Yard 5, both Yards 6 and 7 also revealed low dates; Yard 6 was 1677 and Yard/Hearth 7 1679.9. Perhaps this can be explained by the disturbance of the earthquake, which may have introduced underlying debris to these areas.

#### **Building 8 and Test Area XU-3**

In addition to the other areas, Building 8 and test area XU-3 were evaluated for stem diameter date ranges. Both buildings lacked floors and were fairly jumbled in nature. Although the functions of both these buildings are unknown, enough pipes were recovered to be evaluated, although none were found in a sealed off context. The mean for Building 8 was 1666.3 and for XU-3, 1684.5. The low mean for Building 8 suggests that this areas contained a mix of probably discarded and new pipes.

#### **Binford vs. Heighton/Deagan Methods**

Besides looking at the correlations between stem diameters and proveniences, pipe stem dates are useful in another way. Since the publication of Harrington's 1954 paper, a number of alternatives to his method of pipe stem dating have been suggested. The kaolin clay pipe collection from Port Royal provides an opportunity to compare the Binford method, which has proven fairly reliable over the years, to the Heighton/Deagan method.

To make the comparison, five bodies of data from the Port Royal kaolin pipe collection were used. The first included pipes from the database (all layers) and the data set comprised of pipes from Layer 3. To provide further refinements and tighter controls in the comparison, "LE" marked pipes from Layer 3 were also tested, as well as pipes from Building 1, Room 5, and Building 3, Room 2 (Layer 3). The tabulations to test these methods are presented at the end of the chapter.

In applying the Binford formula to the pipes recovered from all layers of the site database, the overall date was 1688.5 compared to the date of Heighton/Deagan date of 1720. Using the Layer 3 data set, the results were the same. The "LE" pipes produced

a Binford date of 1685 and a Heighton/Deagan date of 1718. Finally, for Building 1, Room 5, the Binford formula yielded a date of 1685, whereas the Heighton/Deagan method resulted in a date of 1718.5. For Building 3, Room 2, the Binford date was 1696, and the Heighton/Deagan date 1723. Using the Binford formula, a comparison of bell curves showing the frequency distributions of pipe-stem diameters for Layer 3 (Figure 15), Building 1, Room 5 (Figure 16), and Building 3, Room 2 (Figure 17), illustrates how similar the distributions are for the two specific rooms and Layer 3 as a whole (see the end of the chapter for the statistical breakdown of each bell curve).

### **Mean Dates for Common Bowl Types and Makers' Marks**

A final effort to test formula dating was to use the pipe stem frequencies of the five most common bowl types that appear in Layer 3. For example, applying the Binford formula to the most frequent bowl Type 1.77 results in a mean date of 1701.1. The mean dates for the four most common bowl types are as follows: Type 1.74 (1703), Type 1.73 (1694.6), Type 2.12 (1671.6), and Type 2.22 (1670.5).

For the makers' marks "IB" and "WE", in applying the Binford method, the mean date for "IB" pipes from Layer 3 was 1700 and for the "WE" pipes, 1659. In examining the mean Binford dates for both the most common bowl types and makers' marks, it appears that these dates cover a wide range, but all fall within the Port Royal occupation period, with only minor overlap. It does demonstrate however, that specific bowl forms and pipemakers have their own particular dates, and one should allow for minor adjustments when this is known. For example, in the case of "WE" pipes, they were probably manufactured slightly earlier, beginning in the 1660s, by William Evans I, then extending to his son, William Evans II, who was active in the 1690s. "IB" pipes, continuously manufactured into the early 18th century. Generally, the date ranges correlated well to building and room functions with the exception of Yards 5, 6, and 7, although in the case of Yard 5, a crack in the brick floor may account for the presence of discarded pipes. A date of 1684.5 resulted from taking the mean for all buildings and rooms at the site (Layer 3), which falls nicely within the occupation period and close to

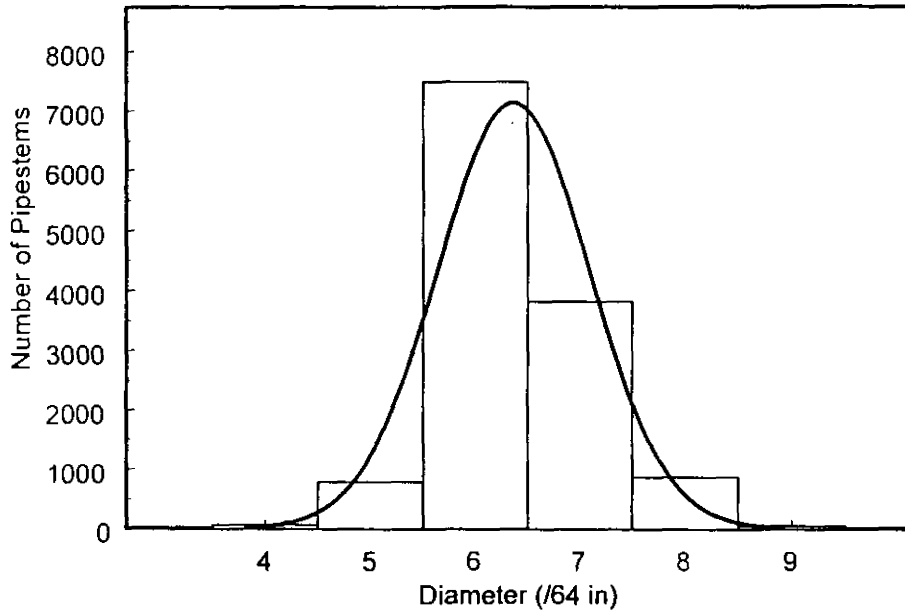


Figure 15. Frequency distribution of pipe-stem diameters, Layer 3.

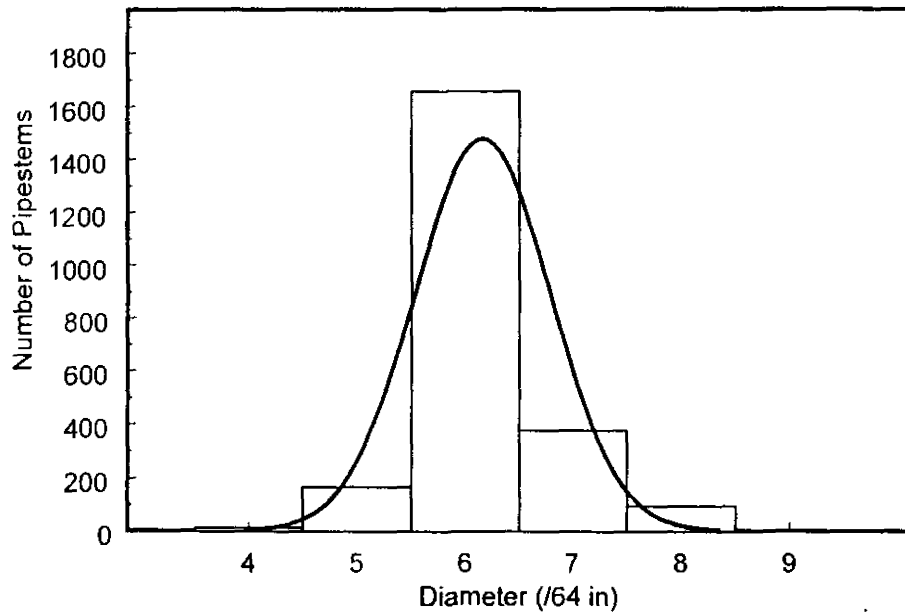


Figure 16. Frequency distribution of pipe-stem diameters, Building 1, Room 5.

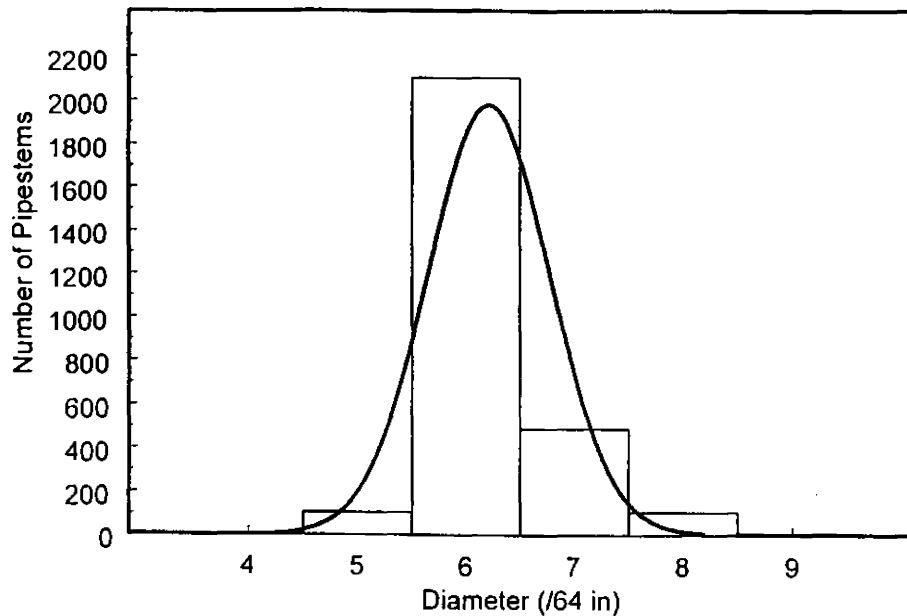


Figure 17. Frequency distribution of pipe-stem diameters, Building 3, Room 2.

the 1692 earthquake. “IB” pipes on the other hand, were produced a little later, beginning in the 1680s, and were manufactured until about 1704.

### Conclusion

The kaolin pipes from the Port Royal collection provided an excellent means to test and assess the effectiveness of formula dating pipe-stem diameters because of the collection’s variety and size, and most importantly, because of the specific time frame of the 1655-1692 occupation, and the 1692 earthquake.

Of all computations for the buildings and rooms at Port Royal, the dates closest to the 1692 earthquake were the Binford dates of 1692.3 for Building 1, Room 1, the combination cobbler/wood turner shop, and Room 6, the area of a wine/pipe shop, which had a date of 1691.9. The two rooms where new pipes were stored, Room 5, Building 1, which had a date of 1696.1, and Room 2, Building 3, having a date of 1694.2, reveal dates slightly later than the Port Royal earthquake. Well-provenienced, in situ groups of pipes such as the ones found in Room 5, Building 1 and Room 2, Building 3, will produce dates slightly later than 1692, mainly because some of the pipe

bowl types found in these rooms extend past the time of the 1692 earthquake. Overall, the date ranges correlated well to the building and room functions.

In comparing Binford formula dating to the Heighton/Deagan method, Binford's method proved to more accurately reflect the Port Royal occupation period and earthquake, with dates ranging from 1685 to 1696, than the Heighton/Deagan method, which consistently produced dates off by 20 years or more, with dates ranging from 1718 to 1723. Based on these results, the Heighton/Deagan method is not recommended, for the dates arrived at by their method do not justify its use.

Finally, in establishing Binford dates for the five most common bowl types at Port Royal (Layer 3) and the most frequently appearing makers' marks, the date ranges run the extent of the Port Royal occupation, with the earliest date being 1659 for the "WE" pipes to the latest date being 1703 for bowl Type 1.74. Pipe bowl Type 1.73 had a Binford date of 1694.6, relatively close to the earthquake. This particular bowl type was often found associated with unused bowls from Buildings 1 and 3, and Yards 4A/4B. Although pipe-stem dating has its limitations, as a relative dating tool, it can be valuable when making site comparisons or in assessing intra-site trends. Generally, pipe-stem dating, as a means of relative dating, is a measure of trends, so that exact dates are not expected. Most Binford pipe-stem dates provide an acceptable date range of 10 to 15 years, and a larger sample usually filters out minor discrepancies, which proved to be the case for the Port Royal pipes.

## Computations for Binford and Heighton/Deagan

### Methods and Statistics on Bell Curves

#### PIPES FROM ALL LAYERS -Binford Formula

$$\begin{aligned}
 \text{Average bore} &= 4 (96) + 5 (1020) + 6 (8596) + 7 (4615) + 8 (1024) + 9 (57) \\
 &= (384) + (5100) + (51,576) + (32,305) + (8192) + (513) \\
 &= 98,070/15,408 \\
 &= 6.36 \\
 Y &= 1931.85 - 38.26X \\
 &= 1931.85 - (38.26) (6.36) \\
 &= 1688.5
 \end{aligned}$$

---

#### Heighton/Deagan Method

$$\begin{aligned}
 \text{Mean stem hole diameter:} &= 6.36 (Y) \\
 Y &= 6.36 \quad \text{Log } Y = .8034 \\
 X &= - \frac{.8034 + 1.04435}{.05324} \\
 X &= 5.45 \\
 \text{Date} &= 1600 + 22X \\
 \text{Date} &= 1600 + 119.90 \\
 \text{Date} &= 1719.9 \text{ or } 1720
 \end{aligned}$$

---

#### PIPES FROM LAYER 3 Binford Formula

$$\begin{aligned}
 \text{Average bore} &= 4 (56) + 5 (780) + 6 (7492) + 7 (3812) + 8 (854) + 9 (42) \\
 &= (224) + (3900) + (44,952) + (26,684) + (6832) + (378) \\
 &= 82,970/13,036 \\
 &= 6.36 \\
 Y &= 1931.85 - 38.26X \\
 &= 1931.85 - (38.26) (6.36) \\
 &= 1688.5
 \end{aligned}$$

---

#### Heighton/Deagan Method

$$\begin{aligned}
 \text{Mean stem hole diameter:} &= 6.36 (Y) \\
 Y &= 6.36 \quad \text{Log } Y = .8034 \\
 X &= - \frac{.8034 + 1.04435}{.05324} \\
 X &= 5.45 \\
 \text{Date} &= 1600 + 22X \\
 \text{Date} &= 1600 + 119.90 \\
 \text{Date} &= 1719.9 \text{ or } 1720
 \end{aligned}$$

**"LE" PIPES FROM LAYER 3**  
**Binford Formula**

$$\begin{aligned}\text{Average bore} &= 5 (1) + 6 (58) + 7 (41) + 8 (4) \\ &= (5) + (348) + (287) + (32) \\ &= 672/104 \\ &= 6.46 \\ Y &= 1931.85 - 38.26X \\ &= 1931.85 - (38.26) (6.46) \\ &= 1684.7 \text{ or } 1685\end{aligned}$$

**Heighton/Deagan Method**

$$\begin{aligned}\text{Mean stem hole diameter:} &= 6.46 (Y) \\ Y &= 6.46 \quad \text{Log } Y = .8102 \\ X &= - \frac{.8102 + 1.04435}{.05324} \\ X &= 5.39 \\ \text{Date} &= 1600 + 22X \\ \text{Date} &= 1600 + 118.58 \\ \text{Date} &= 1718.5\end{aligned}$$

**PIPES FROM BUILDING 1, ROOM 5, LAYER 3**  
**Binford Formula**

$$\begin{aligned}\text{Average bore} &= 4 (11) + 5 (177) + 6 (1713) + 7 (396) + 8 (94) \\ &= (44) + (885) + (10,278) + (2772) + (752) \\ &= 14,731/2391 \\ &= 6.16 \\ Y &= 1931.85 - 38.26X \\ &= 1931.85 - (38.26) (6.16) \\ &= 1696.1\end{aligned}$$

**Heighton/Deagan Method**

$$\begin{aligned}\text{Mean stem hole diameter:} &= 6.16 (Y) \\ Y &= 6.16 \quad \text{Log } Y = .7896 \\ X &= - \frac{.7896 + 1.04435}{.05324} \\ X &= 5.59 \\ \text{Date} &= 1600 + 22X \\ \text{Date} &= 1600 + 122.98 \\ \text{Date} &= 1722.9 \text{ or } 1723\end{aligned}$$

**PIPES FROM BUILDING 3, ROOM 2, LAYER 3**  
**Binford Formula**

$$\begin{aligned} \text{Average bore} &= 4 (1) + 5 (101) + 6 (2104) + 7 (488) + 8 (103) + 9 (1) \\ &= (4) + (505) + (12,624) + (3416) + (824) + (9) \\ &= 17,382/2798 \\ &= 6.21 \\ Y &= 1931.85 - 38.26X \\ &= 1931.85 - (38.26) (6.21) \\ &= 1694.2 \end{aligned}$$

**Heighton/Deagan Method**

Mean stem hole diameter: = 6.21 (Y)  
 $Y = 6.21 \quad \text{Log } Y = .7930$   
 $X = - \frac{.7930 + 1.04435}{.05324}$   
 $X = 5.56$   
 Date = 1600 + 22X  
 Date = 1600 + 122.32  
 Date = 1722.3

**Frequency Distribution Stats for Layer 3**

FREQUENCIES: SIZE  
 WEIGHTED BY: X1

Value	Frequency	Percent	Valid Percent	Cum Percent
4	42	.3	.3	.3
5	854	6.6	6.6	6.9
6	3812	29.2	29.2	36.1
7	7492	57.5	57.5	93.6
8	780	6.0	6.0	99.6
9	56	.4	.4	100.0
TOTAL	13036	100.0	100.0	

Mean	6.635	Variance	.528	Kurtosis	.679
Median	7.000	Std Dev	.726	S.E. Kurt.	.043
Mode	7.000	Std Err	.006	Skewness	-.480
Minimum	4.000	Sum	86498.000	S.E. Skew.	.021
Maximum	9.000	Range	5.000	Valid	13036.000

90% Confidence Interval for the mean = [ 6.6249 to 6.6458]

Percentile	Value	Percentile	Value	Percentile	Value
25.00	6	50.00	7	75.00	7



### Frequency Distribution Stats for Building 1, Room 5

FREQUENCIES: SIZE

WEIGHTED BY: X2

	Value	Frequency	Percent	Valid Percent	Cum Percent
	4	11	.5	.5	.5
	5	165	7.2	7.2	7.7
	6	1657	72.1	72.1	79.7
	7	373	16.2	16.2	96.0
	8	93	4.0	4.0	100.0
	TOTAL	2299	100.0	100.0	
Mean	6.162	Variance	.389	Kurtosis	2.145
Median	6.000	Std Dev	.624	S.E. Kurt.	.102
Mode	6.000	Std Err	.013	Skewness	.755
Minimum	4.000	Sum	14166.000	S.E. Skew.	.051
Maximum	8.000	Range	4.000	Valid	2299.000

90% Confidence Interval for the mean = [ 6.1404 to 6.1832]

Percentile	Value	Percentile	Value	Percentile	Value
25.00	6	50.00	6	75.00	6
Valid Cases	2299	Missing Cases	0		

### Frequency Distribution Stats for Building 3, Room 2

FREQUENCIES: SIZE

WEIGHTED BY: X3

	Value	Frequency	Percent	Valid Percent	Cum Percent
	4	1	.0	.0	.0
	5	101	3.6	3.6	3.6
	6	2104	75.2	75.2	78.8
	7	488	17.4	17.4	96.3
	8	103	3.7	3.7	100.0
	9	1	.0	.0	100.0
	TOTAL	2798	100.0	100.0	
Mean	6.212	Variance	.317	Kurtosis	2.489
Median	6.000	Std Dev	.563	S.E. Kurt.	.093
Mode	6.000	Std Err	.011	Skewness	1.276
Minimum	4.000	Sum	17382.000	S.E. Skew.	.046
Maximum	9.000	Range	5.000	Valid	2798.000

90% Confidence Interval for the mean = [ 6.1948 to 6.2298]

Percentile	Value	Percentile	Value	Percentile	Value
25.00	6	50.00	6	75.00	6
Valid Cases	2798	Missing Cases	0		

## CHAPTER VII

### THE SOCIAL AND ECONOMIC FACTORS OF TOBACCO PIPE

#### SMOKING AS REFLECTED IN THE PORT ROYAL PIPES

##### Introduction and Literature Review

No discussion of clay pipes would be complete without mentioning the economic and social factors that played a part in the adoption of tobacco into English society. At first glance, it appears that clay smoking pipes, such as the ones found at Port Royal, played a minor role within the broader historical context of the 17th century. Yet, a closer look reveals how the manufacture, export, and demand for clay pipes reflect the changing nature of British economic and social conditions, and the desire for such luxury items as tobacco.

The works of Frank (1978), Wallerstein (1974, 1980), and Braudel (1979) set the stage for discussing England's ascendancy to power in a world system based on trade and colonization. One of the benefits of colonization was the economic growth derived from raw materials exported from the American colonies, especially tobacco, as examined in McCusker and Menard (1991), Menard (1976), Dunn (1973) and Price (1978).

Though useful, the world system paradigm does not fully explain England's prosperity. Falling tobacco prices made tobacco affordable, but it was also the *desire* for tobacco which fueled the tobacco trade as consumer demand increased, both at home and in Port Royal. This early consumerism is addressed by Thirsk (1978), Weatherill (1988), Shamma (1990), and McCracken (1990), who assert that such demand preceded the Industrial Revolution. This demand was made possible in part by the emergence of small-scale pre-industrial manufacturing concerns that fueled the economy and provided extra income for family households, as examined by Holderness (1976), Coward (1992), and Woodward (1994). One of these industries was pipemaking, which began in London, but was soon dominated by the city of Bristol, one

of England's premiere ports and the city from where most of Port Royal's pipes were manufactured and exported. Walker's study of pipemaker guilds (1971) and his four-volume work (1977) on the Bristol clay pipe industry are instrumental to the discussion on pre-industrial manufacturing and pipemaking.

The demand for new goods also dovetailed with a social transformation that resulted in new customs and habits both in England and Port Royal. In this transformation, there was a move toward public institutions such as the tavern and other drinking establishments, as explored by Habermass (1989). In these establishments, customers indulged in new dietary stimulants, such as tea, coffee, and chocolate, which Mintz (1985) calls the new "drug foods," and which helped alleviate anxiety and encouraged new social rituals, as explored by Klein (1993).

Tobacco, being the supreme example of these developments, was adopted by the British and their colonial counterparts with an intensity previously unknown, and resulted in a new material culture of clay pipes, tobacco boxes, and other accessories. The evolution of this material culture along with new customs and manners, is discussed in a variety of sources on the social history of smoking. To date, the most comprehensive study is contained in a four-volume set by Brooks published in 1937. Earlier social histories by Penn (1901) and Apperson (1916) supplemented this study, but recent scholarship by Goodman (1993) and particularly Schama's *The Embarrassment of Riches* (1988), offer a more critical view of 17th-century social behavior in the context of tobacco smoking.

### **The World System Paradigm and British Colonization and Trade**

The 17th century has been described as a time of crisis, where the transition from a feudal to market economy created a severe economic slump for most of Europe (Frank 1978:65; Wallerstein 1980:7). For England, the ascension of Charles II in 1660, and the beginning of England's period of Restoration signaled "the economic exit from medievalism" (Minchinton, 1969:11). Part of England's economic recovery derived from overseas colonization and trade, which was accomplished in three ways. First, the

emphasis in trade shifted from internal to external markets and sources of supply.

Second, imports coming from the New World and East Indies aided in the growth of a substantial re-export trade. Third, new markets abroad created the demand for a wider range of goods and services from the homeland. These included not only the American colonies, but also markets in Asia and Africa, as Sheridan states:

England responded to the 17th century crisis by joining together the manpower of West Africa with the tropical climate and soil of the New World to supply exotics to expanding markets in Europe. Thus was constructed that close 'circle, seapower, commerce, and colonies,' which served to expand the Atlantic trading area, the matrix of future commercial and industrial developments as well as divisive political and racial movements [Sheridan 1973:414].

Scholars now generally agree that England's economic renewal was based on "a series of proposals crystallizing into ordinances, proclamations and statutes that formed the dynamic of a new economic policy" (Wilson 1984:61). Economic growth for Britain was actually a slow process throughout the 17th century. In the second half of the 16th century, proponents of colonization, such as Richard Hakluyt, proposed vague ideas about producing desired commodities in English colonies (Parry 1979:3). When the American colonies were first settled, imports exceeded exports, making the balance of payments "passive." Yet, under such conditions costly economic adjustments were soon facilitated by a growing export trade from the colonies and a healthy re-export trade from Britain's central ports. This placed Britain in an advantageous position against her European competitors (Frank 1978:78).

This transformative process extended to a developing world economy or world system (Braudel 1979:39; Frank 1978:78; Wallerstein 1974). In this system, the actors were "participating subeconomies," particularly "the colonized and newly settled regions" (Frank 1978:79). Following Wallerstein's model, newly formed relationships developed between dominant, "core" areas like London, and more peripheral areas such as the colonies along the eastern seaboard of North America and in the Caribbean. The colonies would provide raw materials and, in return, would rely on manufactured goods

from the mother country. Peripheral areas were divided into two zones, a “middle” zone, a semi-urban area containing some of the attributes of the core area, and the larger periphery, a backward area composed of scattered populations. The creation of this *weltwirtschaft* relied on London’s economic, social, and political capital. With the exception of Bristol in the late 17th century, London had “created and directed England from start to finish” (Braudel 1979:365). The outward flow of goods from London to foreign ports made London the central hub to the growing colonial periphery.

Essentially, this expansion by England and other western European countries was unique in that it integrated New World economies with European economies, thereby placing the new settlements in a dependent relationship to the centers through specific linkages. In England’s case, these consisted of the colonial purchase of English goods, and the sole use of English vessels and merchants, thus providing freights, interests, and profits designed to secure state and private profits (Nettles 1933:509-510). Colonialism allowed the metropolis to extend its markets for manufactured goods, whereby the colonies, in turn, supplied raw materials to the metropolis, forming an economic dependency on both sides (King 1990:49).

The world system paradigm has been criticized on the basis that colonization was not central to England’s economic development (O’Brien 1982). Arguments against the world system model include 1) the idea that profits earned in the colonial trade were not sufficient enough to warrant a significant source of capital; 2) that manufactured exports from England did not ignite major industrial development in core areas like London; and 3) colonial markets for British manufactures were relatively small, only accounting for 20 percent of industrial output, as the home market was greater (McCusker and Menard 1991:44).

### **The Benefits of Colonization**

All three of these arguments fall short when developments in England and the colonies are examined more closely. For example, before mid-century, England’s overseas trade mainly consisted of woollen cloth in exchange for wine, foodstuffs, and

grain. By the latter part of the century, however, England's trade was thriving. Jacob Price (1978:122-123) argues that colonial development stimulated England's economy in a number of ways. First, the processing of raw materials from the colonies and the manufacture of goods for export to the colonies employed British workers, utilizing their own resources. Second, colonial demand for goods forced Britain to find new and innovative ways of dealing with scarce resources that ultimately led to experimentation with "new, cost-reducing technologies" (Price 1978:123). Third, the risky nature of long-distance trade with the colonies initiated important institutional changes involving large sums of capital. These changes included the development of larger merchant firms, more efficient credit arrangements, and more capital and insurers, changes that were ahead of their time (Price 1978:123). Britain's economic policy could be thus characterized as a blend of private and state interests (Wilson 1984:57).

England's rivalry with the Spanish and the Dutch in the Caribbean also sparked the desire to colonize and create new trading partners. Britain's retaliation to the Spanish monopoly in the Caribbean was accomplished by raids on Jamaica in 1596 and 1643, followed by the Penn and Venables expedition in 1655, which resulted in the colonization of Jamaica and development of Port Royal. Dutch rivalry was met with the passage of the English Navigation Acts of 1650-1651, which chiefly relegated all English trade to English shipping, thus keeping British trade and revenues in British hands and assuring English merchants and shipowners with a virtual monopoly in their trade with the colonies (Davis 1962:297).

Generally, English overseas trade not only made colonial settlement more comfortable, but also made it possible. (Beer 1948:71; McCusker and Menard 1991:71). This was particularly the case in the West Indies where islands like Jamaica and Barbados eventually exchanged sugar for slaves, necessities, and luxury goods. The first successful English colony in the West Indies, St. Kitts (formerly St. Christopher), provided the initial model for English colonization in 1624. England's next most important colonial settlement, Barbados, was settled in 1625. Nevis (1628), Antigua

(1632), and Montserrat (1650) soon followed. The founding of these early English colonies was accomplished through private enterprise, although royal control by King Charles I was maintained by issuing patents to titled patrons. Such patents were issued to the Earl of Carlisle in 1627, appointing him as Lord Proprietor over present-day St. Kitts, Barbados, Martinique, St. Lucia, St. Vincent, and Grenada. Other proprietorships followed, eventually creating a tight web of British control over the Caribbean colonies (Hamshere 1972:32-34).

### **The Rise of Consumerism and Its Relation to the Tobacco Trade**

In England's economic trade and expansion, Wallerstein and other proponents of the world system paradigm have overlooked a key ingredient that help make this possible; namely the importance of consumer demand. Although English colonists depended on manufactured goods from England in exchange for their raw materials, they eventually *desired* goods that exceeded the basic requirements necessary for survival. Even Hakluyt and Carlisle recognized the advantages of a colonial market for British manufactures that would pour "into a country larger than all Europe" (Beer 1959:72 [1908]).

Recent scholarship indicates that this demand for goods provided the impetus for a growing trade and economy, both at home and in the colonies rather than a dependency based on need. The colonies pulled the strings of core areas like London, that at certain times, almost appeared to reverse the dependency between core and periphery.

This is well demonstrated in the dependence on tobacco. The desire for tobacco fueled a reciprocal trade between England and the colonies that helped foster England's economic development. In the last half of the 16th century and early part of the 17th century, the main supplier of tobacco was Spain. In reaction to the high duties and restrictions imposed on imported tobacco, peasants in England, Wales, and the outer islands of Jersey and Guernsey planted tobacco to supplement their incomes.

By 1610, tobacco cultivation in England was well under way, despite a ban

imposed by Charles I (Farnie 1962:209). By 1634, tobacco had become a poor man's crop. It provided jobs and cash, and, in the town of Winchcombe, contributed to the town's growth and prosperity until the 1660s, when the Privy Council destroyed tobacco crops in the area. It took about 70 years before the government could eradicate home-grown tobacco (Thirsk 1976:91, 1984:260). In the end, however, low tobacco prices from tobacco grown in the Chesapeake colonies finally curbed home production.

For English colonists living in the Chesapeake, tobacco became their chief commodity for export. The amount exported from Virginia in 1617 alone amounted to about 20,000 pounds, and by 1630, this trade expanded to between 400,000 to 500,000 pounds (Beer 1959:87; MacInnes 1926:150). Bermuda, Barbados, St. Kitts, Nevis, Antigua, Montserrat, and Jamaica also produced tobacco as well (Dunn 1973:46, 168). By 1640, the British colonies were producing a total of about 1,250,900 pounds of tobacco (Pagan 1979:253).

In terms of costs to the consumer, tobacco prices varied during the 17th century. Initially, in 1604, to deter smoking, James I increased the import duty on tobacco from 2 pence a pound to 6 shillings, 10 pence on every pound imported from Virginia, which began its cultivation by 1607, and was well under way by 1616 (Beer 1948:24; Farnie 1962:209; Penn 1901:33; Thirsk 1984:216). Royally imposed import duties in combination with the prohibition of imported Spanish tobacco skyrocketed the price of tobacco. During the early 1620s, tobacco prices fluctuated sharply due to the unpredictability of supplies coming from Spanish America, the West Indies, and the Chesapeake. Thus, in the first half of the 17th century, a pipeful (an ounce) cost 3 pence (Tickner 1948:293-293; Curtis-Bennett 1949:81).

Although tobacco from the colonies provided an immensely important source of revenue for both the royal treasury and the colonial governments of Virginia and Maryland, both James I and Charles I were concerned over colonial reliance on this one staple. In 1627, Charles lamented that Virginia was "wholly built upon smoke, tobacco being the only means it hath produced" (Beer 1959:91). This prompted the Privy



Council in 1631 to order colonists to curtail tobacco production, but this directive had little effect.

For many of the British colonists, tobacco was an ideal crop for new settlement and generating income. It required only a short growing cycle (nine months) and could grow in a variety of soils and climates. Although labor intensive, colonists were willing to maintain the year-round attention that was necessary for a successful crop. This included transplanting tiny seedlings, weed maintenance during growth, topping the plant, harvesting, staking and stemming, drying, and curing.

Once these tasks were successfully completed, the tobacco was then tightly packed into hogsheads, large barrels that weighed between 400 and 800 pounds. Often hogsheads were packed to the limit because freight rates were based on number rather than weight. Because of this, hogsheads were packed at the expense of damaging the leaves or cracking the staves which sometimes caused a hogshead to burst during shipment (Breen 1985:51; Davis 1962:287-288; Robert 1967:63).

For the first half of the century, London merchants dominated the tobacco trade. As a major port city, London's merchants had the necessary capital to oversee trade activities. London was also the favored port of the crown, and, consequently, from 1624 through 1638, all imports of tobacco were restricted to London (MacInnes 1926:55; Pagan 1979:256).

London Port Book figures for 1620 indicate that tobacco rated as eighth in the list of the city's imports. The leading imports included textile materials, groceries, timber, and wine (Minchinton 1969:21). By 1633 tobacco ranked fifth, but by 1640, it was the number one import in London (Williams 1955:15). Imported quantities rose from 173,372 pounds in 1620 to 1.25 million pounds in 1640 to between 7 million pounds in 1662, and 9 million pounds in 1668-1669 (Davis 1954:152; Minchinton 1969:21). By the late 1680s, the English were consuming 13 million pounds of tobacco, and re-exporting 25 million pounds to Europe (Davis 1954:151). For 1686 alone, tobacco imported from the colonies accounted for 68 percent of the total value of raw

materials shipped from the colonies (Zahedieh 1994:247). Until the large-scale production of sugar, tobacco thus remained the most remunerative crop in British America. The heavy taxes imposed upon Chesapeake planters was more than offset by their monopoly of the market (Menard 1980:151).

The initial boom in high prices for Chesapeake tobacco ended by 1624, and, from then on, tobacco prices generally dropped, although sporadic fluctuations in price occurred between 1618 and 1660 (Menard 1976:402). Farm prices for Virginia tobacco also dropped from a whopping 40 pence per pound to 3 pence per pound in the 1630s (Menard 1976:404-408). A glutted market by 1640s prompted Virginians to pass a law requiring inspections, burning inferior and excessive tobacco, and cutting back on crops. By 1660, Virginia tobacco fell to 2 pence per pound (Menard 1976:404-408). Bermuda and the West Indian colonies eventually abandoned tobacco as one of their main cash crops, so that by the 1660s, tobacco cultivation in the West Indies had tapered off, with Nevis being the first to convert from tobacco to sugar. By the early 1700s, tobacco cultivation in the British Caribbean was insignificant, and Spanish imports also declined by 1697-1698, and ceased by the 1710s (Dunn 1973: 123; Gray and Wyckoff 1940:24-26; MacInnes 1926:163). By then, most people could afford more than a pipeful a day.

### **Consumerism and Its Relation to the Changing Economy**

As England moved toward center stage in a world system of colonization and trade, the economy began to improve. It was now possible for more people to enjoy pleasures they were previously denied, such as tobacco smoking. In England, farmers, craftsmen, shopkeepers, and others slowly began to thrive in the economic upswing, finding new outlets for their both earning and spending potential. In Port Royal, the ample flow of cash from trade, smuggling, and agricultural pursuits also provided such opportunities for English settlers.

Perhaps the best indicator for such change is seen in consumer spending. Recent scholarship by Shammas (1990), Weatherill (1988), and others challenges the commonly held assumption that the “consumer revolution” did not begin until the Industrial

Revolution. This early consumerism was affected by two main factors in addition to England's broader plan of colonization and trade, namely changing prices and increased earnings through pre-industrial manufacturing, as demonstrated in clay pipemaking.

### Changing Prices

Although economic fluctuations occurred throughout the 17th-century, there were periods when prices appear to have been lower, thereby affecting the spending habits of wage earners. As goods became more available, they also became more affordable, especially nondurable goods or groceries (Shammas 1990:79, 296). Such items included pepper, sugar products, and caffeine drinks, which often appear in the various Port Book entries for London, Bristol, and other port towns, as well as probate inventories for the period.

The availability of more affordable goods also coincided with the influx of workers into urban areas such as London and Bristol. This new work force had little time to prepare their own food and some extra pocket change that went toward purchasing already prepared items, including meals in taverns. As a result, wage-earners in towns and cities became more dependent on the market for their bread and beer (Mintz 1985:165). Contemporary accounts support these developments as London tradesmen spent "most of their money...every Week in the Neighborhood in Strong-Drink, several sorts of Flesh, Bread, Butter, Cheese, Sugar, Spice, Spanish Fruit and in Cloathing, which caused a quick Circulation in all Business" (Tyron 1699:17).

The expanding work force and their demand for goods also coincided with what Peter Borsay terms as an "urban renaissance," where towns became the "engines of the commercial system, pumping goods to and fro along the arteries of trade" (1989:viii, 23). The proliferation of retail shops in both in England by 1640 and in Port Royal supports these developments and the growing reliance on new sources for more affordable goods (Davis 1966:127; Patten 1978:185-186; Shammas 1990:248). John Taylor was especially struck by the "large shops and comodious store houses" he observed in his visit to Port Royal in 1688 (1688:252).

Some of the most common shops were the grocers, apothecaries, and tobacconists (Shammas 1990:227-228). The profusion in tobacco retailers caused anti-tobacconist Barnaby Rich to complain that tobacco was sold in “every Taverne, Inne, and Alehouse, as either Wine, Ale, or Beare; and for Apothecaries Shops, Grosers Shops, Chandler Shops, they are (almost) never without company, that from morning till night are still taking of Tobacco” (1937:I:537 [1615]). It was also an anti-tobacconist who supplied the earliest known print of an English tobacco shop in the 1617 tract, *The Smoaking Age* (Figure 18).

Tobacco shops probably existed in Port Royal as well as London. Usually, the interior of a tobacco shop included scales for weighing out portions of tobacco, as well as a counter supplied a wooden chopping block, candles, tongs, and additional tables and chairs for a leisurely smoke. In Building 3 at Port Royal, two balance scales and three sets of weights were found. Although the scales appear to have been used for large and/or bulky materials such as flour, it is possible that both large and small quantities were weighed, including tobacco leaves (Wayne Smith 1997, pers. comm.).

#### Wages, Pre-Industrial Manufacturing, and Pipemaking

Along with the increase in retail shops and periods of lower prices, rising incomes may have also affected 17th-century consumer behavior. The most likely source of improved incomes derived from the pre-industrial manufacturing practices of the period. Generally, English manufacturing consisted of two types: first, the processing and production of raw materials into goods such as glass, paper, textiles, and brick-making; and second, the smaller cottage industries (Holderness 1976:85, 101). It is these latter manufactures that probably directly affected household income and spending habits.

A recent study of 17th-century households in northern England suggests that many families took on extra work to offset the impact of rising prices while trying to maximize their total income (Woodward, 1994:25). This is especially true for middle-

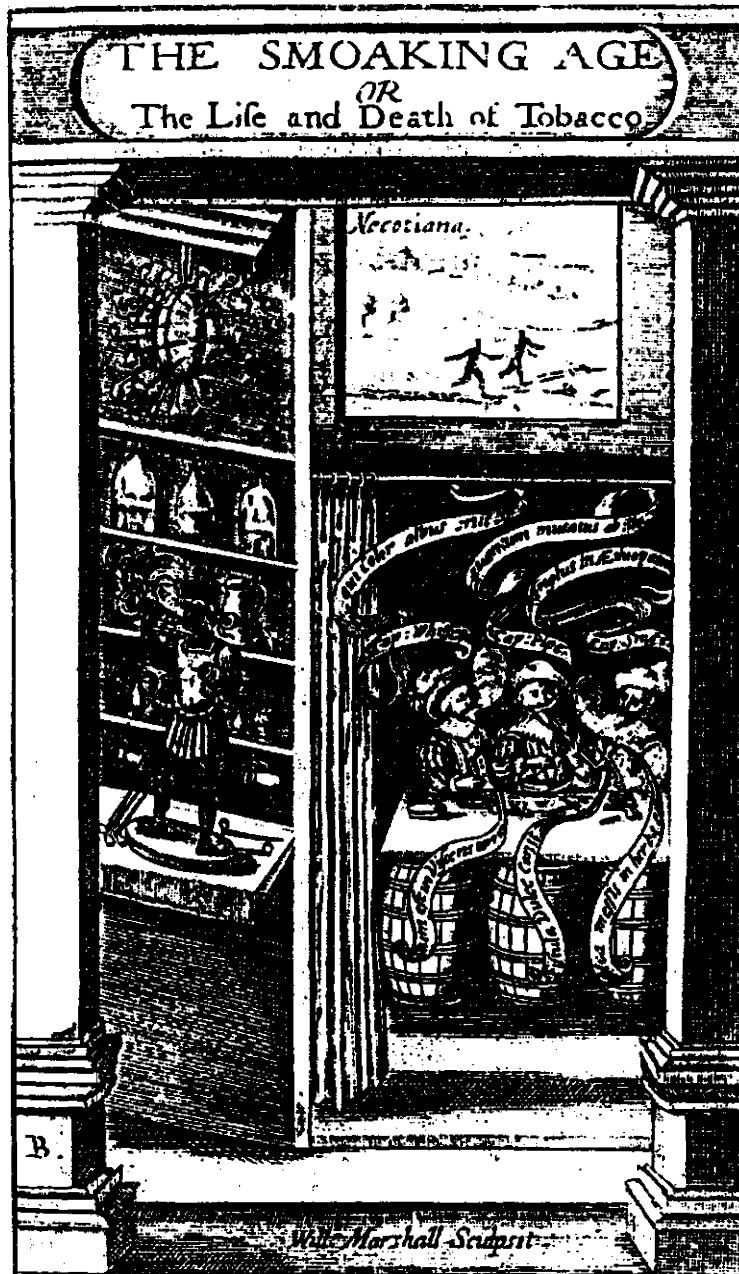


Figure 18. English tobacco shop from Brathwait's *The Smoking Age*, 1617.

range members of English society, namely the merchants, shopkeepers, farmers, yeomen, husbandmen, and craftsmen who supplemented their household incomes by taking on additional craft specialties and/or cottage industries. By taking on additional work, some of these families were eventually able to produce extra pocket money that enabled them to make small purchases of affordable goods and small luxury items. In fact, this extra income “made all the difference between a precarious existence and a modicum of comfort” (Thirsk 1978:8).

Whether as supplemental income to farming or husbandry, or as the sole source of income, the small-scale production of goods in English villages and towns often provided a livelihood for single households and introduced many alternative sources of work into rural communities (Holderness 1976:84; Shammas 1990:2; Thirsk 1978:168). Oftentimes these small family work units required little fixed capital and were labor-intensive, unlike the large production units of the Industrial Revolution (Clarkson 1972:30-31, 97). In addition to members of the immediate family, a few journeymen or apprentices may have been included in the work unit, especially if a trade was involved that required guild membership (Coward 1992:18).

Small craft industries included stocking knitting, buttonmaking, pinmaking, bookbinding, distilling, and the production of such items as ribbon and lace, linen, starch, candles, soap, ale, and clocks (Arnold 1977:314; Patten 1978: 149; Thirsk 1978:6). Clay pipe manufacturing was another small craft industry that was “more dirty than laborious, and but moderately profitable” (Campbell 1747:326).

#### Pipemaking as a Pre-Industrial Manufacture

As a source of income, pipemaking was both labor-intensive and dirty, but it also generated one of the first mass-produced items in a pre-industrial economy. That clay pipes were manufactured, used, and discarded in a relatively short period of time, made them one of the first truly disposable commodities. The throw-away nature of clay pipes thus assured a steady livelihood for those involved in pipemaking.

Although the origins of pipemaking are obscure, Italian majolica potters may

have brought their experience and technology with them to London in 1570 (Peacey, 1996:186). During the first half of the 17th century, most clay pipes were manufactured in London. The reasons for this vary. First, until 1638, imported tobacco was only allowed to enter through London's port. More importantly, London also monopolized the import of fine, white kaolin clay from Poole, the Isle of Wight, Purbeck, and Dorset (Jackson and Price 1974:10). Kaolin clay was superior in its ability produce a hard, white finish when fired, and therefore was the clay of choice among pipemakers.

In terms of both small- and large-scale endeavors, the number of pipemakers increased in the London area, thus prompting the establishment of an official charter in October 1619 to monitor, control, and set standards for the industry as it developed. To accomplish this, the Tobacco Pipe Makers 1619 charter was formed in Westminster by 30 pipemakers, prohibiting pipemaking by nonmembers who were not part of the pipemaker's guild.

As with other trades, pipemakers were required to undertake a seven-year apprenticeship before they could establish their own businesses. The guild and charter thus provided a monopoly for pipemakers in the areas in and around London (Oswald 1967:10; Walker 1971:79). The company was controlled by four backers whose fortunes were tied up in the monopoly of pipe clay (Atkinson and Oswald 1969:172). These backers were key in obtaining the charter and "had sunk 3000 pounds into the venture" (Walker 1971:80).

One of the goals of the charter included deterring the number of unskilled and shoddy producers in the trade. This was especially a problem because as a small craft industry, it was easy to set up a kiln and workshop for anyone who had the inclination. Thus, to maintain "quality control," members of the charter had the right to harass owners of nonguild operations, as well as search shops and warehouses for imported Dutch pipes (Walker 1971:79; Clarkson 1972:103). Despite their efforts, a disagreement between the founders eventually led to the company's demise in 1627 (Walker 1971:80).

A second charter came about in December 1634, granted to 24 individuals in the industry, eight of whom were members of the previous charter. Part of the terms of this agreement was to use only non-timber burning fuels, mostly coal, in the pipe kilns due to a shortage of wood (Walker 1971:80). A third charter was granted in April 1663, the name now being changed to the Tobacco Pipe Makers of the Cities of London and Westminster and the Kingdom of England and Dominion of Wales, along with the same fuel requirement. The charter also prohibited the importation of Dutch-made pipes and the export of English pipe clay, because it was considered to be limited in quantity and the best clay for firing. Like the previous charters, the guild also maintained the right to search shops, warehouses, cellars, and houses for nonguild operations, clay, or imported Dutch-made pipes (Walker 1971:81).

#### The Bristol Pipemaking Industry

By the time of the third London charter, the pipemaking industry at Bristol posed a threat to the London monopoly. The Bristol industry superseded London in pipe production, particularly for export to the American colonies. In fact, probably 98 percent of the white, kaolin clay pipes found at Port Royal were produced and shipped from Bristol; the remaining 2% was from London, Broseley, and Holland.

The Bristol pipemakers had created their own guild and charter as early as 1652 and included 25 members (Walker 1971:84, 86, 456). The establishment of the guild also reflected the city's interest in pipemaking as part its economic development. This was a natural progression because ceramic production had been a key industry in Bristol for many years. As with London pipemakers, Bristol pipemakers were required to serve the customary seven-year apprenticeship (Walker 1971:82). The guild not only provided guidelines for apprenticeships, but also for quality production, guild elections, rights of search, and maintaining appropriate provisions for workers and their families. Fortunately, the guild recorded the names of their members in apprenticeship rolls, which have been valuable in tracing the makers' marks found on Port Royal pipes to the names of specific Bristol pipemakers.



Other guilds were established in York (about 1650) and Gateshead (1675) (Walker 1971:82, Oswald 1975:9). By the latter half of the 17th century, leading production centers for clay pipes included Bristol, Broseley, Hull, and Newcastle, as shown in Figure 19.

Bristol's growth in pipemaking coincided with her growth as one of Britain's chief ports in the latter half of the 17th century and with the growth of Britain's overseas trade in general. Much of Bristol's successful growth during this period can be attributed to the highly organized efforts of the city's Society of Merchant Venturers. The year 1661 marks the event when the Society was given a formal permission by the city to levy and collect wharfage duties, whereas before it had been through private arrangement. In addition, the merchants were actively involved in trading ventures, as well as applying the wharfage fees toward major port improvements, the appointment of river pilots, and educating and providing for sailors and their families (McGrath 1953:111-128; 1975:39-89). Bristol was also the leading port in the re-export trade of Mediterranean goods and East Indian spices and was noted for its renewed trade with Portugal after 1653 (Ramsay 1957:144, 148). More than any other port during the later years of the 17th century, Bristol benefitted from the colonial trade. Cloth dominated the export trade, whereas tobacco, sugar, rum, and fish from Newfoundland composed the chief imports (McGrath 1955:xxi; Minchinton 1969:33). The latter part of 17th century witnessed the beginning of Bristol's African slave trade that was preceded by the city's export of indentured servant labor to the colonies. The magnitude of Bristol's trade is well illustrated in a letter dated 17 October 1692, which states that 30 to 40 vessels alone were outward bound for Virginia, Barbados, Jamaica, and the Leeward Islands (McGrath 1952:196).

Although much smaller than London, Bristol was the second largest port by the end of the 17th century (McGrath 1975:25). Within the century, Bristol's population had almost doubled from 12,000 inhabitants to over 20,000 (McGrath 1955:ix; McGrath 1975:25; Patten 1978:232). A compact city contained within medieval walls,

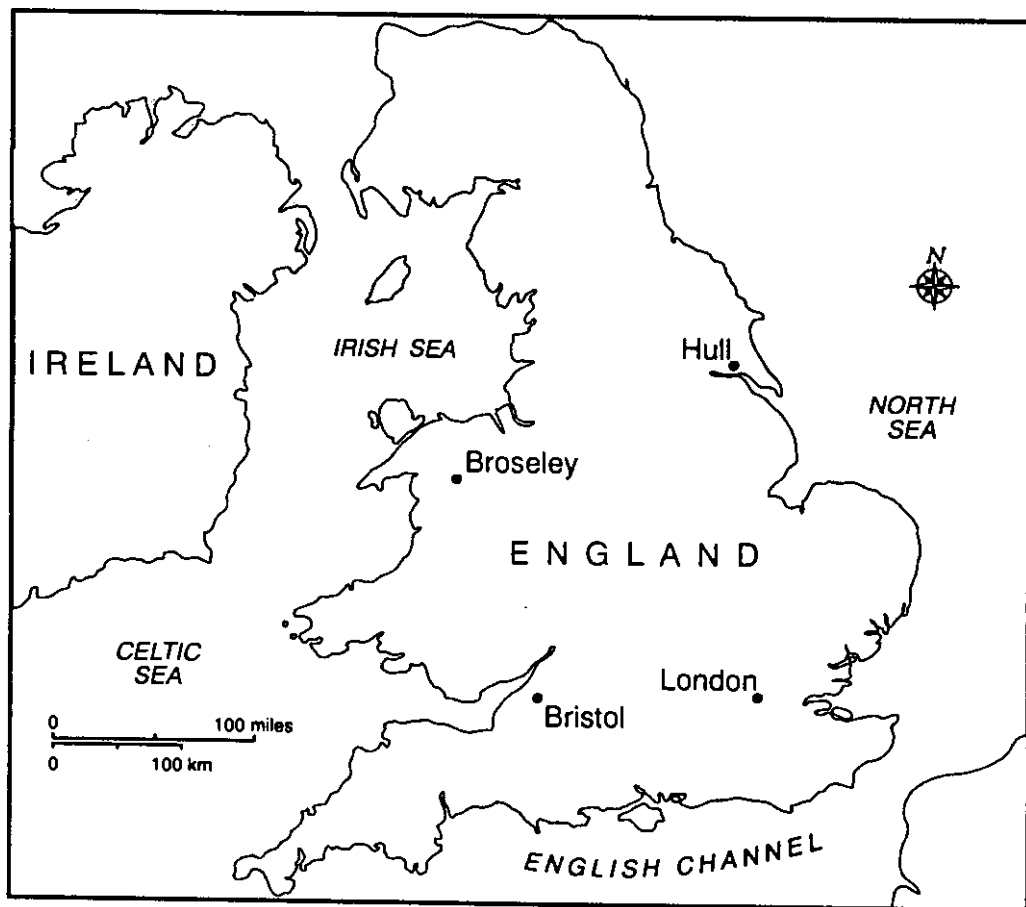


Figure 19. The leading centers for English clay-pipe production.

Bristol was flanked by inland riverways. The Severn River provided wide access to manufactures and raw materials from the interior, along with the Avon River, which also connected Bristol to the southern coast where such raw materials as kaolin pipe clay could be loaded and carried upriver to Bristol pipemakers.

In addition, Bristol had its own industries contributing to its thriving colonial trade. These included shipbuilding, sugar refining, soapmaking, glassmaking, the leather industry, products made from copper and brass, ceramics, and clay tobacco pipes (McGrath 1975:34-35; Morgan 1993:97).

The Bristol pipemakers are a good example of thriving pre-industrial production units that managed to provide for both domestic and foreign markets. The average workshop was often adjacent to the home of a pipemaker and usually included the master and his wife, two journeymen, a senior apprentice, and a junior apprentice (Walker 1977:174). Only in rare instances were some shops large enough to employ more workers as in the Bristol family firm of Tippet, whom Walker refers to as a “pipemaking dynasty,” and whose pipes were exported to Port Royal (1977:464). In any case, sons often followed in their fathers’ footsteps to become pipemakers. The pipemaking family of Lewellyn Evans and sons was also successful, and were one of the chief exporters of clay pipes to the British colonies, particularly Port Royal.

The uniformity seen in Bristol and other English clay pipes is attributed not only to the knowledge and skills of the pipemakers, but also to a remarkable manufacturing process that allowed for the mass production of pipes in a pre-industrial era. The raw material used in making Bristol clay pipes consisted of white kaolin clay that was extracted from deposits located in southern England in the Hampshire and Dorset areas near the coast, as well as the Isle of Wight, Isle of Purbeck, and Devon as shown in the map in Figure 20 (Arnold 1977:317; Oswald 1975:10). Pipemaking essentially involved the production of clay pipes through two-piece molds, followed by high-temperature firing in simple updraught brick kilns, as shown in the reconstructed kiln in Figure 21.

It appears that several hundred to several thousand pipes could be made at a

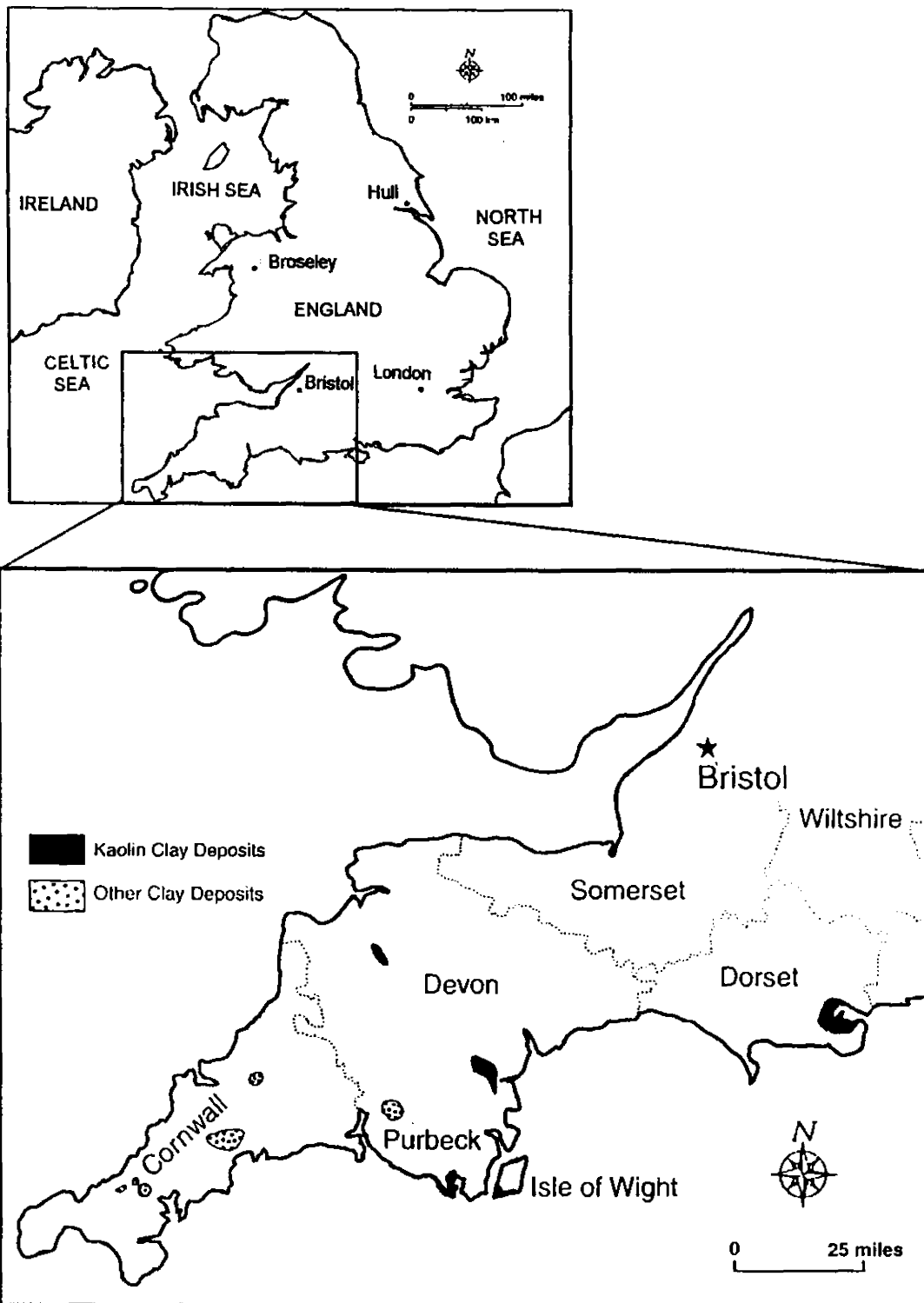


Figure 20. Key clay deposits for English clay-pipe production.

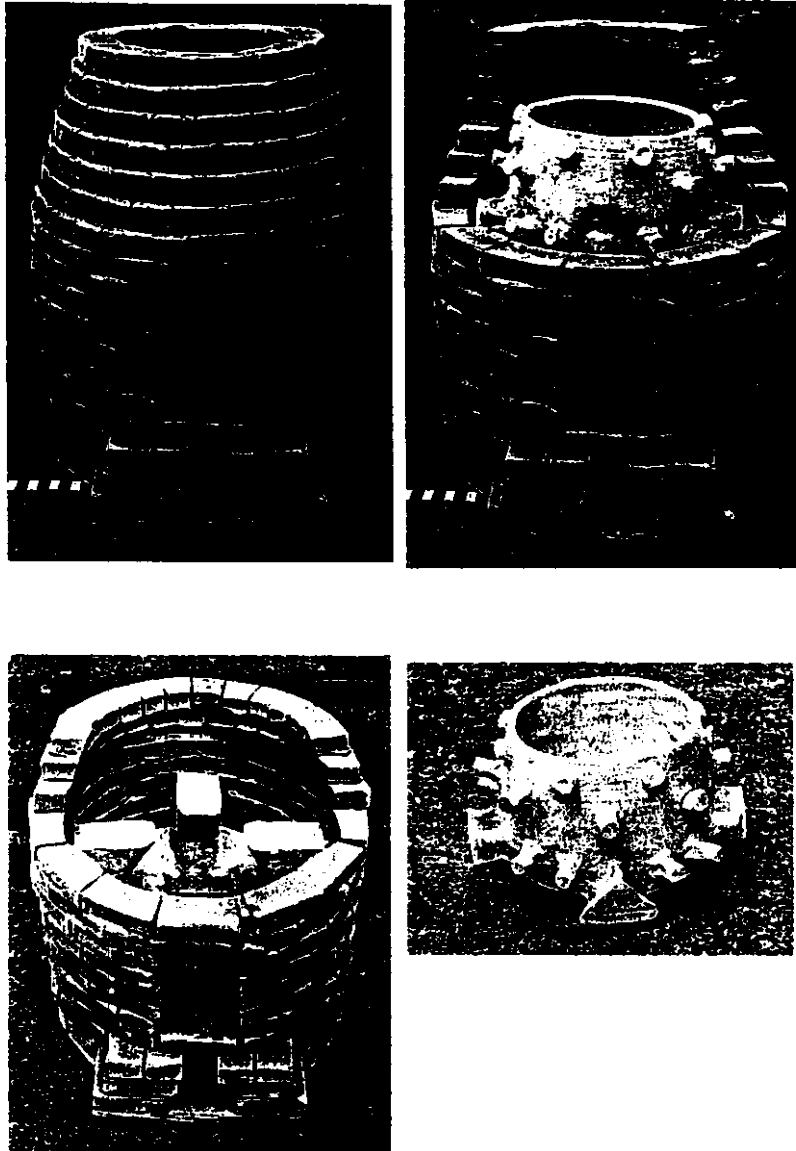


Figure 21. Model of a typical 17th-century updraught kiln (By permission of Peacey 1996:280).

reference to tobacco while anchored on the northeastern side of Cuba during his first voyage in 1492. The diary entry for November 6 states that “My two men met many people crossing their path to reach their villages, men and women, carrying in their hand a burning brand and herbs which they use to produce fragrant smoke” (1992:115 [1492]). The men and women he refers to were native Taino peoples who possibly utilized tobacco through smoking it in cigar-like form.

Other explorers encountered tobacco in a number of ways. In 1499, Amerigo Vespucci observed natives chewing tobacco on the island of Margarita off the coast of Venezuela (Brooks 1937: I:19). In 1535, the French explorer Jacques Cartier witnessed pipe smoking by native peoples living along the St. Lawrence River (West 1970:54). It is therefore not surprising that aboriginal practices of pipesmoking served as the prototypes for English clay pipes. A variety of pipes with bowls and stems were used by indigenous peoples living throughout North America (West 1970:381).

The earliest published account of tobacco usage is attributed to the Spanish Viceroy, Gonzalo Fernández de Oviedo y Valdés, who lived in the Spanish colonies for a number of years. In his *Historia General y natural de las Indias*, first published in 1526, then again in 1535, Oviedo observed that tobacco was inhaled by inserting the ends of a fork-shaped tube the Indians called a *tabaco*, into the nostrils, with the burning leaves placed in the single end of the tube (Brooks 1937: I:204; Fairholt 1859:14). Oviedo refers to this activity as “drinking” the smoke, although what he probably witnessed was the inhalation of snuff and confused it with the other activity of smoking native cigars (Brooks 1937:I:202; Mackenzie 1958:64). The term “tobacco” was thus applied to the name of the forked tube that Oviedo mentions in his account, although Bartolomé de Las Casas also reported that while on Hispaniola, he witnessed Taino Indians smoking native cigars called *tabacos* (Dickson 1954:27).

Perhaps the most influential encounters occurred in the American southeast, in Florida and Virginia, where Europeans met Native Americans smoking small pipes, whose shapes were probably the most likely of prototypes to influence the development

of English and Dutch clay pipes. For example, English sailors under the command of Sir John Hawkins in Florida in 1565 observed the local Indians smoking tobacco through a small pipe consisting of a “cane and an earthen cup in the end” (Hakluyt 1904:57).

The expedition of Sir Walter Raleigh and Thomas Hariot to Virginia Colony in 1585 was also pivotal in introducing tobacco to the English. Hariot’s role was to scientifically assess the territory and its economic potential (Noël-Hume 1994:29). In his detailed observations, Hariot learned about tobacco cultivation and smoking from the local Algonquin Indians, which he published in his account *A Briefe and True Report of the New Found Land of Virginia* in 1590. The pipe used by the Indians that Hariot observed was either a “tube pipe” or an “elbow pipe,” both used by the Indians, the latter very likely serving as the prototype for English and Dutch clay pipes, as shown in Figure 22 (West 1970:151). In his report, Hariot observed that:

There is an herbe which is sowed apart by itselfe and is called by the inhabitants Uppowoc: In the West Indies it hath divers names, according to the several places and countries where it groweth and is used: The Spaniardes generally call it Tobacco. The leaves thereof being dried and brought into powder: they use to take the fume or smoke thereof by sucking it through pipes made of claie into their stomacke and heade; from when it purgeth superflous fleame and other grosse humors, openneth all the pores and passages of the body... We ourselves during the time we were there used to suck it after their maner, as also since our returne.... [Hariot 1972:16 {1590}].

Hariot continued smoking on his return to England in 1586, and is credited, along with Sir Walter Raleigh, as having introduced tobacco smoking to English society. It is also interesting to note that Hariot died of nose cancer in 1621 (Hulton 1972:ix; Shirley 1983: 432-434).

In these early encounters with indigenous practices, explorers also brought back the seeds of *Nicotiana rustica* and *Nicotiana tabacum* to Europe. The seeds of these two native American tobacco plants would provide the stock for future tobacco plants in Europe, Asia, and the New World colonies (Mackenzie 1958:66).

By 1570, most of Europe had been exposed to tobacco, and it was produced in

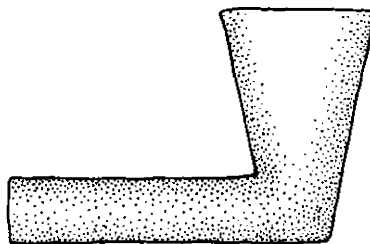


Figure 22. Clay “elbow pipe” Native American prototype for English clay pipes.

small quantities in Spain, Italy, Belgium, Switzerland, and England (MacInnes 1926:20-21; Brooks 1937:I:31, 36; Dickson 1954:1-75). By the early 1600s, tobacco was also grown in India, Japan, West Africa, the Philippines, and China (Brooks 1937:I:42). Chinese merchants then introduced tobacco into Tibet, Mongolia, Turkestan, and eastern Siberia (Brooks 1937:I:42; Goodman 1993:37).

In the rapid adoption of tobacco into many societies, the English and Dutch supersede all others in terms of popularity, consumption, and widespread use of tobacco. This raises important questions as to how and why this occurred, particularly in English culture and society. Several explanations have been proposed. They include: 1) medical reasons; 2) the hunger argument; 3) the addictive and narcotic effects of smoking; and 4) social reasons. These reasons are examined in the next section.

### **Why the English Adopted Smoking**

#### *The Medicinal Attributes of Tobacco*

One of the more persuasive arguments for the adoption of smoking relates to tobacco’s medical properties as claimed by its endorsers. Claims for tobacco’s curative powers and healthful benefits were proposed shortly after its discovery and introduction to Europe. Known as “the holy herb,” tobacco appeared in private gardens throughout Europe as a potential remedy for a number of ailments in a number of preparations, including unguents, antiseptics, cathartics, powders, poultices, and inhalants (Brooks 1937:I:31; Goodman 1993:43).



The first written account extolling the virtues of tobacco was Jean Liébault's *L'Agriculture et maison rustique*. Liébault, a French physician, first published his work in 1567, with subsequent editions, in which he provided a detailed account of the plant, as well as all the diseases it could cure (Brooks 1937:I:32-33; Dickson 1954:71-72).

The most influential writer to gain the attention of the medical world, however was Nicolas Monardes, a Spanish physician at Seville. Although Monardes had not been to the New World, he was well-acquainted with contemporary accounts of the plant and grew the plant in his own garden (Goodman 1993:44).

Monardes first mentions tobacco as a curative, when he published his findings in two separate editions in 1574 and 1580, the first being translated into English as *Joyfull Newes Out of the Newe Founde Worlde* in 1577 (Goodman 1993:46; Laufer 1924:22). Monardes' work was also published in all major European languages and successive editions for the next two centuries (Goodman 1993:46). This was the most comprehensive contemporary discussion on the subject, as well as on the medicinal plants of the New World. Monardes' works were widely accepted, and they became *the* source for information about tobacco in the 16th century (von Gernet 1988:43).

Monardes claimed that tobacco could expel excess moisture from the body as well as cure worms, arthritic pain, bites, stings and sores, hunger and thirst. For toothache, the proper procedure involved taking:

a little Baull made of the leafe of the Tabaco, washing first the toothe with a small clothe wet in the Joyce, it taketh awaie the paine, and doth staie it, that the putrefaction go not forward: in hot causes it doth not profite, and this remedy is so common that every one healeth.  
[Monardes 1925:80 {1577}].

Monardes also promoted tobacco inhalation through a tube as a curative, based on Native American encounters that he had heard about. Monardes states:

The leafe of this herbe beyng dried in the shadowe, and hanged up in the house, so that there come neither Sunne, winde, nor fyre, thereunto, and beyng caste on a Chaffyng dishe of Coales to bee burned, takyng the smoke thereof at your mouth through a tonnell or cane, your hed being well covered, causeth to avoyde at the mouth great quantitie of slimy and flematicke water,

whereby the body will be extenuated and weakened, as though one had long fasted, thereby it is thought by some, that the dropsie not havynge taken roote, will bee healed by this Perfume. [Monardes 1925:97{1577}].

By providing the most extensive catalogue of illnesses and afflictions that tobacco could cure, both Liébault and Monardes established the new therapeutic code for tobacco (Brooks 1952:38). Relying on these accounts, other physicians soon added their own stamp to the medical literature.

As a cure-all, tobacco reached its peak in popularity by 1600, but afterward, it tapered off gradually, although in the colonies, it was still used as a curative for specific ills, as in the case of English physician Hans Sloane. During his visit to Port Royal and Jamaica in the late 1680s, Sloane, seeking the advice of an African woman known for her expertise in such matters, observed her treating a wart on his toe, as she

open'd the skin with a Pin above the swelling, and carefully separated the Tumour from the skin, and then pull'd it out, putting into the Cavity whence it came, some Tobacco leaves which were burnt in a Pipe she was smoaking. After a very small smarting it was cured [Sloane 1707:cxxiv].

### *The Hunger Argument*

If tobacco was championed as a curative, it was also prescribed to curb hunger and thirst. Monardes observed the Native American practice of chewing tobacco to alleviate hunger and thirst as “thei take a little baule..., and thei put it betwene the lower lippe and the teethe, and thei goe chewing it all the tyme that thei travell.” This prevented them from “havynge neede of meate, or drinke, for thei feele no hunger, drieth, nor weaknesse, nor travaile doeth trouble them” (Monardes 1925:90 [1577]).

Some contemporaries proposed tobacco as a solution during times of famine. John Nicholl, an Englishman, published his story in 1607, describing the benefits of tobacco after 15 days of being shipwrecked on a desolate isle near St. Lucia:

In that fiftene dayes five of our companie pined to death for hunger... Tobacco was the chiefe food I found to do me good, and did preserve my lyfe, and those which could take it downe, did keepe strongest, but those which could not take it at all, died first [1937:I:442-443 {1607}].

Other writers for the period extolled tobacco's ability to curb hunger and thirst, especially during food shortages. Scotsman William Barclay noted that "it maketh hungrie and filleth, it maketh thirstie, and quencheth thirst" (1937:I:514 [1614]). The energizing and appetite-abating qualities of tobacco, hot tea, coffee, and chocolate drinks also may have been appealing to the working poor who needed the stimulation to compensate for a less than adequate diet largely based on starch (Braudel 1979:261; Mintz 1985:75-77; Shammas 1990:297).

Although it is possible that tobacco curbed nagging appetites, it does not adequately explain why it had such mass appeal in the 17th century. A more convincing argument is that tobacco had a narcotic effect on smokers who then developed a dependency on the drug.

### *Tobacco Addiction*

Tobacco as an addictive offers a very attractive thesis for explaining its mass consumption in the 17th century, as it does today. The significant quantities of clay pipes exported to Jamaica testify not only to the popularity of smoking, but also suggest that tobacco addiction was well-entrenched in Port Royal as elsewhere during this time.

Unlike the 17th century, the chemical constituents of tobacco are now well known, thus providing a better understanding how tobacco affects the human body. The chief culprit of the pleasure/addiction syndrome is nicotine ( $C_{10}HN$ ), which is the chief alkaloid found in tobacco, and named after the Frenchman Jean Nicot, who is credited with introducing tobacco to France in the late 16th century. The most current view by researchers is that tobacco is addictive because the nicotine in the tobacco, in a series of complex chemical reactions, raises levels of the neurotransmitter, dopamine, in the brain (Brautbar 1995:265; Gold 1995:29). A recent study also suggests that this affect is extended by a chemical found in smoke that blocks the enzyme, MAO B, which would normally destroy it (Fowler et al., 1996:733).

In the 17th century, accounts indicate that pipe smokers inhaled their smoke, exhaling through the nose much like cigarette smokers do today. In fact, the design of

the 17th-century clay pipe, with its typically small bowl and long stem maximized the transfer of smoke to the mouth (Deetz, 1977:19). The hurried gulping of 17th-century pipe smokers potentially aided in the quick release of nicotine into the bloodstream and directly to the brain, thus causing addiction.

*Smoking for Pleasure: The Social Aspects of Smoking*

If tobacco as a medicine, appetite suppressant, or addiction seem insufficient reasons for its large-scale consumption in the 17th century, then a final argument rests with tobacco smoking as a pleasurable, social pastime, complete with its own rituals and material culture. Idling hours away in a tavern with smoke and drink was the chief recreation for many, particularly for those escaping the hot Jamaican sun in Port Royal.

Smoking provided “compelling satisfactions of a purely psychological nature,” such as “the oral satisfaction of clutching a pipe...sucking and chewing on the stem, and using the mouth in the act of ingestion” (Rublowsky 1974:76-77). Further satisfaction was derived from “the manipulative action of the fingers and hands in lighting and smoking the pipe...” (Rublowsky 1974:77).

Herein lies one possible explanation for the mass appeal of smoking in the 17th century: through the ritual lighting and ingesting, smoking in a Durkheimian sense, was a small, sacred act in the ordinariness of everyday life. Richard Klein captures the essence of this idea in his book, *Cigarettes are Sublime* (1993). Although his work concerns modern-day cigarette smoking, it is very likely that pipesmoking in the 17th-century provoked a similar response. In many ways, the pipe, like the cigarette, served as a symbolic instrument, acquiring the qualities of a sacred object (or an erotic one), “endowed with magical properties and seductive charms, surrounded by taboos and an air of danger...” (Klein 1993:xii-xiii). Even as pipesmoking was popular, it was not always accepted by everyone, so that it still retained an aura of forbidden pleasure. For this reason, smoking became associated with a kind of sophistication, where smokers formed their own kinship and rituals that separated them from everyone else.

In addition to the ritual aspects of pipesmoking, smoking also encouraged

conviviality through conversation and promoted friendly relations in public contexts. An entry in Richard Lowe's diary illustrates this point as Lowe brings his Lancashire neighbor "a pipe of tobacco" as a gesture of friendship (1938:43-44 [1663-1674]).

Jürgen Habermass maintains that the transformation of English culture in the 17th century developed in the public sphere where people came "together to form a public, readied themselves to compel public authority to legitimate itself before public opinion" (1989:25). The public forum was embodied in institutions such as coffeehouses, taverns, and clubs, where conversation functioned as a kind of moral instruction in the shaping of attitudes and manners (Habermass 1989:25; 30-36). The many taverns, grog shops, and other drinking establishments in England and Port Royal attest to this social development.

In another sense, smoking, provided a novel experience for a society undergoing transition in the 17th century. For England, in many ways, it was a time altered by new social alignments, changing economic conditions, and demographics (Reay 1985:18; Wrightson 1982:13-14). For the English colony at Port Royal, this was especially true, with its flow of cash, influx of imported goods, and fairly fluid society.

The introduction of tobacco as well as "drug foods" such as coffee, sugar, and chocolate thus offered the opportunity to experience new sensations and stimuli (Mintz 1985:99-100). Tobacco especially provided "a paradoxical experience...with its contradictory physical effects, its poisonous taste and unpleasant pleasure" (Klein 1993:27).

## **The Material Culture of Smoking**

### *Common Folk and Their Smoking Customs*

The chief instrument that afforded such ritual pleasure was the clay pipe. Pipesmoking began shortly after the introduction of tobacco into England, which would place it not long after 1558 (Ayto 1994:4). The earliest description of a clay pipe appears in William Harrison's *Great Chronologie*, published in 1573, where he describes the new practice of pipesmoking:

in these daies the taking-in of the smoke of the Indian herbe called "Tobacco," by an instrument formed like a little ladell, whereby it passeth from the mouth into the hed & stomach, is gretlie taken-up and used in England, against Rewmes & some other diseases ingendred in the longes & inward partes, & not without effect [Brooks 1937:I:298].

By the 1590s, clay smoking pipes were being produced in England for the public consumption of tobacco (Oswald (1975:5). Smoking was possibly introduced to the man on the street by sailors and sea captains in major port towns like London (Penn 1901:57). Initially, tobacco was costly for the average smoker during the late 16th and early 17th centuries, but the less affluent were not entirely daunted by tobacco prices. In 1614, a member of the House of Commons complained that "poore men spend four pence of their days wages at night in smoke" (Rive 1926:58). Several accounts portray the early smoker as buying small quantities and placing the precious tobacco in a walnut shell, and sucking the smoke through a straw (Penn 1901:60). The first clay pipes with their small bowls also indicate that tobacco prices were still comparatively high until after the 1620s.

By mid-century, however, pipesmoking was affordable and an integral part of English life. For example, the St. Bride's (London) annual parish feast for May 24, 1666, included an expenditure of 3 shillings for tobacco for 20 or more adults (Apperson 1916:73). In a similar vein, the 1673 church accounts for the North Elmham Church in Norfolk included payments for "Butter, cheese, Bread, Cakes, Beere and Tobacco and Tobacco Pipes at the goeing of the Rounds of the Towne" (Apperson 1916:73). In 1686 in St. Andrews parish, Norwich, parishioner Robert Watts financed the purchase and distribution of pipes, wine, and rolls to the parish poor (Karshner 1979:298). At the Coronation of George I in 1714, participants were provided with 2½ pounds of tobacco and 216 pipes (Penn 1901:83).

Early on, foreign travelers were keen observers of English smoking customs. German traveler Paul Hentzner, who spent 14 days in London in 1598, was particularly struck by the popularity of smoking in London. He noted that

the English are constantly smoking the Nicotian weed, which in America is called Tobaca--others call it Paetum--and generally in this manner: they have pipes on purpose made of clay, into the farther end of which they put the herb, so dry that it may be rubbed into powder, and lighting it, they draw the smoke into their mouths, which they puff out again through their nostris like funnels, along with it plenty of phlegm and defluxion from the head [1937:I:494-495 {1612}].

This account also suggests that smoking was not all that delicate, and involved a certain amount of coughing and spitting. This could prove especially unpleasant for passersby as tobacco was smoked openly on London's streets (Apperson 1916:33). For more refined smokers, the spittoon, a Dutch invention of the 17th century (*quispedoor*), composed part of a smoker's paraphernalia (Brongers 1964:163), but in more plebeian circles, the floor would suffice (Goodman 1993:83).

Tobacco could also have varying effects on the smoker, as Robert Hooke demonstrates in his *Diary*. In one instance, he complained that "tobacco doe no good without old malago. Vomited black stuff after" (1968:201). Another time, Hooke remarked that he "slept well after tobacco" (1968:196). The stupefying effect of alcohol was also associated with tobacco by some moralists of the time. This notion was perpetuated by Dutch genre painters of the 17th century like Adriaen Brouwer in his painting, *The Smoker*, shown in Figure 23. That some of these smokers appear so insensate has prompted speculation that the tobacco was spiked with an opiate or narcotic such as *Cannabis sativa*, that was obtained either in the Levant and Orient by Dutch travelers (Schama 1988:212-213). Another interpretation of these scenes, however is the lethargic and vain passage of time (Schama 1988:213). According to art historian Simon Schama, pipes were one of the many symbolic objects of contemporary works that "signified the ephemerality as well as the futility of the material life" (1988:214).

Across the Atlantic, in Puritan New England, smoking was often associated with drinking and an immoral way of life, so was often met with disapproval, but not without a double standard as churchgoers waited out long sermons to the "soothing and edifying



Figure 23. Adriaen Brouwer's *The Smoker*, Rijksmuseum, Amsterdam (Schama 1988:212).



accompaniment of a pipe” (Penn 1901:82). In many cases, for those who objected to smoking in church, their mouths “were closed, so to speak, by their own pipes” (Apperson 1916:64).

The “clinking of flints and steel and the clouds of smoke” became such a nuisance, however, that by 1669, a law was enacted in Massachusetts Bay colony prohibiting smoking in or near church grounds or smoking on the Sabbath (Penn 1901:82). This law was actually preceded by the Massachusetts Court’s decision in 1634 to prohibit smoking by two or more persons publicly or privately and the Blue Laws of 1650 where the General Court of Connecticut prohibited smoking under the age of 21 (Dow 1988:63; Field 1897:23; Robert 1967:105; Apperson 1916:65). Also under this law, a smoker was required to have a license to smoke by a physician. Other restrictions included that no smoking be permitted in public “in the streett, hiwayes, or any barnyardes, or uppon training dayes, in any open places, under the penalty of six-pence for each offense against this order” (Apperson 1916:65). Ironically, in Virginia, colonists were fined 50 pounds of tobacco if they did not attend church on Sunday (Hawke 1988:23). Despite these stringent laws, most commoners ignored them, and smoking as a leisure pastime thrived in the English colonies as it did in mother England. No such laws were known to exist for Port Royalists.

### *The Wealthy and Their Smoking Customs*

Although pipesmoking was widespread in English culture, there were class distinctions in the material culture of smoking, both at home and abroad. Sir Walter Raleigh is credited for having introduced smoking into Court and polite society and making it fashionable to “drink tobacco.” Raleigh’s influence extended to a segment of London’s idle young men known as gallants or dandies, who developed their own rituals and material culture around pipesmoking. One 17th-century observer described them as “a kind of walking Mercers shop” whose sole ambitions were to achieve “Knighthood, and then an olde Ladie” (Earle 1980:39-40 [1628]).

In their affectations, these men about town parlayed their social standing by

virtue of studied mannerisms often exaggerated to the point of absurdity. They could be identified by their starched ruffs and velvet breeches and large feathered hats as shown in a 17th-century print, *The Suckling Faction* in Figure 24. As a fad and a form of elitism, they chose smoking as their speciality and trademark, which managed to arouse the ire of moralists and clergymen as well as James I. Their “bizarre dissipations” also inspired parodies like Brathwait’s *The Smoking Age* (1617).

One of the rituals of these young men involved spending hours practicing smoking tricks in the back rooms of apothecary shops where tobacco was sold. Another popular meeting place was the “tobacco ordinary,” which served as a type of an after-dinner smoking club in the neighborhood of St. Paul’s Cathedral. Many of these tobacco ordinaries existed around the area, where, after an exhausting day of gallivanting about town, the gentlemen spent their time discussing the merits of different kinds of tobacco and their respective pipes, as well as tobacco prices and vendors (Apperson 1916:27-28). Another ritual pastime involved sitting stage side of a theater where gentlemen could freely criticize the play and players in between blasts of smoke. Dandies also employed their own terms for tobacco. Tobacco was often referred to as the “leaf,” “pudding” or a piece of “cane” (Brooks 1937:I:53). Smoke was also called “fume” in some cases.

The material culture of smoking for this social group, and for the wealthy in general, signified their preoccupation with status and exclusivity. Apperson (1916:29) observes that it was customary for wealthy young men to carry ornate pipe pouches. One such pouch exists at Wallace Collection in London’s Hartford House, and has been attributed to Sir Walter Raleigh. The case is made of leather and measures about 20 cm by 10 cm, as shown in Figure 25. The outside is decorated in tiny beads of silver, carnelian, and turquoise.

Inside the pouch are six to seven separate compartments to hold pipes. Two small smoked pipes are still stored in the pouch and possibly date to 1630. What makes the pipes stand out is their design. These are not ordinary clay pipes, but are attached to



Figure 24. "Dandies" enjoying pipesmoking, from *The Suckling Faction*, 1641.

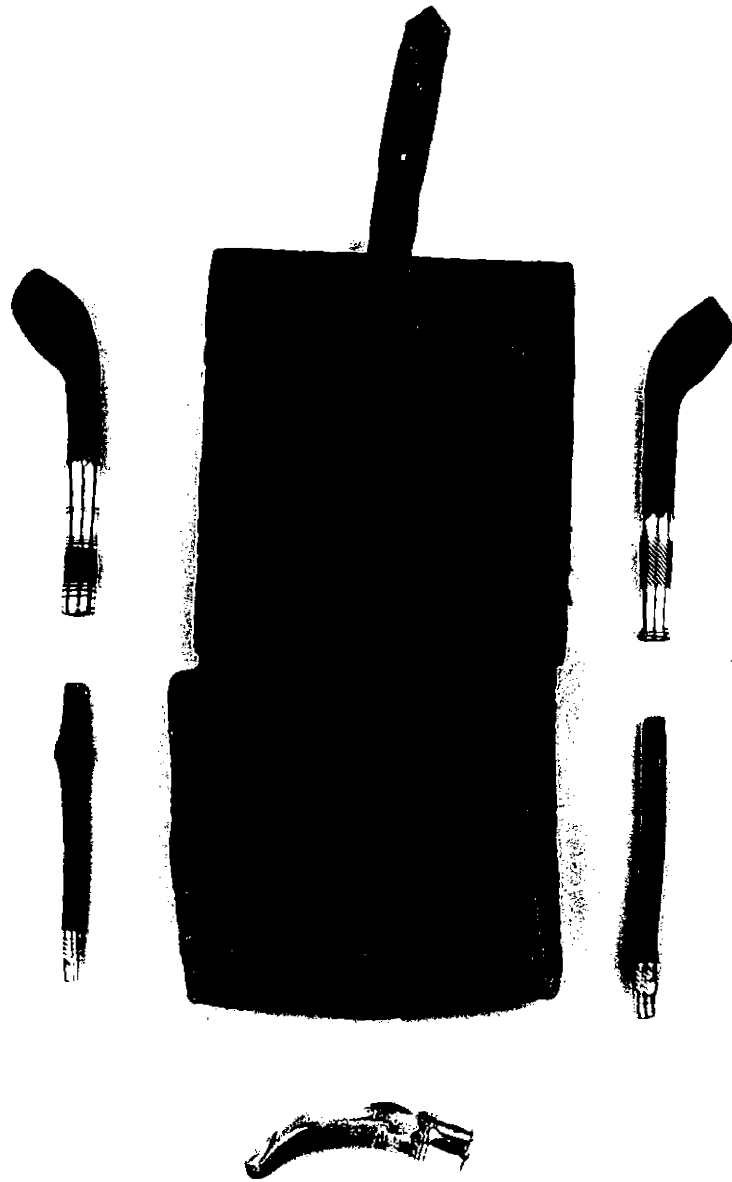


Figure 25. Interior of pipe pouch, late 1500s, attributed to Sir Walter Raleigh (Photo courtesy of the Wallace Collection, London).

silver and bamboo extenders, much like a modern-day cigarette holder. Along with the case in this collection is a carved bone shaped like a human finger, which has a wooden end that serves as a pipe tamper or stopper.

Other distinctive items in the material repertoire of the well-to-do included ornate tobacco boxes made of gold, silver, ivory and tortoiseshell, mother-of-pearl, and expensive and rare woods. The boxes came in all sizes, but were often small enough to be carried in a large pocket. Some tobacco boxes even contained tiny silver tongs for lifting hot embers, a tamper (or stopper) to compress the tobacco in the pipe bowl, a knife to shred the tobacco, a pick, and a small scoop for drying the leaf (Brooks 1937: I:53; Dunhill 1954:13).

### *The Material Culture of Smoking at Port Royal*

Although a number of Port Royal's smokers were well-to-do, relatively few items related to smoking have been recovered in the numerous archaeological excavations conducted at Port Royal, aside from the pipes. One find consists of a brass pipe tamper found during one of Marx's excavations, as shown in Figure 26 (1968d).

Archaeological excavations in 1987 also revealed a pipe bowl (574-3; bowl Type 1.73) that appeared to contain tobacco residue in the form of carbonized and uncarbonized plant tissue still in the pipe. Another pipe bowl (688-2; bowl Type 1.73) with tobacco residue was discovered in Room 2 in 1989. Because of the infusion of seawater into the residue, positive identification was not possible (John Jones 1997, pers. comm.).

The pipe bowl recovered in 1987 was unique in another way, however. When the residual tobacco plug was removed, close examination revealed a small irregular pebble placed at the bottom of the bowl over the stem hole. Perhaps the pebble was placed there to prevent the overpacking of the tobacco which could obstruct the stem hole and the drawing of the smoke. This has not been reported before, and was either a common practice at Port Royal and in England, or else explains the idiosyncratic behavior of one individual.

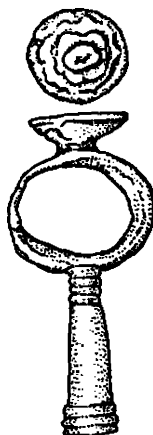


Figure 26. Brass pipe tamper recovered from Marx's excavation (Marx 1968d).

### **Gender, Age, and Smoking**

Although smoking customs and habits varied among the different social classes throughout England and the British colonies, the question of who smoked is intriguing and elusive. Early 20th-century accounts by Fairholt (1859), Penn (1901) and Apperson (1916) suggest that pipe tobacco smoking in 17th-century English society transcended age and gender boundaries. Recent authors such as Goodman (1993:62) are hesitant to define any gender and/or age differences in 17th-century smokers.

At first glance, it appears that smoking was mainly a male activity. There is much to support this notion. Seventeenth-century Dutch genre paintings depict countless scenes of men smoking in taverns, in portraits, or other scenarios. German and French prints are similar as well. At the same time, contemporary literature mostly refers to men as smokers with little mention of women and children. behavior of one individual.

Although adult male smokers pervade the literature, a few accounts document children smoking, but they are mainly health-related. The belief that tobacco smoke guarded against bad health persisted throughout the 17th century, particularly during the Plague of 1665 (Penn 1901:79-80). The most commonly cited example in this regard is the obligatory morning smoke for young boys at Eton College in London during this

time (Apperson 1916:77; Penn 1901:80). Other accounts include an observation by one Ralph Thoresby, who in 1702, witnessed his brother's sickly three-year-old boy smoking three pipes in succession at Garraway's Coffeehouse in Leeds (Apperson 1916:92). These accounts are the only few available that hint at children smoking, and currently, there appear to be no written accounts of children smoking at Port Royal.

One other explanation for children smoking, and one less comfortable with modern-day standards, is that children were simply allowed to smoke if they wished. It is also possible that poor children may have smoked to abate hunger. Artistic representations of children smoking are scarce. A domestic scene by Dutch artist Jan Steen depicts one of the few examples of children smoking during this time, where an older man is pictured holding a clay pipe that extends to a young boy's mouth (Figure 27).

In contrast, literary references to women smoking are more numerous, and mostly negative. The few positive references include the purchase of a tobacco box, pipes, and tobacco for his "honorable Ladie" in 1641-1642 by the Marquis of Hartford (Mansfield 1963:30). In another account, Sir Francis Throckmorton in 1654, presented his mother with some tobacco for her pipe, along with a new spinning wheel (1948:24, 26). An entry in the Jamaica probate inventory for Sir Thomas Lynch (V2/F93-97, 1685) mentions a gold snuff box along with a chocolate pot and matching cups for his "Ladies Owne Chamber."

In addition to these references, pipes with tiny bowls have been referred to as "ladies ladell pipes," which implies that smaller, more delicate pipes were manufactured for lady smokers. Three of these pipes were found at Port Royal in 1989 and 1990 (655-2, 824, and 826-1; bowl Type 2.11), and their bowls measure only 2.5 cm in length (Figure 28). Although it is interesting to consider that such small pipes were specifically made for women, there is no conclusive evidence to support this.

For the few positive references to women smokers, there are twice as many that are not. For instance, a Swiss proclamation issued sometime in the 1670s, laments that



Figure 27. Jan Steen's *As the Old Sing, So Pipe the Young*, 1668, Rijksmuseum, Amsterdam (Chapman et al., 1996:173).



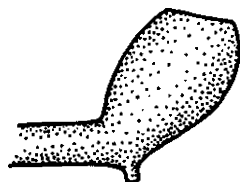


Figure 28. “Ladies Ladell pipe” recovered at Port Royal.

“servants, and even wives and daughters, used tobacco to a scandalous degree...” (Corti 1932:125). In *The London Spy*, Ned Ward complains about the unkempt woman he saw “stepping from the alehouse to her lodgings, with a parcel of pipes in one hand, and a gallon pot of guzzle in the other...” (1927:120). During his visit to New England in 1696, Ward also complained that the “Women (like the Men) are excessive smokers” (1933:10). In a similar vein, John Taylor describes the strumpets of Port Royal as walking about the streets barefoot and in their petticoats, with “a red tobacco pipe in their mouths” (1688:265).

An English libel suit in the court of the Archdeacon of Essex further perpetuates the lowly image of women as smokers. The suit involved a tavernkeeper named George Thresher and one of his frequent customers, Elizabeth Savage, who was given to “stronge drinke and tobacco” (Apperson 1916:208).

The observations of travelers provide rich fodder about women smokers. In Holland, foreign visitors were “repelled by the spectacle of women blowing smoke from between tar-blackened teeth” (Schama 1988:189). While traveling on horseback in the English countryside, Celia Fiennes noticed that in Cornwall, “both men, women and children have all their pipes of tobacco in their mouths and soe sit round the fire smoaking, which was not delightfull to me when I went down to talke with my Landlady for information of nay matter and customes amongst them” (1982:204). Frenchman M. Jorevin de Rochefort in 1671 observed an after-dinner ritual in Worcester where

they set on a the table half a dozen pipes and a paquet of tobacco for smoking, which is a general custom as well among women as men, who think that without tobacco one cannot live in England because they say it dissipates the evil humours of the brain...I have known several who, not content with smoking in the day. Went to bed with pipes in their mouths, and others who have risen in the night to light their pipes, to take tobacco with a much pleasure as they would have received in drinking either Greek or Alicant wine [Penn 1901:79].

Another French traveler named Misson in 1698, noted that “Women take it [tobacco] in abundance, particularly in the Western Counties” (Apperson 1916:210-211). In 17th-century Holland, second to England in tobacco consumption, smoking among women was more common in the countryside. Dutch physician Cornelis Bontekoe commented on the women of northern Holland and Grouwland who “puffed s like blazes and carried flint and steel and tinder-boxes about with them” (Brongers 1964:195-196).

Artistic renderings of women smoking, though rare, help convey these images. Flemish artist David Teniers’ serene setting in a country tavern, where a woman is lighting a pipe, is probably the exception (Figure 29). A less flattering scene is provided by the 17th-century Dutch artist Jacob Duck in his *The Pipe Drunk Woman*, which depicts a woman passed out from too much drink and tobacco (Figure 30).

Such scenes were based on real-life observations, and it is not beyond the realm of possibility that such scenes also occurred at Port Royal. During his visit to Port Royal in 1697, Ned Ward complained that the women there were “wicked without shame,” comporting themselves with “an impudent air...and a lewd carriage” (1933:16). That women openly smoked (and drank) in Port Royal probably reinforced Ward’s opinion that the women of Port Royal were disgraceful.

Scenes of pipesmoking involving women have been discussed by art historian and critic Simon Schama, who provides an in-depth study of the iconographic symbolism of pipesmoking in Dutch 17th-century genre painting (1988:205-215). Schama observes that clay pipes, early on, acquired overtly sexual meanings in Dutch culture. In one sense, the wonderful genre scenes of artists Jan Steen, himself an



Figure 29. David Tenier's *Woman Lighting a Pipe* (location unknown; Brongers 1964:195).



Figure 30. Jacob Druck's *The Pipe Drunk Woman*, Alta Pinakothek, Munich (Wilenski 1945: Plate 88).

innkeeper, were a kind of contemporary “soft porn” that allowed Dutch concerns with sex, drinking, and moral decrepitude to be played out in a strongly Calvinistic society.

Although moralistic in tone, many of Steen’s scenes are ribald and realistic and portray subtle, but unmistakable, sexual innuendos, such as his *Tavern Scene* in Figure 31. In this work, the visual communication between the woman and her seducer reveals their intimate association as “the wrongdoer pokes a little finger into the bowl of his pipe, reenacting by the obscene gesture the cause of her distress” (Schama 1988:205). In several of these types of paintings, women in smoking scenes or smoking themselves represent a kind of opprobrium.

### **Context and Smoking**

That so many genre scenes involving smoking occurred in taverns conveys two messages. First, drinking establishments were a key component of both Dutch and English social life, and second, such establishments were the most customary setting for smokers. The transformation of English life from the private to public sphere began in the late 1500s, but it was only in the next century that public institutions gained importance as outlets for socializing. In 1577, over 17,000 drinking establishments in 30 counties were recorded, most of which were alehouses (Clark 1983:2,14). By 1628, Londoner Richard Rawlidge complained about the proliferation of alehouses, for “every street [is] replenished with them” (Clark 1983:39). By mid-century, there were over 50,000 alehouses in England, or one for every hundred inhabitants (Reay 1985:15). Port Royal, as well could boast its fair share of assorted drinking establishments. John Taylor remarked that Port Royal had “many Taverens, and abundance of Punch Houses, or rather may be fittly called Brothel Houses” (1688:262).

The basic difference among the many drinking establishments was their clientele. Inns “belonged to the road,” and therefore provided sleeping accommodations for travelers (Burke 1930:131). Some inns were large fashionable establishments that offered wine, ale, and beer, along with elaborate meals consisting of several courses for well-heeled travelers. The high cost of drinking or staying at an inn usually deterred



Figure 31. *Tavern Scene* by Jan Steen, National Gallery, London (Schama 1988:205).

ordinary folk from the premises (Clark 1983:5,8).

Coffeehouses also became popular meetings place for smoking tobacco, and clay pipes were often sold on the premises, as shown in Figure 32. At coffeehouses, customers could gossip, have intellectual discussions, read, or relax quietly. As in England, Port Royal probably had its share of coffeehouses, as John Taylor observed in his visit to Port Royal (1688:262). The Jamaica probate inventory of Charles Booker (V3/F112-113), dated May 19, 1688, includes entries for “nine Coffe dishes; 12 Cofee Plates; 12 pounds of Coffe Berreys; [and] coffe Potts,” thus suggesting commercial use for these items, such as a coffeehouse. In addition to coffee, coffeehouses also served chocolate, tea, cider, ale, and spirits, as well as snacks (Hart 1970:94-95; Robinson and Adams 1968:463).

Perhaps of all drinking establishments, none was more central to English life at home and abroad than the tavern. In his *Micro-cosmographie*, published in 1628, John Earle (1980:33 [1628]) preferred the tavern to alehouse because it “is a degree, or... a pair of stayres above an Alehouse... it is the busie mans recreation, the idle mans businesse, the melancholy mans Sanctuary, the strangers welcome, the Innes a Court mans entertainment, the Scholers kindness, and the Citizens courtesie.”

Port Royal, like England, had its share of taverns, prompting one observer to note that “there is not now resident upon this place ten men to every house that selleth strong liquors” (Burns 1954:329). During his visit to Port Royal, Ned Ward (1933:16) noted how the people took “pleasure in drinking” to the point of shameless debauchery and offensive behavior that made Port Royal the “very Sodom of the Universe.” In fact, for so many of Port Royal’s citizens, tavern life signified their daily routine.

Although drinking was the main activity, most taverns sold pipes and tobacco, sometimes on credit, and offered meals as well. Entertainment was also available in the form of card games, dancing, and singing (Clark 1983:68, 155; Spink 1992:9-13). In Port Royal, during the heat of midday, taverns provided refuge from the hot Jamaican sun as well as providing lunch and beverages; tavern activity resumed in the early



Figure 32. *Interior of a London Coffee House*, by Anonymous, about 1695, British Museum (Maccubbin and Hamilton-Phillips 1989: xxxii).

evening when the shops closed for the day (Claypole 1972:195).

The material culture of taverns is evident in the inventories of six Port Royal tavern keepers as well as the archaeological record. Peggy Leshikar-Denton (1988:23) observed that pewter dishes, cutlery, and tankards, as well as saucers, salt cellers, porringers, and other items related to serving food, made up a significant part of these inventories.

Generally, taverns at Port Royal, like their English counterparts, had several rooms and storage areas, and often a second story. Taverns typically included the standard wooden tables and chairs, candles, serving pots, tableware, sometimes pewter, a pair of shove-halfpenny game boards, and an area stocked with wine and spirits (Davis 1966:158). Common items in the storage area or “cellar,” would include liquor, clay pipes, candles, and other provisions. A substantial array of artifacts recovered from Building 1, Room 4, match this description and complement the probate inventories.



The remains of over 60 onion bottles found in situ, many of which were corked and contained liquid, as well as a wooden table and stool found crushed under a brick wall, a Bellarmine jug, coarse red earthenware sherds, and the remains of two wooden barrels that possibly contained wine, strongly support the idea that Room 4 was a tavern with a small storage area (Hamilton 1984:21).

## **Conclusion**

As the first throw-away, mass-produced items, clay pipes reflect the changing economic and social conditions of English 17th-century life. As England forged its way into an emerging world system of colonization and trade, a relationship of dependency between England and her colonies stimulated economic growth and created a new consumer demand both at home and abroad. Part of this demand was stimulated by periods of lower prices, as demonstrated in the successful cultivation and sale of tobacco, which both helped the economies of England and its Chesapeake colonies, and made tobacco affordable for most people. The demand for tobacco and other luxuries is also seen in the potential increased earnings of middle-range wage-earners in urban areas, as demonstrated by the increasing number of retail shops where they could purchase these goods, and in the burgeoning of small, craft-oriented, industries such as pipemaking, which provided additional income for many families, both rural and urban.

Clay pipes also signify the rapid adoption of tobacco smoking as well as new customs and habits in English society. The proliferation of taverns and other establishments testifies to the popularity of public gatherings and the desire for new stimulants such as tobacco and coffee, which were often served at these places. In addition to changing tastes in recreation and diet, a new material culture accompanied smoking that reflected class distinctions. In sum, the transformation of English society both at Port Royal and in England can be traced back through the ubiquitous clay pipe, the first mass-produced item which hinted at things to come.

## CHAPTER VIII

### CONCLUSION

This study demonstrates how the Port Royal archaeological collection of kaolin clay pipes reflects the economic and social transformation of 17th-century English society. Information derived from the analysis of the pipes is complemented by documentary research from the London and Bristol Port Books, the Jamaica Probate Inventories, and other sources. From this synthesis, several points can be summarized.

Starting with a database of 21,575 pipes recovered from 1981-1990, 61 bowl types have been identified and arranged in an expandable typology, based on bowl shape and type of heel. The typology reflects the overall evolution of clay pipes over three centuries, with the greatest stylistic changes occurring between 1680 and 1710.

Information from the database also reveals 39 makers' marks, most of them attributed to Bristol pipemakers, where many of Port Royal's pipes were manufactured and exported. The most common marks of "LE," "IB," and "WE," belong to Bristol pipemakers and have strong parallels from other English colonial sites. In addition to marked pipes, the collection contains over 70 decorated pipes that show a trend toward decorative motifs at the end of the 17th century, culminating in the elaborate pipes of the 19th century.

In analyzing the pipe distribution patterns at the site, certain trends are also evident. First, heavy concentrations of predominantly new pipes were found in Buildings 1 and 3, and second, the distribution patterns for the Building 5/4 complex indicate that more pipes were found outside in the yards rather than in the buildings.

The discovery of so many new pipes in Building 1, Room 5, and Building 3, Room 2, strongly suggests that both of these areas had storage facilities that contained the current retail stock in pipes to be bought and sold in the shops and taverns of Port Royal. This accords with the documentary evidence gleaned from the Bristol Port Book entries and the Jamaica Probate inventories, which both indicate that significant

quantities of clay pipes were being shipped to Port Royal.

The second pattern clearly shows that the yard areas, particularly Yards 4A/4B, contained more pipes than the interior of Buildings 5/4. Although many English colonial sites are distinguished by South's "Brunswick Pattern" of adjacent secondary refuse disposal, which predicts that areas of refuse are often found accumulated by the entries and exits of buildings, South's model was only somewhat applicable to the distribution patterns of pipes found in the yard areas at Port Royal. Instead, the presence of pipes, together with other artifacts, confirms that the yard areas at Port Royal were used for multi-purpose activities such as food preparation, weighing and measuring items, and storage. In most cases, hearths, cisterns, and latrines were located in the yards, which often served as extended work spaces and areas of privacy in a densely packed city of almost 6,000 people and over 2,000 buildings.

Only one area, the front exterior area of Room 1, Building 1, possibly correlates with South's model; however, a sidewalk found located in front of Building 1 was probably swept regularly so that refuse did not really accumulate by the front door of this building as it has at other British-American sites.

In fact, the pipe distributions in the yard areas at Port Royal reveal more about the throw-away nature of clay pipes than about refuse disposal. Because they were plentiful and cheap, clay pipes were easily discarded and replaced, making them one of the first truly disposable commodities in a pre-industrial society.

The presence of discarded pipes mixed with newer pipes at Port Royal was also validated by the results obtained from pipe-stem formula dating, using the Binford method. For example, Yards 4A/4B, which contained discarded and unused pipes, resulted in dates of 1684.7 and 1679.3, respectively. Generally, the Binford dates corresponded well to the functions of the buildings and rooms at Port Royal. Room 5, Building 1, had a date of 1696.1, and Room 2, Building 3, had a date of 1694.2. The dates reflect the predominance of new pipes found in these rooms and the likelihood that Room 5, Building 1, was a part of a wine/pipe shop, and Room 2, Building 3, a

storage area.

A comparison of the Binford and Heighton/Deagan methods of formula dating also confirmed that the Binford method was more reliable. The Heighton/Deagan method consistently produced dates that were off by 20 years or more, whereas the Binford dates were closer to the 1692 earthquake.

Further conclusions resulting from the analysis of the Port Royal pipes also reflect trends within the broader historical context of 17th-century English economy and society. It was shown that England's chief strategy for economic growth and eventual world dominance was achieved through colonization and trade. This trade relied on a reciprocal exchange of raw materials from England's American colonies, as demonstrated in the demand for tobacco, which became popular soon after its introduction into mid-16th century England by explorers who had witnessed the Native American practice of tobacco smoking firsthand. The desire for tobacco thus spawned a tobacco economy in the Chesapeake colonies, and for a short time, in the Caribbean, that provided both England and her colonies with additional revenue.

The demand for tobacco also marked the beginning of a consumerism that was partly made possible by pre-industrial manufactures, which often supplemented family household incomes, and allowed for the purchase of new commodities. An example of this pre-industrial manufacturing is seen in the production of clay pipes, which especially thrived in the city of Bristol, where most of the Port Royal pipes were manufactured. Bristol pipemakers, such as the Evans family, produced clay pipes by the thousands, exporting them in bulk to the Atlantic and Caribbean colonies. Clay pipe shipments listed the Bristol Port Books for 1682 and 1694-1695, bear this out, particularly for Jamaica. The Port Book figures revealed that shipments of clay pipes to Jamaica for these years totaled more than all the American colonies combined!

The large amount of clay pipes recorded in these sources and recovered at Port Royal affirm the popularity of smoking at this time, signaling important social changes taking place in English customs and habits. Changes in personal dietary habits are

reflected in the demand for sugar, coffee, chocolate, and tea. These new dietary changes also point to another important social development, namely the transition from private to more public forms of socialization in such institutions as the tavern, which proliferated both at home and in the colonies. In these places, men, and possibly women, could drink and smoke freely on a daily basis. Tavern scenes in 17th-century Dutch genre paintings depicting drinking and smoking testify to the popularity of these pastimes and contexts.

Finally, the adoption of smoking into English society resulted in a new material culture that signified social status. Whereas most smokers relegated their repertoire to clay pipes, more wealthy smokers developed a penchant for expensive tobacco boxes, pipe tampers, and other accessories. Many of these items are listed in the Jamaica Probate Inventories, but are absent from the archaeological record at Port Royal, except for a brass pipe tamper that was recovered from Marx's excavations. The discovery of a pipe with a small pebble in it, however, may represent an innovative attempt to make it easier to draw smoke from the pipe.

In conclusion, the Port Royal pipes have been useful to the site analysis of the buildings and rooms as well as in relating Port Royal to a broader, historical framework. Future areas of research might include further investigation into shipments of pipes to the English colonies, utilizing the London and Bristol Port Records. Continued research in the identification and publication of makers' marks from both New and Old World sites would greatly contribute to the body of knowledge in this area. Eventually, a large, computerized, on-line database of clay pipes and their related archaeological sites would be immensely useful to historical archaeologists. An all-inclusive database would allow for typological comparisons, as well as tracing makers' marks and potential trade routes.

It has been shown in this study that the acquisition of objects gained new meaning in the practical and symbolic aspects of 17th-century life, and that clay pipes, as part of 17th-century material culture, were imbued with different meanings. For

example, as ordinary, functional objects, clay pipes were manufactured, used, and discarded in a very short period of time. Yet, clay pipes also embodied the more ephemeral moments of life in the pleasurable, and sometimes forbidden, acts of smoking and drinking. For the archaeologist, clay pipes offer clues to understanding 17th-century daily life and customs. The kaolin clay pipe collection from Port Royal, Jamaica, affords the opportunity to realize this goal and thereby provides a window into 17th-century English colonial culture and society.

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**APPENDIX A**  
**KAOLIN CLAY PIPES WITH MAKER'S MARKS RECOVERED**  
**FROM PORT ROYAL, JAMAICA, 1981-1990\***

**\*Notes: Please see the Appendix table for pipes that have 10 or more entries. .  
Maker's marks appear in alphabetical order, beginning at the top of each page.  
In the drawings, maker's marks are either on the backside of the bowl, as  
indicated by a small line, or on the heel, as indicated by the encircled mark shown  
below the heel.**

**-IA-****ARTIFACT NUMBER/PROVENIENCE:**

See the following pages.

**BOWL TYPE:** See the following pages.

**STEM DIAMETER:** See the following pages.

**PIPES RECOVERED:** See the following pages.

**PIPEMAKER:** John or James Abbott

**ATTRIBUTION:** Three "IA" marked pipes were recovered. The "IA" appears on two bowl forms; Type 1.63 ( two bowls), and Type 2.13 (one bowl). Although there are a number of "IA" marked clay pipes for the mid- to late 17th century, particularly for London and Bristol, the most likely makers are John or James Abbott of Bristol (Oswald 1960:17-18; 1975:130, 150). The Type 1.63 bowls have an "IA" cartouche located on the right-hand side of the pipe. The Type 2.13 bowl has the cartouche I/ABBO/TT located on the right-hand side of the pipe. Walker (1977:1404-1405) ascribes this mark to James Abbott, who apprenticed to John and Joan Abbot, was freed February 1676 and dead by 1718-1722. John Abbott was freed in 1651, married Joan Abbot, and was dead by 1696. The spellings for the Abbott pipemakers also include: Abbot, Abbots, Abbotts, Abott, and/or Abbett). Sources: Jackson and Price (1974:26), Oswald (1983:257), and Walker (1977:612, 1045-1048).

**PARALLELS:** Three (?) IA pipes were recovered at the Nominy Plantation site in Virginia (Mitchell 1983:20). "IA" pipes were also recovered at previous Port Royal excavations by Mayes (1972:113-114), and Marx, where the mark was found as a cartouche, on the backside of the bowl, and on the heel (1968b:13, 1968c:15, 17).

**-IA-**

**ARTIFACT NUMBER/PROVENIENCE:**

PR86 Lot 262, East of Yard 4B

PR89 Lot 783, Ship

**BOWL TYPE:** 1.63

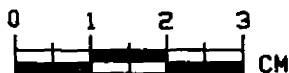
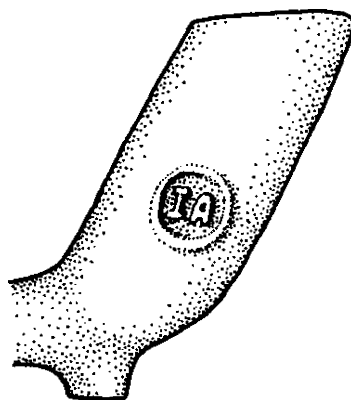
**PIPES RECOVERED:** 2

**STEM DIAMETERS:** 4/64, 5/64

**PIPEMAKER:** John or James Abbott

**ATTRIBUTION:** See previous discussion.

**PARALLELS:** See previous discussion.



-IA-

**ARTIFACT NUMBER/PROVENIENCE:**

PR90 Lot 2074-3, Ship

**BOWL TYPE:** 2.13

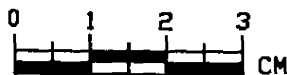
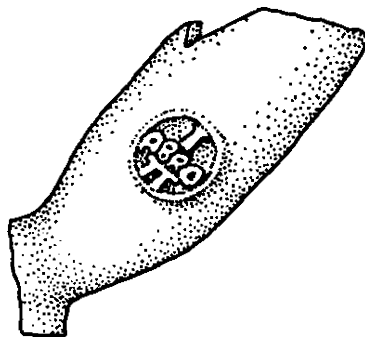
**STEM DIAMETER:** 6/64

**PIPES RECOVERED:** 1

**PIPEMAKER:** John or James Abbott

**ATTRIBUTION:** See previous discussion.

**PARALLELS:** See previous discussion.





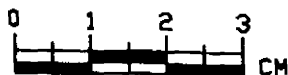
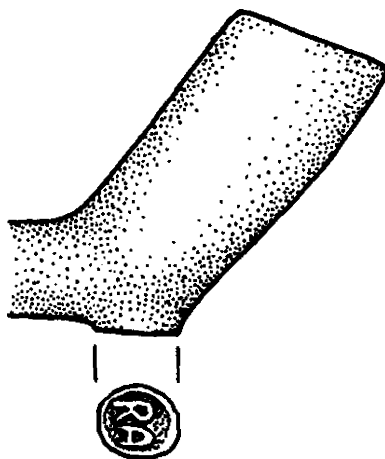
**-RA-****ARTIFACT NUMBER/PROVENIENCE:**

PR87 Lot 353-2, East of Yard 4B

**BOWL TYPE:** 1.29**STEM DIAMETER:** Unknown**PIPES RECOVERED:** 1**PIPEMAKER:** Richard Abbott

**ATTRIBUTION:** The "RA" mark was found on the bottom heel of one bowl Type 1.29. The pipemaker is possibly Richard Abbott of Bristol, who was freed in 1689/1690 after marrying the daughter of Richard Nunney or Nooney, another Bristol pipemaker. Richard Abbott's mark is similar in style to the "RN" mark attributed to Richard Nunney. Abbott was last mentioned in the St. James' Parish roll for 1715. Sources: Jackson and Price (1974:27) and Walker (1977:1045, 1468-1469).

**PARALLELS:** One "RA" pipe was recovered at the Nominy Plantation site in Virginia (Mitchell 1983:20). An "RA" pipe was also recovered by Marx. The mark was found on the heel (1968c:17).



**-EB-****ARTIFACT NUMBER/PROVENIENCE:**

See the following pages.

**BOWL TYPE:** See the following pages.

**STEM DIAMETER:** See the following pages.

**PIPES RECOVERED:** See the following pages.

**PIPEMAKER:** Edward Battle and/or Edward Bird

**ATTRIBUTION:** Fourteen "EB" pipes were recovered with the initials found impressed into the heel of the pipe in either a plain ring or a borderless stamp. Of the five bowl types, there are two Type 1.13 pipes, two are Type 1.12, one is Type 2.13, one is Type 1.11, and five are Type 1.42. Two "EB" pipes recovered in 1981 (66-25, 66-248), and 1984 (813) respectively, were unidentifiable fragments. The "EB" pipes possibly belong to two makers, Edward Battle or Edward Bird. Edward Battle was the son of Robert Battle, and apprenticed to Philip and Sarah Edwards. He was freed in 1660, and with his wife Abigaille, apprenticed John Webb in 1669. The other possible maker is Edward Bird, an English pipemaker working in Amsterdam from 1630-1665. Bird died in 1665, but his son Evert continued the business. Given that 399 "EB" pipes, ascribed to Edward Bird, were found on the Monte Cristi shipwreck off the Dominican Republic by Hall (1996:128), it appears that most of the "EB" pipes from Port Royal are markedly different in shape, being less bulbous than the "EB" pipes from Monte Christi, although there are a few exceptions. The majority of "EB" pipes at Port Royal are probably Edward Battle pipes, and a few are possibly those of Edward Bird. Sources: Hall (1996:126-134), Jackson and Price (1974:28), and Walker (1977:606, 1060, 1406-1407).

**PARALLELS:** "EB" pipes ascribed to Edward Bird have been found on many sites, including Fort Orange, New York; Fort Corchaung, Long Island; Jamestown, Virginia and Dutch sites in Brazil (see Hall 1996:126-134). "EB" pipes were also recovered by Marx. The mark was found on the backside of the bowl (1968b:15, 1968c:19).

**-EB-**

**ARTIFACT NUMBER/PROVENIENCE:**

PR81 Lot 56-32

PR85 Lot 1075-1, Building 3, Room 1

**BOWL TYPE:** 1.11

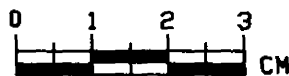
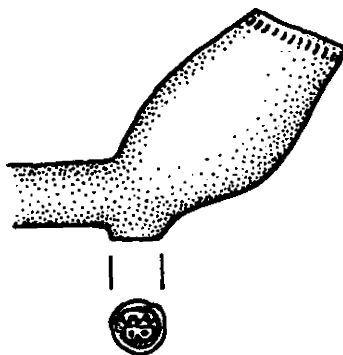
**STEM DIAMETERS:** Both are 7/64.

**PIPES RECOVERED:** 2

**PIPEMAKER:** Edward Battle and/or Edward Bird

**ATTRIBUTION:** See previous discussion.

**PARALLELS:** See previous discussion.



**-EB-**

**ARTIFACT NUMBER/PROVENIENCE:**

PR85 Lot 1023-3, Building 3, Room 1

PR89 Lot 653-2, Building 5, Room 1

**BOWL TYPE:** 1.12

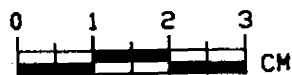
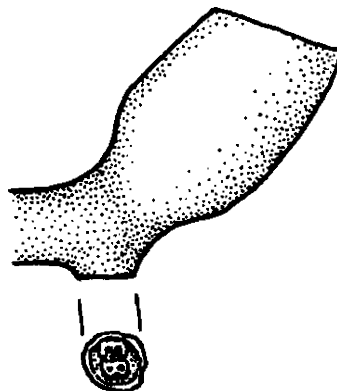
**PIPES RECOVERED:** 2

**STEM DIAMETERS:** 6/64, one unknown

**PIPEMAKER:** Edward Battle and/or Edward Bird

**ATTRIBUTION:** See previous discussion.

**PARALLELS:** See previous discussion.



**-EB-**

**ARTIFACT NUMBER/PROVENIENCE:**

PR81 Lot 66-243

PR86 Lot 1135-4, Building 3, Room 3

**BOWL TYPE:** 1.13

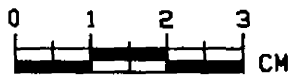
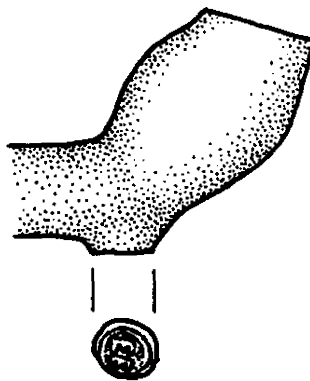
**STEM DIAMETERS:** Both are  $7/64$ .

**PIPES RECOVERED:** 2

**PIPEMAKER:** Edward Battle and/or Edward Bird

**ATTRIBUTION:** See previous discussion.

**PARALLELS:** See previous discussion.



**-EB-**

**ARTIFACT NUMBER/PROVENIENCE:**

PR83 Lot 328, Building 1, Room 2  
PR85 Lot 1025-5, Building 3, Room 1  
PR85 Lot 1064-4, Building 3, Room 1  
PR85 Lot 1073-3, Building 3, Room 1  
PR86 Lot 1055-3, Building 3, Room 4

**BOWL TYPE:** 1.42

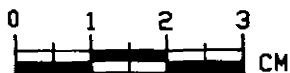
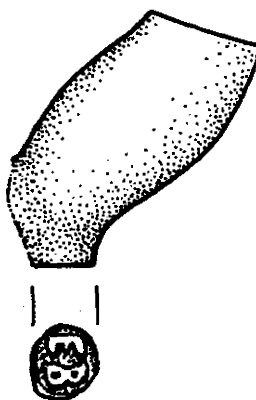
**STEM DIAMETERS:** 7/64 (4 pipes), 6/64 (1 pipe).

**PIPES RECOVERED:** 5

**PIPEMAKER:** Edward Battle and/or Edward Bird

**ATTRIBUTION:** See previous discussion.

**PARALLELS:** See previous discussion.



**-IB-****ARTIFACT NUMBER/PROVENIENCE:**

See the following pages.

**BOWL TYPE:** See the following pages.

**STEM DIAMETER:** See the following pages.

**PIPES RECOVERED:** See the following pages.

**PIPEMAKER:** Unknown

**ATTRIBUTION:** Thirty pipes were found with the mark "IB," that can be divided into six bowl types: one Type 1.27, two Type 1.73 pipes, seven Type 1.74, two Type 1.77 pipes, 15 Type 1.91 pipes, and three Type 2.12 pipes. The "IB" marked pipes discovered at Port Royal are not easily ascribed to any particular maker. For both London and Bristol pipemakers of the mid- to late 17th century, there are numerous possibilities. Bristol pipemakers include John Bladen I, who was freed in 1657 and worked until 1689; John Bladen II, son of John Bladen I, who was freed in 1685; James Bladen, also a son of John Bladen I, freed in 1683; James Bull II, apprenticed to Edward Randall I in 1680 and was freed in 1690; and Joseph Butt, also apprenticed to Edward Randall in 1670 and was freed in 1704. Sources: Jackson and Price (1974:29-30) and Walker (1977:1066-1067).

**PARALLELS:** An "IB" pipe bowl with a crown-like shape was found at Martin's Hundred, Virginia; however no identification was given (Noël-Hume 1979:20-21). "IB" pipes were also recovered during previous excavations at Port Royal by Mayes (1972:113) and Marx, where the mark was found as a cartouche and on the backside of the bowl (1968b:15, 1968c:19, 21).

**-IB-**

**ARTIFACT NUMBER/PROVENIENCE:**

PR86 Lot 132, XU-3

**BOWL TYPE:** 1.27

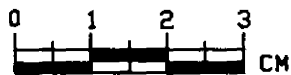
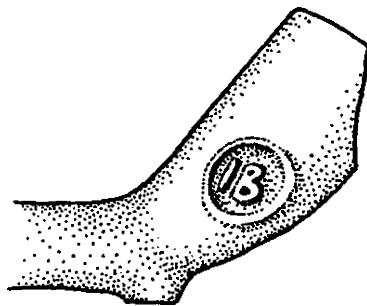
**STEM DIAMETER:** 5/64

**PIPES RECOVERED:** 1

**PIPEMAKER:** Unknown

**ATTRIBUTION:** See previous page.

**PARALLELS:** See previous page.





**-IB-**

**ARTIFACT NUMBER/PROVENIENCE:**

PR85 Lot 500, Building 1, Room 5

PR85 Lot 1067-2, Building 3, Room 2

**BOWL TYPE:** 1.73

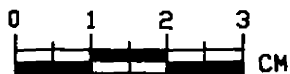
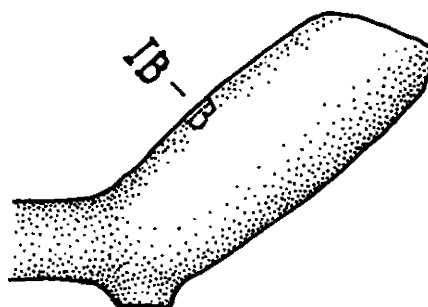
**STEM DIAMETERS:** 7/64, 6/64

**PIPES RECOVERED:** 2

**PIPEMAKER:** Unknown

**ATTRIBUTION:** See previous discussion.

**PARALLELS:** See previous discussion.



- IB -

**ARTIFACT NUMBER/PROVENIENCE:**

PR83 Lot 500, Building 1, Room 5  
PR85 Lot 1066-2, Building 3, Room 1  
PR85 Lot 1068-2, Building 3, Room 2  
PR85 Lot 1078, Building 2, Room 2  
PR85 Lot 1083, Building 3, Room 2  
PR85 Lot 1084-1, Building 3, Room 2  
PR86 Lot 165, XU-3

**BOWL TYPE:** 1.74

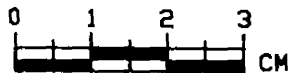
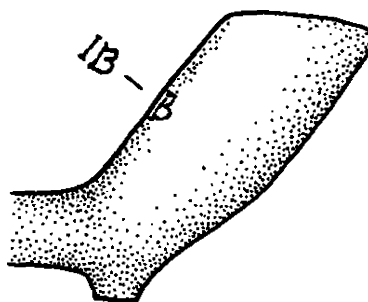
**STEM DIAMETERS:** 7/64 (3 pipes), 6/64 (4 pipes)

**PIPES RECOVERED:** 7

**PIPEMAKER:** Unknown

**ATTRIBUTION:** See previous discussion.

**PARALLELS:** See previous discussion.



**-IB-**

**ARTIFACT NUMBER/PROVENIENCE:**

PR85 Lot 1086-2, Building 3, Room 2

PR85 Lot 1084-1, Building 3, Room 2

**BOWL TYPE:** 1.77

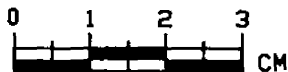
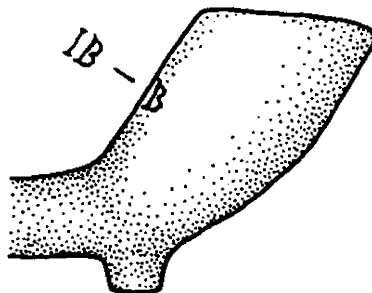
**STEM DIAMETERS:** 7/64, 6/64

**PIPES RECOVERED:** 2

**PIPEMAKER:** Unknown

**ATTRIBUTION:** See previous discussion.

**PARALLELS:** See previous discussion.



**-IB-**

**ARTIFACT NUMBER/PROVENIENCE:**

Please see the Appendix Table for over 10 entries.

**BOWL TYPE:** 1.91

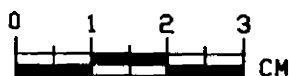
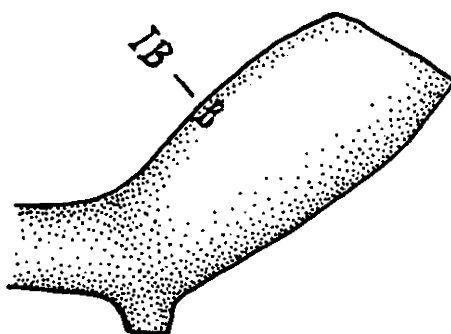
**STEM DIAMETERS:** See Table.

**PIPES RECOVERED:** 15

**PIPEMAKER:** Unknown

**ATTRIBUTION:** See previous discussion.

**PARALLELS:** See previous discussion.



- IB -

**ARTIFACT NUMBER/PROVENIENCE:**

PR85 Lot 1084-1, Building 3, Room 2

PR85 Lot 1084-1, Building 3, Room 2

PR85 Lot 1085-1, Building 3, Room 2

**BOWL TYPE:** 2.12

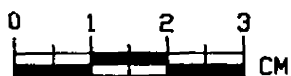
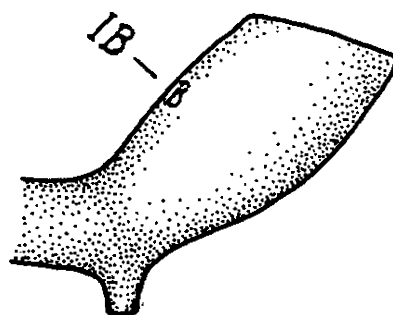
**STEM DIAMETERS:** 6/64 (2 pipes), 8/64

**PIPES RECOVERED:** 3

**PIPEMAKER:** Unknown

**ATTRIBUTION:** See previous discussion.

**PARALLELS:** See previous discussion.



- LB -

**ARTIFACT NUMBER/PROVENIENCE:**

PR85 Lot 1084-2, Building 3, Room 2

**BOWL TYPE:** 1.74

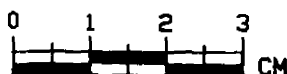
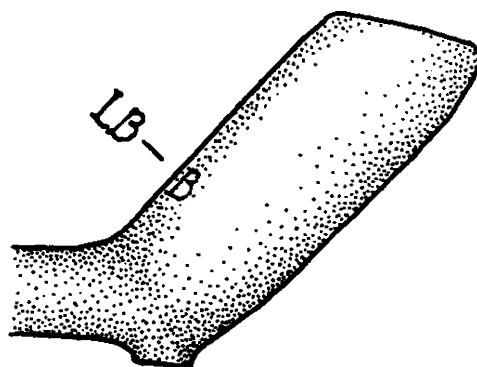
**STEM DIAMETER:** 6/64

**PIPES RECOVERED:** 1

**PIPEMAKER:** Lawrence Bull

**ATTRIBUTION:** Three pipes marked "LB" were recovered. These pipes are believed to be the products of Lawrence Bull, a Bristol pipemaker who was freed in 1675 following his apprenticeship to James Bull I of Bristol. Sources: Jackson and Price (1974:31), Oswald (1975:151), and Walker (1977:1083).

**PARALLELS:** An "LB" pipe was also recovered by Marx. The mark was found on the backside of the bowl, as in the pipe shown below (1968c:21).



- LB -

**ARTIFACT NUMBER/PROVENIENCE:**

PR85 Lot 1068-1, Building 3, Room 2

**BOWL TYPE:** 2.12

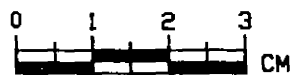
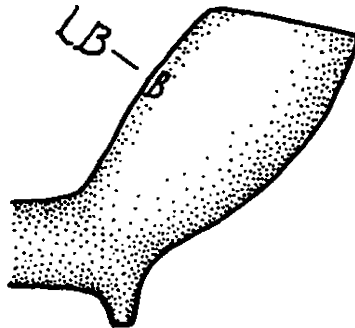
**STEM DIAMETER:** Unknown

**PIPES RECOVERED:** 1

**PIPEMAKER:** Lawrence Bull

**ATTRIBUTION:** See previous discussion.

**PARALLELS:** See previous discussion.



- LB -

**ARTIFACT NUMBER/PROVENIENCE:**

PR83 Lot 303-1, Building 2

**BOWL TYPE:** 2.22

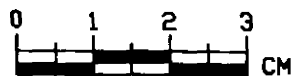
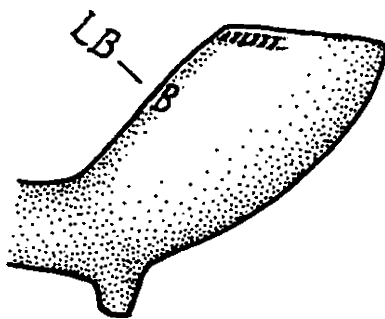
**STEM DIAMETER:** 6/64

**PIPES RECOVERED:** 1

**PIPEMAKER:** Lawrence Bull

**ATTRIBUTION:** See previous discussion.

**PARALLELS:** See previous discussion.



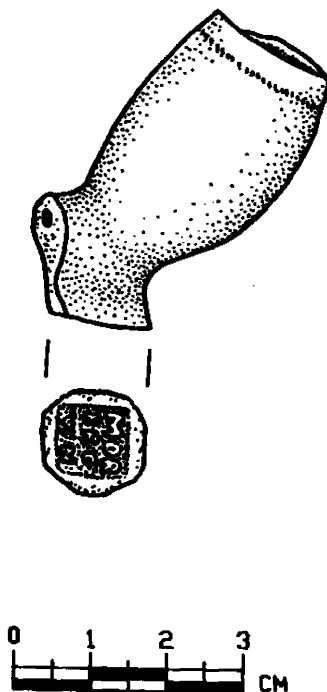


**-MOR/BRO/WN-****ARTIFACT NUMBER/PROVENIENCE:**

PR83 Lot 522-3, Building 1, Room 5

**BOWL TYPE:** 1.16**STEM DIAMETER:** 6/64**PIPES RECOVERED:** 1**PIPEMAKER:** Michael Brown (?)

**ATTRIBUTION:** One pipe bearing the mark "MOR/BRO/WN", bowl Type 1.16, was recovered in 1983. The bowl is wide and elongated, and has a thick stem and a very large round heel. This style along with maker's mark located on the heel in a square is typical for Broseley-made pipes. The mark is similar to that of pipemaker Michael Brown (1681), although his mark reads MICH/BRO/WNE. Presently, the attribution is unknown, but the pipe was probably made in Broseley. Sources: Atkinson (1975:25-27, 49) and Oswald (1975:51, 5a).

**PARALLELS:** Unknown

**-RC-**

**ARTIFACT NUMBER/PROVENIENCE:**

PR83 Lot 312-41, Building 1, Room 2

**BOWL TYPE:** 1.63

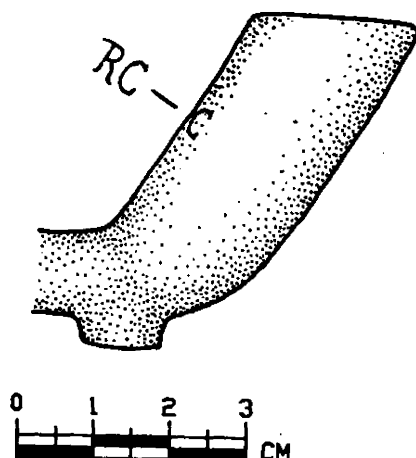
**STEM DIAMETER:** 5/64

**PIPES RECOVERED:** 1

**PIPEMAKER:** Unknown

**ATTRIBUTION:** Two "RC" pipes were recovered, one bowl Type 1.63, the other unidentifiable. Although the pipemaker remains unknown, the "RC" possibly belongs to either Robert Cross or Richard Carter I, both of Bristol. Robert Cross apprenticed to Thomas and Joan Watts, beginning in 1697. Richard Carter I apprenticed in 1699 to James and Jane Abbott and was freed in 1706, working until about 1729. Another possibility is Richard Cherrington, who was freed in 1704 and last recorded in the Temple Parish roll for 1722. Sources: Jackson and Price (1974:36), Oswald (1975:151), and Walker (1977:1094, 1099, 1110).

**PARALLELS:** Other "RC" pipes have been recovered at Martin's Hundred, and Jamestown, Virginia, although they are marked on the heel and date to the 1640s-1660s (Cotter 1994: 148; Noël-Hume 1979:9-10, 20-21). Three other "RC" pipes were recovered from North American sites, however, they all include the initials "PW" on the bottom, which suggests a joint partnership. One "RC/PW" pipe was recovered from a site in upstate New York dating between 1690-1755. Another was found at the Primes Hill Oneida site, which dates from 1696-1720 (McCashion 1979:146-147), and the third pipe was found at Harmony Hall, Maryland (Potter and Sonderman 1991:30-31). "RC" pipes were also recovered at Port Royal by Mayes (1972:113) and Marx, where the mark was found on the backside of the bowl (1968b:17, 1968c:25, 27).



-TC-

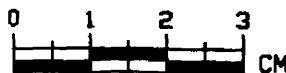
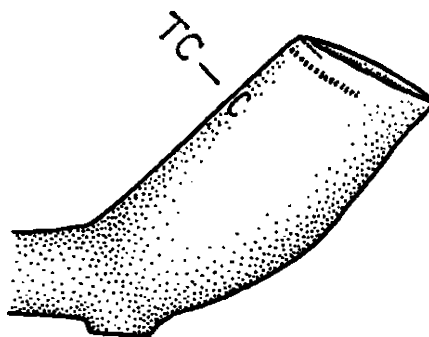
**ARTIFACT NUMBER/PROVENIENCE:**

PR87 Lot 442, Yard 4B

**BOWL TYPE:** 1.24**STEM DIAMETER:** 5/64**PIPES RECOVERED:** 1**PIPEMAKER:** Unknown

**ATTRIBUTION:** One pipe marked "TC" on the backside of the bowl, Type 1.24, was found during the 1987 field season. Although there are numerous possibilities, two Bristol pipemakers, Thomas Cogswell and Thomas Collins were active during the period for the stem diameter date range of 1710-1750 (5/64). Cogswell apprenticed to Devereaux and Rebecca Jones in 1713. Collins apprenticed to Edward and Mary Reed and was freed by 1722. Another possibility is Thomas Cooke of Hull, who apprenticed to Robert Chapman in 1671, and was probably freed in 1679. Sources: Jackson and Price (1974:37), Oswald (1975:152), Sheppard (1912:11, 21), and Walker (1977:1102-1104).

**PARALLELS:** A "TC" pipe was recovered at the St. John's Site in St. Mary's City, Maryland, which dates from 1638 to 1720 (Hurry and Keeler 1991:37, 55, 69). The St. John's pipe was not identified. A "TC" pipe was also recovered by Marx. The mark was found on the heel (1968c:27).



**-TD-**

**ARTIFACT NUMBER/PROVENIENCE:**

PR81 Lot 62-47

**BOWL TYPE:** 2.24

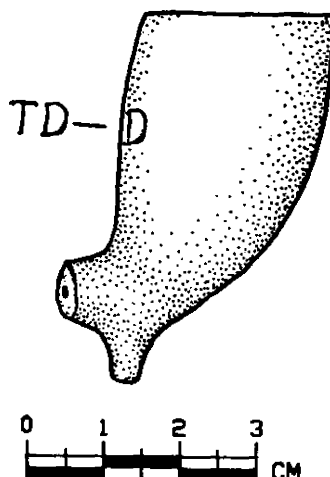
**STEM DIAMETER:** 5/64

**PIPES RECOVERED:** 1

**PIPEMAKER:** Unknown

**ATTRIBUTION:** Two "TD" marked pipes were recovered in 1981 and 1987, both bowl Type 2.24. The original maker of "TD" marked pipes is unknown, although Thomas Dormer, a wealthy London merchant, was the only pipemaker recorded with these initials from London. Dormer pipes date from 1748-1770, and because they were known for their fine craftsmanship and widely exported, they were often copied. "TD" pipes were also manufactured by the leading Glasgow firms in the 19th century, as well as in France, the Netherlands, Germany, Japan, and North America. For these reasons, it is difficult to attribute "TD" marked pipes to any one pipemaker. A small pipe stem fragment (312-24) (4/64) was recovered in 1983, and may have once been part of another "TD" pipe from the site. Sources: Alexander (1983:197-205), Sudbury (1980:34), and Walker (1966:86-102; 1983:12-19, 86-87).

**PARALLELS:** "TD" pipes were found at Jamestown, Virginia (Cotter 1994:214), and at Drax Hall near St. Ann's Bay, Jamaica (Armstrong 1990:205). "TD" pipes also have been found on a number of North American sites. "TD" pipes were recovered at Port Royal by Mayes (1972:112, 114), Priddy (Brown 1996:259), and Marx. The pipes were marked on the backside of the bowl and the heel (1968b:17, 19, 1968c:77).



**-TD-**

**ARTIFACT NUMBER/PROVENIENCE:**

PR87 Lot 331, Building 2

**BOWL TYPE:** 2.24

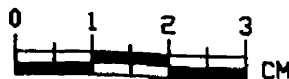
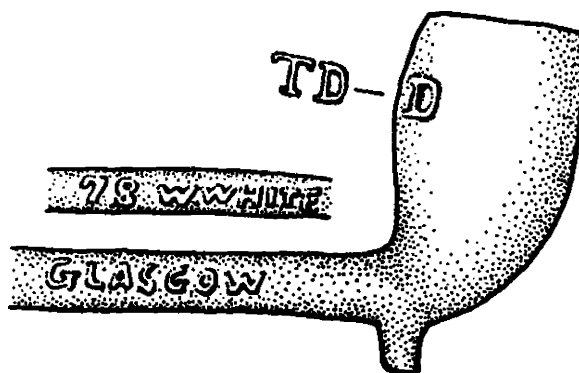
**STEM DIAMETER:** 4/64

**PIPES RECOVERED:** 1

**PIPEMAKER:** Unknown

**ATTRIBUTION:** The stem designation of "Glasgow" indicates that this pipe was probably manufactured in the early 19th century when Glasgow's pipe industry was flourishing.

**PARALLELS:** See previous discussion.



**-EDWARDS-****ARTIFACT NUMBER/PROVENIENCE:**

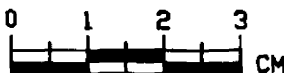
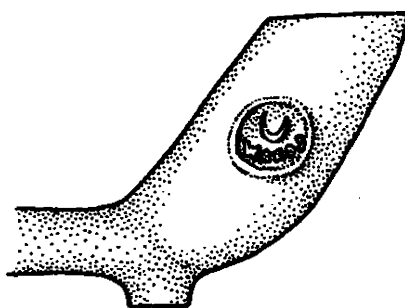
PR83 Lot 308-2, Building 1, Room 2

PR89 Lot 308-2, Building 5, Room 3

**BOWL TYPE:** 1.61, one unknown**STEM DIAMETER:** 7/64, one unknown**PIPES RECOVERED:** 2**PIPEMAKER:** Henry Edwards

**ATTRIBUTION:** Two pipes were recovered depicting the name Edwards in cartouche form on the right-hand side of the bowl. Although the cartouche is worn on bowl Type 1.61, the "WARDS" is visible on the bottom of the cartouche, along with what appears to be a shield. The other (bowl type unknown) is a bowl fragment depicting "H/EDWA/RDS" enclosed in the cartouche. Walker (1977:1418-1419) attributes these marks to Henry Edwards, who apprenticed to Richard and Mary Foot in 1689 and was freed in 1699. He was active until at least 1731. Sources: Jackson and Price (1974:41) and Walker (1977:1122).

**PARALLELS:** "EDWARDS" pipes in cartouche form were also recovered at Port Royal by Mayes (1972:114) and Marx (1968b:25, 27, 1968c:37, 39).



-IE-

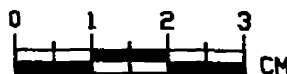
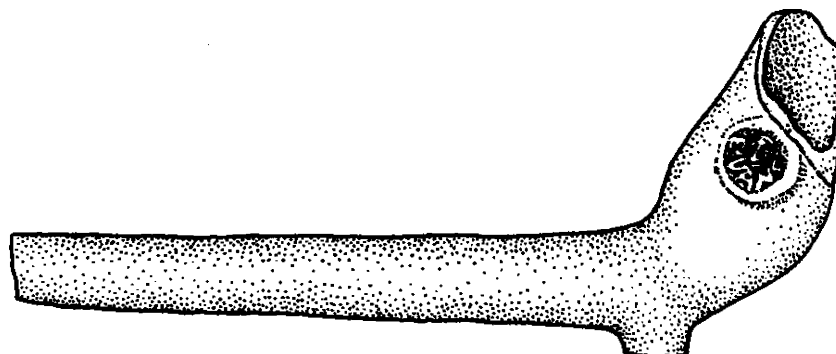
**ARTIFACT NUMBER/PROVENIENCE:**

PR90 Lot 1054-1, Ship

**BOWL TYPE:** 1.53**STEM DIAMETER:** 5/64**PIPES RECOVERED:** 1**PIPEMAKER:** Isaac Evans

**ATTRIBUTION:** Ten pipes were found bearing the name "EVANS or "IE" on them. The bowl types include the following: Type 1.53 (1 pipe), Type 1.62 (1 pipe), Type 1.63 (4 pipes), Type 1.74 (2 pipes), and Type 2.23 (1 pipe). A stem bearing the "IE" stamp was recovered in 1989 (654-2). In most cases, "IE" pipes are the product of Isaac Evans, who apprenticed under his father William Evans in 1696. It is believed that he formed a partnership with Robert Tippett from ca. 1698-1713. Evans is listed as the Master of the Pipe Makers Company for 1710. The "IE" mark is incised on the back of the bowl, whereas the "EVANS" is found as a cartouche on the right side of the bowl and also appears on the stem. Sources: Alexander (1983:208), Jackson and Price (1974:41, 95), Oswald (1975:152) and Walker (1977:610, 1130-1131, 1426-1427).

**PARALLELS:** An "IE" pipe with the anchor cartouche was found during the excavation of Augustine Heerman's Warehouse in New York (Dallal 1985: Plate VII-17, 19). "IE" pipes were also recovered at Port Royal by Mayes (1972:112-113, 116), where they appear on the backside of the bowl without a cartouche, and by Marx, where the mark was found as a cartouche, on the backside of the bowl, and on the stem (1968b:19, 21, 27, 29, 31, 1968c:31, 33, 39, 41, 107).



**-IE-**

**ARTIFACT NUMBER/PROVENIENCE:**

PR90 Lot 886-4, Hearth 7

**BOWL TYPE:** 1.62

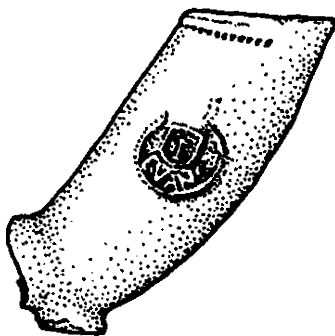
**STEM DIAMETER:** 5/64

**PIPES RECOVERED:** 1

**PIPEMAKER:** Isaac Evans

**ATTRIBUTION:** See previous discussion.

**PARALLELS:** See previous discussion.





**-IE-**

**ARTIFACT NUMBER/PROVENIENCE:**

PR84 Lot 617, Building 1, Room 6

PR87 Lot 325-1, Building 2

PR87 Lot 435-1, Yard 4B

PR87 Lot 556-2, North Building 5

**BOWL TYPE:** 1.63

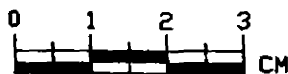
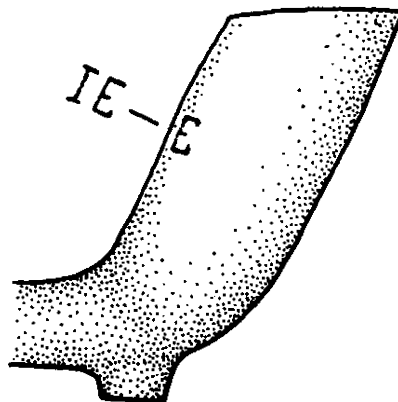
**STEM DIAMETERS:** All are 5/64.

**PIPES RECOVERED:** 4

**PIPEMAKER:** Isaac Evans

**ATTRIBUTION:** See previous discussion.

**PARALLELS:** See previous discussion.



**-IE-**

**ARTIFACT NUMBER/PROVENIENCE:**

PR85 Lot 1093-3, Building 3, Room 2

PR90 Lot 887-4, Hearth 7

**BOWL TYPE:** 1.74

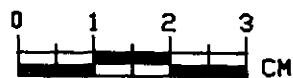
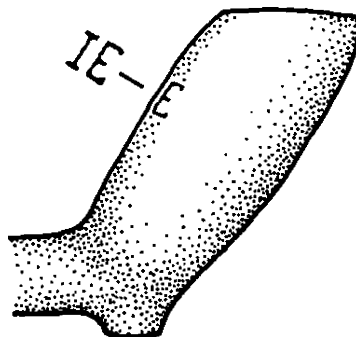
**STEM DIAMETERS:** Both are 6/64.

**PIPES RECOVERED:** 2

**PIPEMAKER:** Isaac Evans

**ATTRIBUTION:** See previous discussion.

**PARALLELS:** See previous discussion.



**-IE-**

**ARTIFACT NUMBER/PROVENIENCE:**

PR90 Lot 2074-16, Ship

**BOWL TYPE:** 2.23

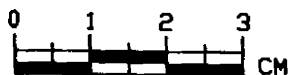
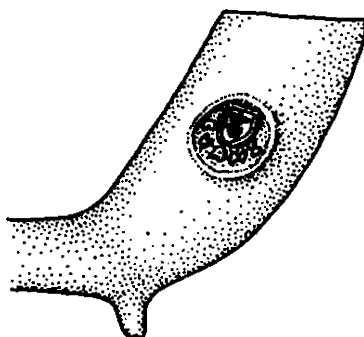
**STEM DIAMETER:** 5/64

**PIPES RECOVERED:** 1

**PIPEMAKER:** Isaac Evans

**ATTRIBUTION:** See previous discussion.

**PARALLELS:** See previous discussion.



-IE-

**ARTIFACT NUMBER/PROVENIENCE:**

PR89 Lot 654-2, Building 5, Room 1

**BOWL TYPE:** Stem

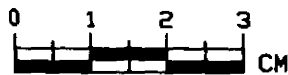
**STEM DIAMETER:** 7/64

**PIPES RECOVERED:** 1

**PIPEMAKER:** Isaac Evans

**ATTRIBUTION:** See previous discussion.

**PARALLELS:** See previous discussion.



**-IE & SON-****ARTIFACT NUMBER/PROVENIENCE:**

PR85 No provenience

**BOWL TYPE:** 4.15**STEM DIAMETER:** Unknown**PIPES RECOVERED:** 1**PIPEMAKER:** Unknown

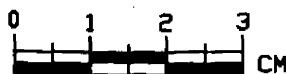
**ATTRIBUTION:** According to the Noël-Hume typology, this ornate pipe bowl style pipe dates between 1790 and 1820. Although this could be a product of the Evans family, given the date range for his pipes, it is not likely. A similar "IE" mark is attributed to Bristol pipemaker Joseph Edwards, who was active from 1774 to 1823 (Oswald 1985:13, 14).

**PARALLELS:** Unknown.

Side



Front



**-LE-****ARTIFACT NUMBER/PROVENIENCE:**

See the following pages.

**BOWL TYPE:** See the following pages.

**STEM DIAMETER:** See the following pages.

**PIPES RECOVERED:** See the following pages.

**PIPEMAKER:** Llewellyn Evans

**ATTRIBUTION:** One hundred forty-one "LE" marked pipes have been recovered, making this the most common maker's mark found at Port Royal. Of the 141 pipes, 15 are fragments, six are stems, and the remaining pipes are composed of 15 bowl types with the following quantities: Type 1.23 (9), Type 1.24 (1), Type 1.44 (2), Type 1.53 (1), Type 1.61 (1), Type 1.73 (47), Type 1.74 (30), Type 1.77 (6), Type 1.91 (4), Type 2.12 (3), Type 2.14 (1), Type 2.21 (2), Type 2.22 (10), Type 3.12 (2), and Type 4.12 (1). The "LE" pipes are attributed to Llewellyn (or Luellen or Lluellin) Evans, a Bristol pipemaker who apprenticed to James Fox, and worked between 1661 and 1684 and died by 1688/1689. He was probably the brother of one of the William Evans.' After his death, his wife Elizabeth took over the business, apprenticing two journeymen between 1688/89 and 1690. The "LE" is found incised on the backside of the bowl, except for the six stems that were recovered. Sources: Jackson and Price (1974:42), Oswald (1975:152), and Walker (1977:602, 607, 657-658, 1132, 1428-1431).

**PARALLELS:** Evans exported his pipes to the English colonies, therefore his pipes have been recovered at New Brunswick, Canada, and colonial sites all along the eastern seaboard. An "LE" pipe was also found in the Port Royal New Street excavations (Brown 1996:259). "LE" pipes were also recovered at Port Royal by Mayes (1972:115-116), and Marx, where the marks were found on the backside of the bowl and on the stem (1968b:21, 23, 67, 1968c:33, 35, 105, 107).

**-LE-**

**ARTIFACT NUMBER/PROVENIENCE:**

PR87 Lot 403-2, Yard 4B (9 pipes)

**BOWL TYPE:** 1.23

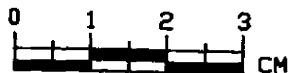
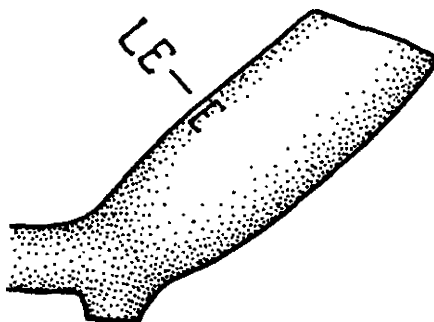
**STEM DIAMETERS:** All are 6/64.

**PIPES RECOVERED:** 9

**PIPEMAKER:** Llewellyn Evans

**ATTRIBUTION:** See previous discussion.

**PARALLELS:** See previous discussion.



**-LE-**

**ARTIFACT NUMBER/PROVENIENCE:**

PR90 Lot 467-4, Yard 4A

**BOWL TYPE:** 1.24

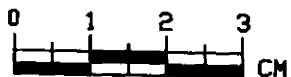
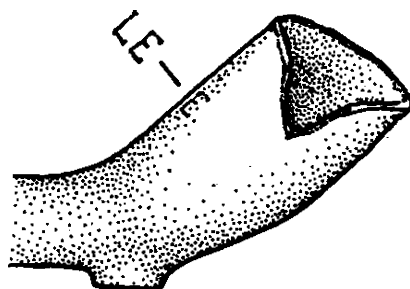
**STEM DIAMETER:** 6/64

**PIPES RECOVERED:** 1

**PIPEMAKER:** Llewellyn Evans

**ATTRIBUTION:** See previous discussion.

**PARALLELS:** See previous discussion.





-LE-

**ARTIFACT NUMBER/PROVENIENCE:**

PR90 Lot 465-3, Yard 4A

PR90 Lot 961-2, Yard 6, Cistern

**STEM DIAMETERS:** 8/64, 1 unknown

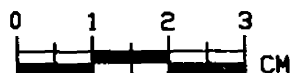
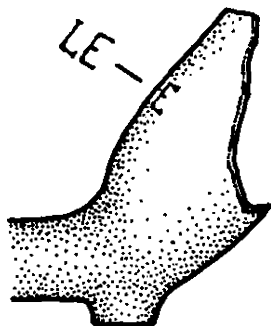
**BOWL TYPE:** 1.44

**PIPES RECOVERED:** 2

**PIPEMAKER:** Llewelin Evans

**ATTRIBUTION:** See previous discussion.

**PARALLELS:** See previous discussion.



**-LE-**

**ARTIFACT NUMBER/PROVENIENCE:**

PR90 Lot 464-4, Yard 4A

**BOWL TYPE:** 1.53

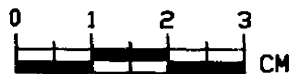
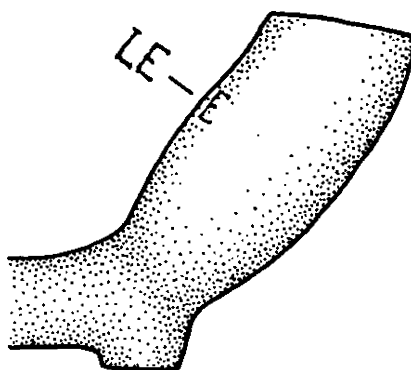
**STEM DIAMETER:** Unknown

**PIPES RECOVERED:** 1

**PIPEMAKER:** Llewelin Evans

**ATTRIBUTION:** See previous discussion.

**PARALLELS:** See previous discussion.



-LE-

**ARTIFACT NUMBER/PROVENIENCE:**

PR90 Lot 467-4, Yard 4A

**BOWL TYPE:** 1.61

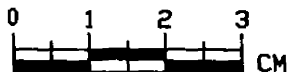
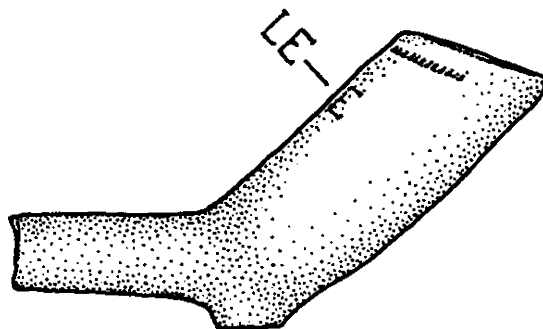
**STEM DIAMETER:** 7/64

**PIPES RECOVERED:** 1

**PIPEMAKER:** Llewellyn Evans

**ATTRIBUTION:** See previous discussion.

**PARALLELS:** See previous discussion.



**-LE-**

**ARTIFACT NUMBER/PROVENIENCE:**

Please see Appendix Table for a complete listing.

**BOWL TYPE:** 1.73

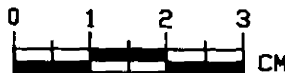
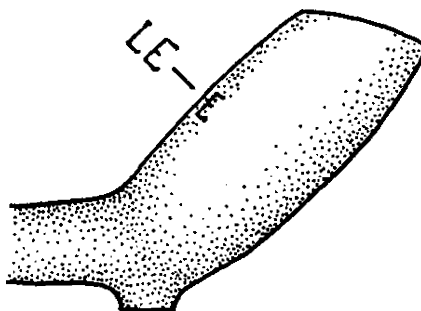
**STEM DIAMETERS:** Please see Table.

**PIPES RECOVERED:** 47

**PIPEMAKER:** Llewelin Evans

**ATTRIBUTION:** See previous discussion.

**PARALLELS:** See previous discussion.



**-LE-**

**ARTIFACT NUMBER/PROVENIENCE:**

Please see Appendix Table for a complete listing.

**BOWL TYPE:** 1.74

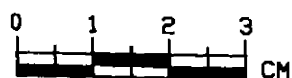
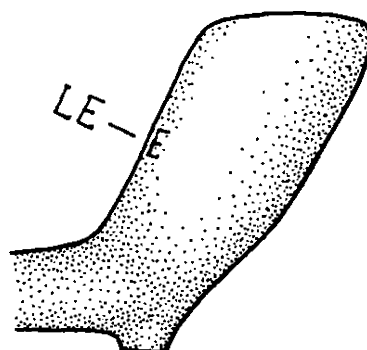
**STEM DIAMETERS:** Please see Table.

**PIPES RECOVERED:** 30

**PIPEMAKER:** Llewelin Evans

**ATTRIBUTION:** See previous discussion.

**PARALLELS:** See previous discussion.



**-LE-**

**ARTIFACT NUMBER/PROVENIENCE:**

PR83 Lot 308-42, Building 1, Room 2  
PR83 Lot 500, Building 1, Room 5  
PR83 Lot 522-4, Building 1, Room 5  
PR83 Lot 531-4, Building 1, Room 5  
PR83 Lot 547-1, Building 1, Room 5  
PR87 Lot 403-1, Yard 4A

**BOWL TYPE:** 1.77

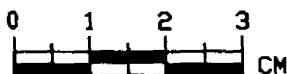
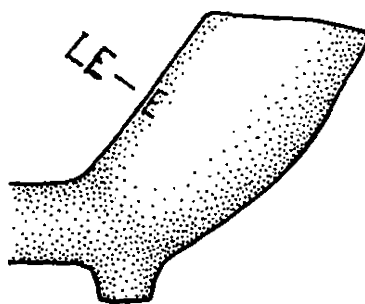
**STEM DIAMETERS:** 6/64 (3 pipes), 7/64 (3 pipes)

**PIPES RECOVERED:** 6

**PIPEMAKER:** Llewelin Evans

**ATTRIBUTION:** See previous discussion.

**PARALLELS:** See previous discussion.



-LE-

**ARTIFACT NUMBER/PROVENIENCE:**

PR83 Lot 500, Building 1, Room 5 (2 pipes)

PR87 Lot 354-3, Hearth 4B (2 pipes)

**BOWL TYPE:** 1.91

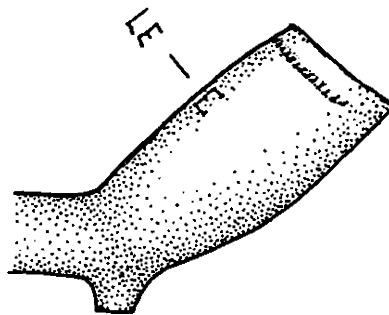
**STEM DIAMETERS:** 6/64 (2 pipes; 2 unknown)

**PIPES RECOVERED:** 4

**PIPEMAKER:** Llewelin Evans

**ATTRIBUTION:** See previous discussion.

**PARALLELS:** See previous discussion.



**-LE-**

**ARTIFACT NUMBER/PROVENIENCE:**

PR83 Lot 522-1, Building 1, Room 5

PR85 Lot 1077-3, Building 3, Room 2

PR86 Lot 1135-3, Building 3, Room 3

**BOWL TYPE:** 2.12

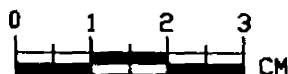
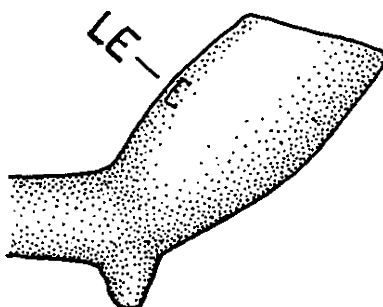
**STEM DIAMETERS:** 6/64, 7/64, 8/64

**PIPES RECOVERED:** 3

**PIPEMAKER:** Llewelin Evans

**ATTRIBUTION:** See previous discussion.

**PARALLELS:** See previous discussion.





**-LE-**

**ARTIFACT NUMBER/PROVENIENCE:**

PR90 Lot 865-3, Yard 4A

**BOWL TYPE:** 2.14

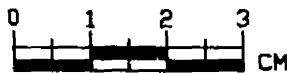
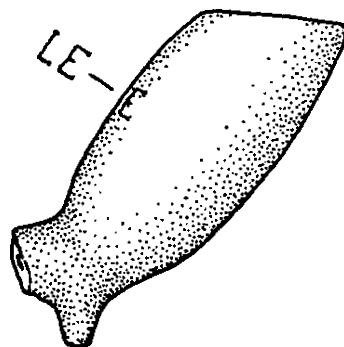
**STEM DIAMETER:** Unknown

**PIPES RECOVERED:** 1

**PIPEMAKER:** Llewelin Evans

**ATTRIBUTION:** See previous discussion.

**PARALLELS:** See previous discussion.



**-LE-**

**ARTIFACT NUMBER/PROVENIENCE:**

PR83 Lot 524-1, Building 1, Room 5

PR89 Lot 743-1, Yard 4A

**BOWL TYPE:** 2.21

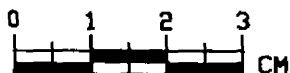
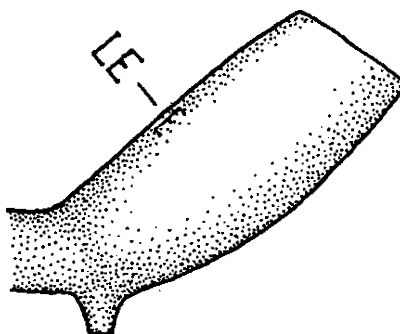
**STEM DIAMETERS:** Both are 6/64.

**PIPES RECOVERED:** 2

**PIPEMAKER:** Llewelin Evans

**ATTRIBUTION:** See previous discussion.

**PARALLELS:** See previous discussion.



**-LE-**

**ARTIFACT NUMBER/PROVENIENCE:**

Please see Appendix Table for a complete listing.

**BOWL TYPE:** 2.22

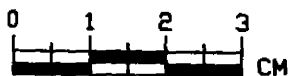
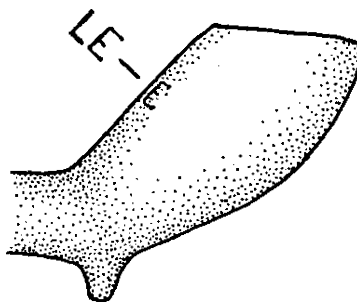
**STEM DIAMETERS:** Please see Table.

**PIPES RECOVERED:** 10

**PIPEMAKER:** Llewelin Evans

**ATTRIBUTION:** See previous discussion.

**PARALLELS:** See previous discussion.



-LE-

**ARTIFACT NUMBER/PROVENIENCE:**

PR86 Lot 1053-4, Building 3, Room 3

PR90 Lot 887-4, Yard 7

**BOWL TYPE:** 3.12

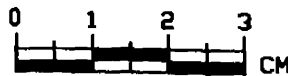
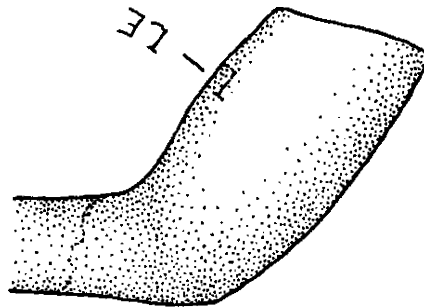
**STEM DIAMETERS:** 7/64, one unknown

**PIPES RECOVERED:** 2

**PIPEMAKER:** Llewellyn Evans

**ATTRIBUTION:** See previous discussion.

**PARALLELS:** Evans also manufactured "export" style pipes. Two others have been recovered from Port Royal; one during Marx's project (1968b:21, No. 28), and the other during Priddy's New Street excavations (Brown 1996:260, Fig. 48a).



**-LE-**

**ARTIFACT NUMBER/PROVENIENCE:**

PR81 Lot 65-2, Provenience unknown

PR82 Lot 161-37, Building 1, Room 2

PR83 Lot 304-8, Building 1, Room 5

PR83 Lot 500, Building 1, Room 5

PR87 Lot 566-2, Building 8

PR89 Lot 625-2, Building 5, Room 1

**BOWL TYPE:** Stem

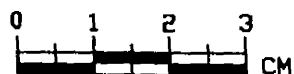
**STEM DIAMETERS:** 7/64 (5 pipes), 8/64 (1 pipe)

**PIPES RECOVERED:** 6

**PIPEMAKER:** Llewellyn Evans

**ATTRIBUTION:** See previous discussion.

**PARALLELS:** See previous discussion.



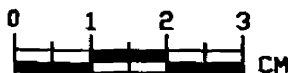
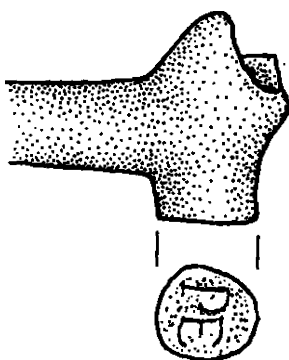
**-PE-****ARTIFACT NUMBER/PROVENIENCE:**

PR86 Lot 125-4, XU-3

**BOWL TYPE:** Unknown**STEM DIAMETER:** 7/64**PIPES RECOVERED:** 1**PIPEMAKER:** Philip Edwards I or II

**ATTRIBUTION:** One "PE" marked pipe was found in 1986, with the mark located on the heel. The pipemaker is either Philip Edwards I or his son, Philip II, both of Bristol. Philip I was freed in 1649 and became one of the founding members of the Bristol Guild in 1652. His pipes have been found on several colonial American sites, which suggests that he exported his product widely. Philip I probably died by 1683. Philip II apprenticed under his father in 1669, was freed in 1680, and was still active by 1696. Sources: Jackson and Price (1974:42,95-96), Oswald (1975:152) and Walker (1977:605, 1125-1126).

**PARALLELS:** There is a "PE" pipe dating to the mid-1600s in the Bigford Collection, which comprises artifacts from colonial sites in upstate New York (McCashion 1979: 110-111). Thirteen "PE" pipes were recovered at the French colonial site, Fort Pentagoet in Maine (Faulkner 1987: 173-174). "PE" pipes were also recovered by Marx (1968c:35). In all cases, the mark was found at the base of the heel.



**-WE-****ARTIFACT NUMBER/PROVENIENCE:**

See the following pages.

**BOWL TYPE:** See the following pages.

**STEM DIAMETER:** See the following pages.

**PIPES RECOVERED:** See next page.

**PIPEMAKER:** William Evans I or II

**ATTRIBUTION:** Twenty-two pipes bearing the mark "WE" were recovered, which includes seven fragments (65-57, 547-1, 647-1, and 748-2), four stems, and 11 identifiable pipe bowl styles including: Type 1.54 (2 pipes), Type 1.61 (1 pipe), Type 1.73 (1 pipe), Type 1.74 (4 pipes), Type 2.12 (1 pipe), and Type 2.14 (2 pipes). The "WE" mark is found on the backside of the bowl and is probably the mark of William Evans I or II. Williams Evans I was the son of weaver Llewellyn Evans of Brecknocke. He apprenticed to Jane Wall, was freed in 1660, and worked until at least 1682. William Evans II was the son of William I, and also apprenticed to Jane Wall, then apprenticed to Robert Tippet I for the remainder of his term. He received his freedom in 1667 and was active until possibly 1697. According to Walker, it is almost impossible to separate the pipes of both father and son. Sources: Jackson and Price (1974:42-43), Oswald (1975:152-153), and Walker (1977:1132-1136,1432-1435).

**PARALLELS:** "WE" pipes have been recovered from the St. John's site in Maryland (Hurry and Keeler 1991:69), colonial Jamestown (Cotter 1994:62), and the Nominy Plantation site in Virginia (Mitchell 1983:21). "WE" pipes were also recovered at Port Royal by Mayes (1972:112-113) and Marx, where the mark was found on the backside of the bowl and on the stem (1968b:23, 25, 67, 69, 1968c:35, 37, 105, 107).

**-WE-**

**ARTIFACT NUMBER/PROVENIENCE:**

PR86 Lot 124-4, XU-3

PR87 Lot 353-2, East of Yard 4B

**BOWL TYPE:** 1.54

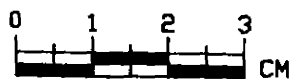
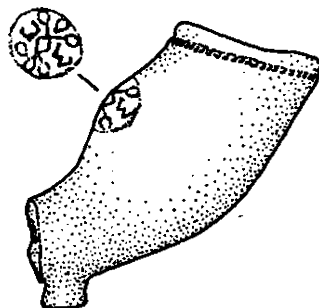
**STEM DIAMETERS:** Both are 7/64.

**PIPES RECOVERED:** 2

**PIPEMAKER:** William Evans I or II

**ATTRIBUTION:** See previous page.

**PARALLELS:** See previous page.





-WE-

**ARTIFACT NUMBER/PROVENIENCE:**

PR90 Lot 887-9, Yard 7

**BOWL TYPE:** 1.61

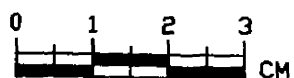
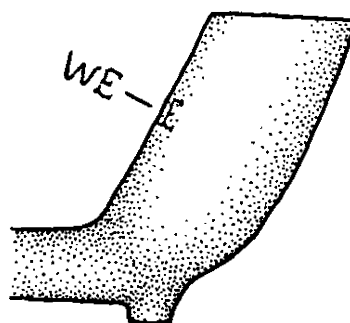
**STEM DIAMETER:** 7/64

**PIPES RECOVERED:** 1

**PIPEMAKER:** William Evans I or II

**ATTRIBUTION:** See previous discussion.

**PARALLELS:** See previous discussion.



**-WE-**

**ARTIFACT NUMBER/PROVENIENCE:**

PR83 Lot 311-116, Building 1, Room 2

**BOWL TYPE:** 1.73

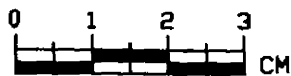
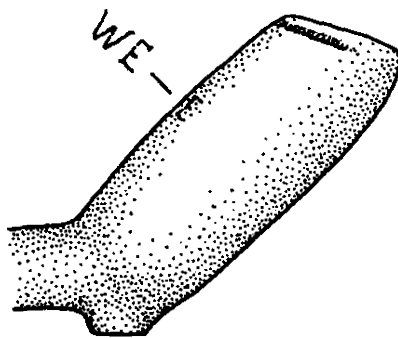
**STEM DIAMETER:** 8/64

**PIPES RECOVERED:** 1

**PIPEMAKER:** William Evans I or II

**ATTRIBUTION:** See previous discussion.

**PARALLELS:** See previous discussion.



-WE-

**ARTIFACT NUMBER/PROVENIENCE:**

PR83 Lot 316-38, Building 1, Room 2

PR85 Lot 916-3, North of Building 1

PR85 Lot 956-3, North of Building 1

PR87 Lot 362-2, South of Building 4

**BOWL TYPE:** 1.74

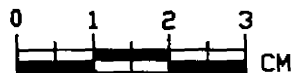
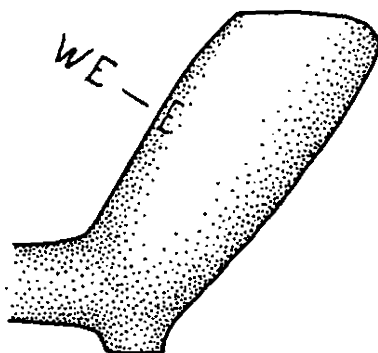
**STEM DIAMETERS:** All are 7/64.

**PIPES RECOVERED:** 4

**PIPEMAKER:** William Evans I or II

**ATTRIBUTION:** See previous discussion.

**PARALLELS:** See previous discussion.



**-WE-**

**ARTIFACT NUMBER/PROVENIENCE:**

PR84 Lot 816, Alley

**BOWL TYPE:** 2.12

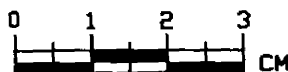
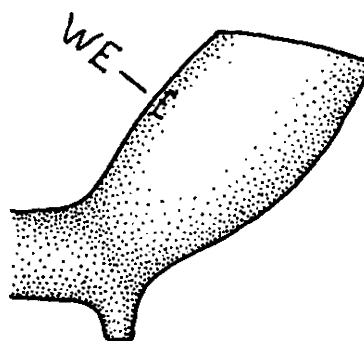
**STEM DIAMETER:** Unknown

**PIPES RECOVERED:** 1

**PIPEMAKER:** William Evans I or II

**ATTRIBUTION:** See previous discussion.

**PARALLELS:** See previous discussion.



-WE-

**ARTIFACT NUMBER/PROVENIENCE:**

PR83 Lot 328, Building 1

PR87 Lot 534-4, Building 8

PR89 Lot 653-3, Building 5, Room 1

**BOWL TYPE:** 2.14

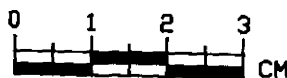
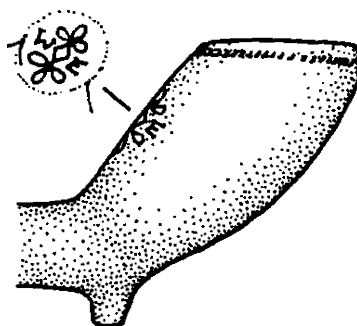
**STEM DIAMETERS:** Two are 7/64, one is unknown.

**PIPES RECOVERED:** 3

**PIPEMAKER:** William Evans I or II

**ATTRIBUTION:** See previous discussion.

**PARALLELS:** See previous discussion.



**-WE-**

**ARTIFACT NUMBER/PROVENIENCE:**

PR81 Lot 52-24

PR83 Lot 328, Building 1

PR83 Lot 328, Building 1

PR87 Lot 404-2, Yard 4B

**BOWL TYPE:** Stems

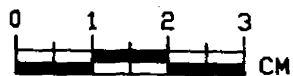
**STEM DIAMETERS:** All are 7/64.

**PIPES RECOVERED:** 4

**PIPEMAKER:** William Evans I or II

**ATTRIBUTION:** See previous discussion.

**PARALLELS:** See previous discussion.



-GF-

**ARTIFACT NUMBER/PROVENIENCE:**

PR83 Lot 316-31, Building 1, Room 2

**BOWL TYPE:** 1.22

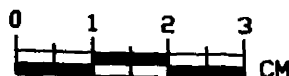
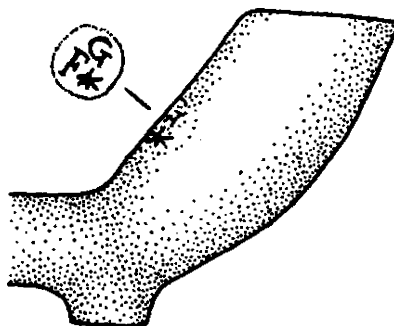
**STEM DIAMETER:** 6/64

**PIPES RECOVERED:** 1

**PIPEMAKER:** Unknown

**ATTRIBUTION:** One pipe marked "GF" is a cartouche that appears on the backside of the bowl. The pipemaker of the "GF" pipe is possibly George Fowler of Hull or George Farmer of London. Fowler apprenticed in 1663 to Elizabeth Atkinson and was freed in 1670. The published "GF" marks from Hull depict the GF separated by a tree, which appears to be a common motif for Hull pipes. Another possibility is George Farmer of London who was working in 1677. A common London motif, a star-like mark, also appears on the Port Royal pipe. Sources: Oswald (1975:136), Sheppard (1912:9-10, 19) and Watkins (1979:88, 91, 110).

**PARALLELS:** Unknown



**-LF-**

**ARTIFACT NUMBER/PROVENIENCE:**

PR90 Lot 465-1, Yard 4A

**BOWL TYPE:** 1.61

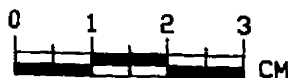
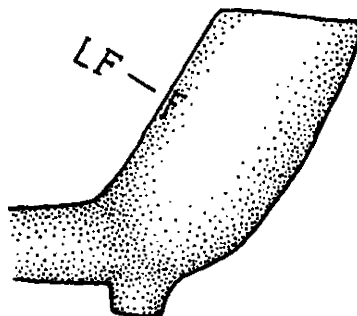
**STEM DIAMETER:** 7/64

**PIPES RECOVERED:** 1

**PIPEMAKER:** Unknown

**ATTRIBUTION:** Three "LF" pipes were found. One pipe is unidentifiable, whereas the other two pipes consist of bowl Types 1.61 and 1.73. There is no mention of any pipemaker in published sources with these initials for the British Isles, and the pipe does not appear to be Dutch.

**PARALLELS:** An "LF" pipes were also recovered by Marx. The mark was found on the backside of the bowl (1968c:43).





**-LF-**

**ARTIFACT NUMBER/PROVENIENCE:**

PR87 Lot 423-1, Yard 4B

**BOWL TYPE:** 1.73

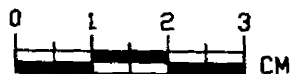
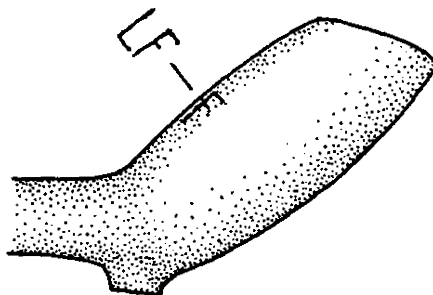
**STEM DIAMETER:** 8/64

**PIPES RECOVERED:** 1

**PIPEMAKER:** Unknown

**ATTRIBUTION:** See previous discussion.

**PARALLELS:** See Previous discussion.



-RF-

**ARTIFACT NUMBER/PROVENIENCE:**

PR87 Lot 543-2, Building 5, Sidewalk

**BOWL TYPE:** 1.91

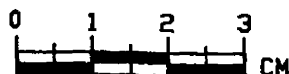
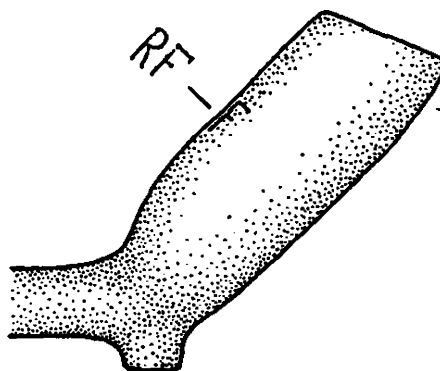
**STEM DIAMETER:** 7/64

**PIPES RECOVERED:** 1

**PIPEMAKER:** Unknown

**ATTRIBUTION:** One pipe marked "RF" on the backside of the bowl, was recovered in 1987. No maker in published sources has been identified for the "RF" mark. There was a Bristol pipemaker named Richard Foot who apprenticed to William and Margaret Williams in 1675, was freed in 1684, and apprenticed his own journeyman in 1699. Whether he is the maker of the Port Royal pipe remains unknown. Sources: Jackson and Price (1975:43) and Oswald (1975:153).

**PARALLELS:** Unknown



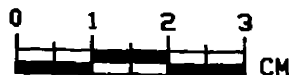
**-McDOUGALL-****ARTIFACT NUMBER/PROVENIENCE:**

PR84 Lot 826, Alley

**BOWL TYPE:** Stem**STEM DIAMETER:** 4/64**PIPES RECOVERED:** 1**PIPEMAKER:** D. McDougall Company

**ATTRIBUTION:** Part of the name McDougall was found on this broken pipe stem, and is ascribed to the D. McDougall Company of Glasgow, Scotland. The McDougall firm was probably the largest of the 19th-century Glasgow pipemakers, and exemplifies the success of the Glasgow pipemakers, who penetrated the export market during the 19th century. Originally started by Duncan McDougall in 1846, the company was active until 1964. Sources: Gallagher 1987:67-68), Jack (1986:134), Oswald (1975:113), Sudbury (1980:30), and Walker and Walker (1969:133).

**PARALLELS:** McDougall pipes are commonly found on 19th-century sites throughout America and Canada, and even Australia, and usually predate 1891 (Sudbury 1980:36). McDougall pipes have been recovered at the Caleb Pusey House, Pennsylvania (Alexander 1983:220-221), Connesville, Pennsylvania (Sudbury 1980), Fort Walsh, Saskatchewan (Richie 1983:97), Kanaka Village, Vancouver (Pfeiffer 1982:113, 117), Hudson's Bay Company's Bellevue Farm, Washington (Pfeiffer 1983a:178), Cabinet Landing Site, Idaho (Pfeiffer 1985:120), and many other sites. McDougall pipe stems were also found during Marx's excavations (Marx 1968b:103, 1968c:67).



-IH-

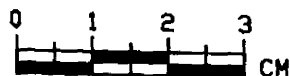
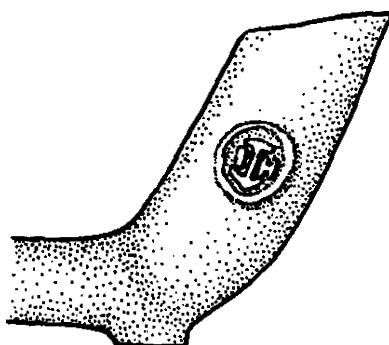
**ARTIFACT NUMBER/PROVENIENCE:**

PR89 Lot 633-1, Building 5, Sidewalk

**BOWL TYPE:** 1.53**STEM DIAMETER:** 5/64**PIPES RECOVERED:** 1**PIPEMAKER:** John Hunt II or III

**ATTRIBUTION:** Five pipes bearing the "IH" mark on the right-hand side of the bowl were recovered. One pipe is a marked stem, one pipe is bowl Type 1.53, two are bowl Type 1.61, and one is bowl Type 1.62. The "IH" mark is possibly attributed to Bristol pipemakers John Hunt II or John III. John Hunt II apprenticed to his mother Christian Hunt in 1685/1686 and was freed in 1689, and is the brother of John III. John III, son of Flower and Christian Hunt, apprenticed to his father and was freed in 1694. Because both were active during the same period, the pipes of these two makers are not easily distinguished. Sources: Jackson and Price (1974:47-48), Oswald (1975:154), and Walker (1977:598-601,609, 1178-1180, 1450-1451).

**PARALLELS:** "IH" pipes were also recovered by Marx. The mark was found as an anchor cartouche, on the backside of the bowl, and as initials on the stem (1968b:33, 1968c:43).



**-IH-**

**ARTIFACT NUMBER/PROVENIENCE:**

PR83 Lot 429-45, Building 1, Room 4

PR86 Lot 115-1, XU-3

**BOWL TYPE:** 1.61

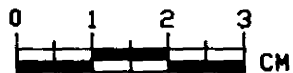
**STEM DIAMETERS:** Both are  $5/64$ .

**PIPES RECOVERED:** 2

**PIPEMAKER:** John Hunt II or III

**ATTRIBUTION:** See previous discussion.

**PARALLELS:** Unknown



**-IH-**

**ARTIFACT NUMBER/PROVENIENCE:**

PR89 Lot 823-3, Building 4, Room 4B

**BOWL TYPE:** 1.62

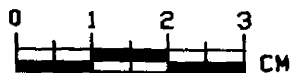
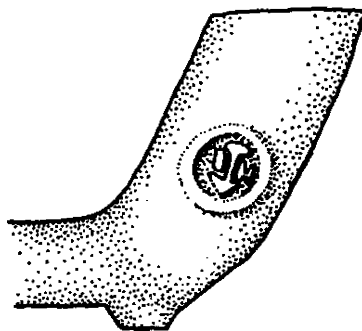
**STEM DIAMETER:** 6/64

**PIPES RECOVERED:** 1

**PIPEMAKER:** John Hunt II or III

**ATTRIBUTION:** See previous discussion.

**PARALLELS:** Unknown



**-JH-**

**ARTIFACT NUMBER/PROVENIENCE:**

PR89 Lot 897-2, Yard 4A

**BOWL TYPE:** Stem

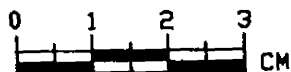
**STEM DIAMETER:** 7/64

**PIPES RECOVERED:** 1

**PIPEMAKER:** John Hunt II or III

**ATTRIBUTION:** See previous discussion.

**PARALLELS:** Unknown



**-RH-**

**ARTIFACT NUMBER/PROVENIENCE:**

PR89 Lot 864-1, Yard 4A

**BOWL TYPE:** 1.26

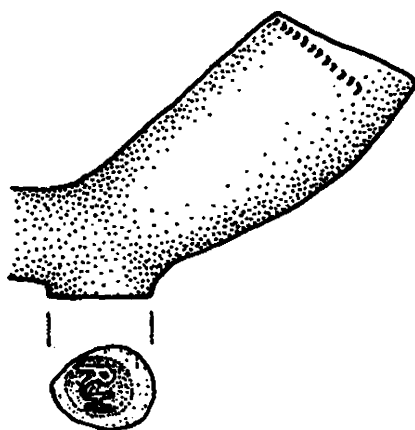
**STEM DIAMETER:** 8/64

**PIPES RECOVERED:** 1

**PIPEMAKER:** Unknown

**ATTRIBUTION:** One pipe marked "RH" on the heel were recovered in 1989. Although there are a number of Bristol pipemakers with these initials, no published examples of their pipes presently exist.

**PARALLELS:** An "RH" pipe was also recovered by Marx. The mark was found on the heel (1968c:45).





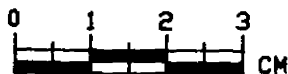
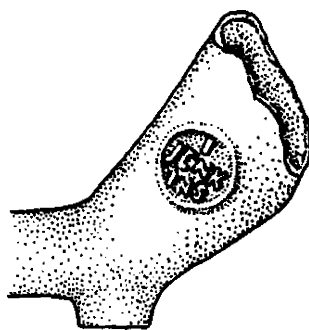
**-I/JENK/INS-****ARTIFACT NUMBER/PROVENIENCE:**

PR90 Lot 843-6, Ship

**BOWL TYPE:** 1.21**STEM DIAMETER:** 5/64**PIPES RECOVERED:** 1**PIPEMAKER:** James Jenkins

**ATTRIBUTION:** Four pipes bearing the name "I/JENK/INS" were recovered, with the cartouche located on the right-hand side of the bowl for bowl Types 1.21, 1.52, and 1.63 (two pipes). The "I/JENK/INS" mark is attributed to James Jenkins of Bristol. Jenkins apprenticed to William and Mary Tippet in 1700 and was freed in 1707. He took on several apprentices of his own and was active until about 1739. The remains of some of his pipes were recovered from a kiln site north of Lewin's Mead, Bristol in 1972. Sources: Jackson and Price (1974:51, 121-122) and Walker (1977:612, 1183-1184, 1452-1453).

**PARALLELS:** An "I/JENK/INS" pipe was recovered during the excavation of the Augustine Heerman's Warehouse in upstate New York (Dallal 1985:VII-40; Plate VII-18). Mayes (1972:114) and Marx (1968b:35, 1968c:49) also found "I/JENK/INS" pipes at Port Royal. In all cases, the mark appeared as a cartouche on the right side of the bowl.



**-I/JENK/INS-**

**ARTIFACT NUMBER/PROVENIENCE:**

PR87 Lot 556-1, North of Building 5

**BOWL TYPE:** 1.52

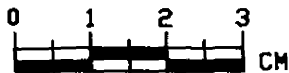
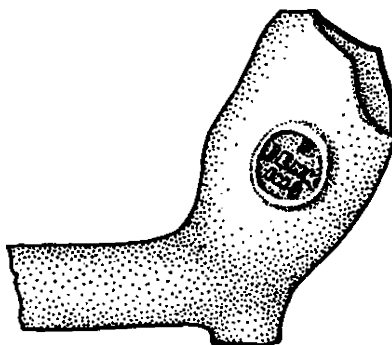
**STEM DIAMETER:** 5/64

**PIPES RECOVERED:** 1

**PIPEMAKER:** James Jenkins

**ATTRIBUTION:** See previous discussion.

**PARALLELS:** See previous discussion.



**-I/JENK/INS-****ARTIFACT NUMBER/PROVENIENCE:**

PR87 No provenience

PR87 Lot 556-1, North of Building 5

**BOWL TYPE:** 1.63

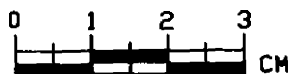
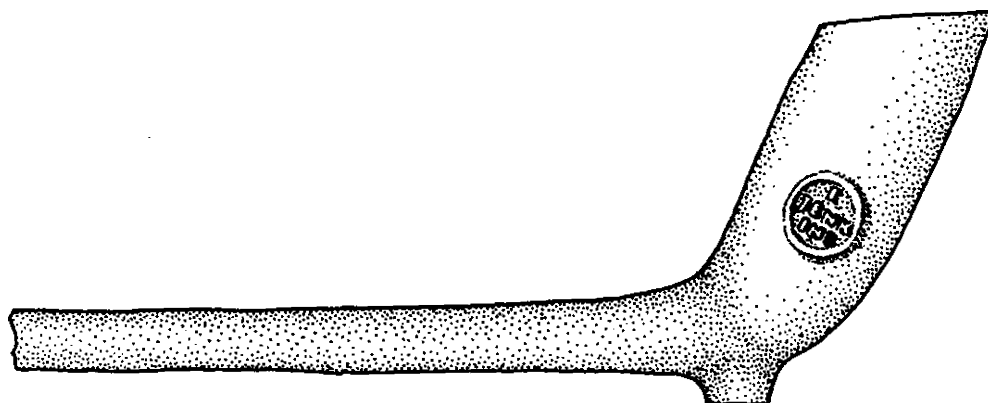
**STEM DIAMETERS:** Both are 5/64.

**PIPES RECOVERED:** 2

**PIPEMAKER:** James Jenkins

**ATTRIBUTION:** See previous discussion.

**PARALLELS:** See previous discussion.



**-D/JONES-****ARTIFACT NUMBER/PROVENIENCE:**

PR84 Lot 629-3, Building 1, Room 6

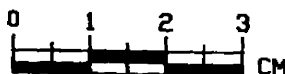
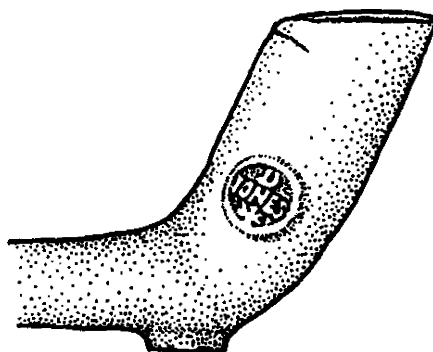
PR90 Lot 947-1, Yard 5

PR90 Lot 1083-2, Ship

**BOWL TYPE:** 1.62**STEM DIAMETERS:** All are 5/64.**PIPES RECOVERED:** 3**PIPEMAKER:** Devereaux Jones I or II

**ATTRIBUTION:** The mark "D/JONES" was found on three pipes, all bowl Type 1.62. The cartouche is located on the right-hand side of the bowl and is probably the product of Bristol pipemakers Devereaux Jones I or II. Devereaux Jones I apprenticed to Llewelin Evans in 1684, was freed in 1691, and was last recorded in 1712. His son Devereaux II, apprenticed to his father and was freed in 1727, although his father was probably deceased by then. Devereaux II was probably dead by 1748. Sources: Jackson and Price (1974:51) and Walker (1977:1186-1188, 1454-1455).

**PARALLELS:** A "D/JONES" pipe was recovered at the Augustine Heerman's Warehouse in upstate New York (Dallal 1985:VII-39-40; Plate VII-18). "D/JONES" pipes were also found at Port Royal excavations by Priddy (Brown 1996:259), Mayes (1972:114), and Marx (1968b:35, 1968c:47, 49).



**-LL-**

**ARTIFACT NUMBER/PROVENIENCE:**

PR87 Lot 521, North of Building 5

**BOWL TYPE:** 1.56

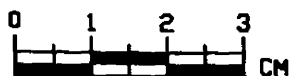
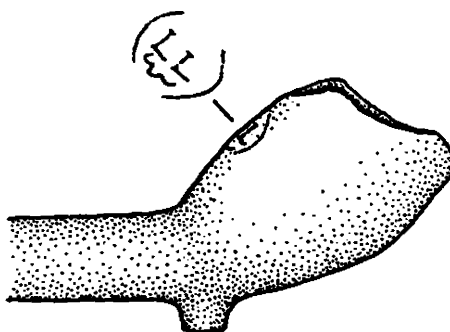
**STEM DIAMETER:** 7/64

**PIPES RECOVERED:** 1

**PIPEMAKER:** Unknown

**ATTRIBUTION:** There is a single occurrence of one pipe parked marked "LL" on the backside of the bowl. At present, no known maker in published sources has been found with this mark, although it appears to be from Bristol.

**PARALLELS:** Unknown



-M73-

**ARTIFACT NUMBER/PROVENIENCE:**

PR86 Lot 125-1, XU-3

**BOWL TYPE:** Stem

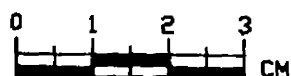
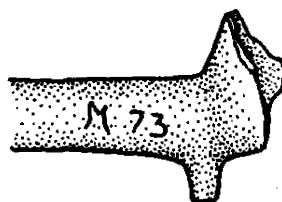
**STEM DIAMETER:** Unknown

**PIPES RECOVERED:** 1

**PIPEMAKER:** Unknown

**ATTRIBUTION:** Although the specific pipemaker is unknown, the stem probably belongs to one of the major Glasgow pipemakers of the 19th century, such as William White or the McDougall firm. The "M73" refers to the catalog number, which often appeared next to the maker's name (Alexander 1983:221; Gallagher 1987:73).

**PARALLELS:** Common on 19th-century North American sites, wherever Scottish pipes have been found.



**-CM-**

**ARTIFACT NUMBER/PROVENIENCE:**

PR83 Lot 303-51, Building 1, Room 2

**BOWL TYPE:** 1.28

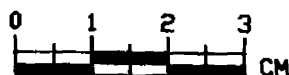
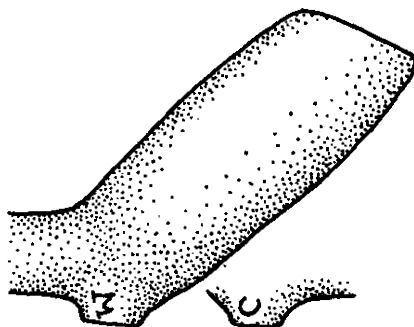
**STEM DIAMETER:** 6/64

**PIPES RECOVERED:** 1

**PIPEMAKER:** Unknown

**ATTRIBUTION:** There is a single occurrence of a pipe marked "CM" on the heel. The "CM" mark could belong to Bristol pipemaker Charles Moon, however, who was active from 1771-1810s, although this date does not coincide with the stem diameter date range for 6/64, which is 1680-1710. Sources: Jackson and Price (1974:115) and Oswald (1975:155).

**PARALLELS:** A "CM" marked pipe was recovered from a waste heap during construction in Bristol in 1971, along with pipes made by members of the Robert Tippet family and pipemaker Israel Cary I (Jackson and Price 1974:111).



-N-

**ARTIFACT NUMBER/PROVENIENCE:**

PR89 Lot 741-4, Yard 4A

**BOWL TYPE:** 1.28

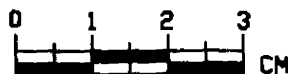
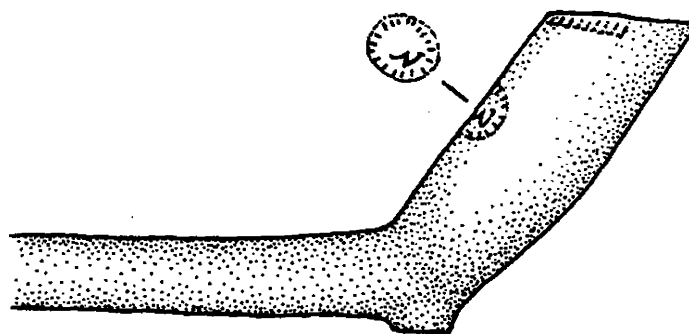
**STEM DIAMETER:** 7/64

**PIPES RECOVERED:** 1

**PIPEMAKER:** Unknown

**ATTRIBUTION:** There is a single occurrence of a pipe mark "N" on the backside of the bowl. Currently, there are no references to this mark in available published sources.

**PARALLELS:** Unknown





-RN-

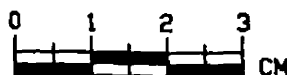
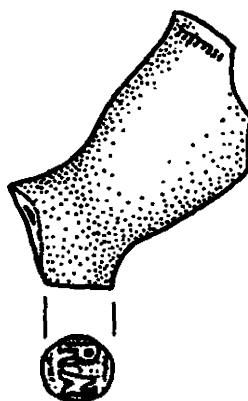
**ARTIFACT NUMBER/PROVENIENCE:**

PR81 Lot 58-21

**BOWL TYPE:** Unknown**STEM DIAMETER:** 7/64**PIPES RECOVERED:** 1**PIPEMAKER:** Richard Nunney

**ATTRIBUTION:** One pipe fragment marked "RN" on the was recovered in 1981, but the bowl type is unidentifiable. Richard Nunney (or Nooney, Nonney, Ninney, Nony) has been credited for the "RN" mark. He was a founder and member of the Bristol Pipemaker's Guild in 1652, but was not freed until 1655. He apprenticed his son Robert in 1676/77 and was active until the 1690s, and was probably dead by 1713. Sources: Jackson and Price (1974:59, 104), Oswald (1975:156), and Walker (1977:1225-1226, 1466-1469).

**PARALLELS:** "RN" pipes were also recovered by Marx. The mark was found on the backside of the bowl and the heel (1968b:37, 1968c:51).



**-TO-**

**ARTIFACT NUMBER/PROVENIENCE:**

PR89 Lot 825, Yard 4B

**BOWL TYPE:** 2.12

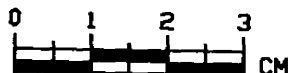
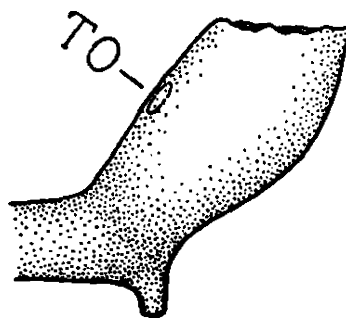
**STEM DIAMETER:** 7/64

**PIPES RECOVERED:** 1

**PIPEMAKER:** Thomas Owen I

**ATTRIBUTION:** One pipe bearing the mark "TO" on the backside of the pipe was recovered. The "TO" pipe may be the product of Thomas Owen I, who was a Bristol pipemaker. Owen apprenticed to Elizabeth Evans and was freed by 1698. He was dead by 1725 when his son Thomas II took his freedom. Sources: Jackson and Price (1974:105, 61), Oswald (1975:156), and Walker (1977:665, 1232, 1472-1473).

**PARALLELS:** "TO" marked pipes have been found at the New Street tavern site at Port Royal, where they comprised the majority of marked pipes (70 out of 92; Brown 1996:259), as well as two colonial Virginia sites, Nominy Plantation and Jamestown, and the Onondaga site in upstate New York (McCashion 1979:148-149; Mitchell 1983:21). "TO" pipes were also recovered by Mayes (1972:112-113) and by Marx, (1968b:39, 41, 1968c:53); in both cases, the mark was found on the backside of the bowl.



**-IP-**

**ARTIFACT NUMBER/PROVENIENCE:**

PR87 Lot 353-1, East of Yard 4B

**BOWL TYPE:** 1.73

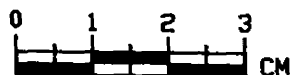
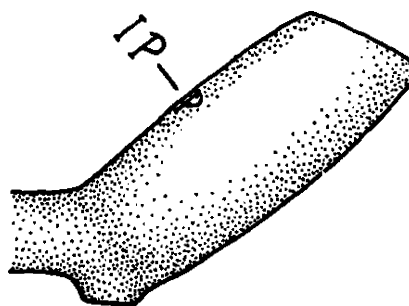
**STEM DIAMETER:** 6/64

**PIPES RECOVERED:** 1

**PIPEMAKER:** Unknown

**ATTRIBUTION:** Six pipes with the "IP" comprise one bowl Type 1.73 pipe marked on the backside of the bowl and five marked stems. There are at least nine Bristol pipemakers associated with this mark, including Jacob Prosser, John Prosser, and John Poyte. Another possibility is John Page of Hull, who apprenticed to Elizabeth Atkinson in 1666 and was freed in 1673. Sources: Hurry and Keeler (1991:69), Jackson and Price (1974:106, 11), and Sheppard (1912:10, 20).

**PARALLELS:** An "IP" marked pipe was found at the St. John's site in Maryland, but also remains unidentified. Oswald (1959:60) suggests that the mark might belong to the Pratt family of Taunton. Eighteen "IP" marked pipes were recovered from the Nominy Plantation site in Virginia (Mitchell 1983:22). "IP" pipes were also recovered by Marx. The mark was found as a cartouche, on the backside of the bowl and on the stem (1968b:41, 1968c:53, 55, 105).



**-IP-**

**ARTIFACT NUMBER/PROVENIENCE:**

PR81 Lot 58-15

PR81 Lot 67-12

PR84 Lot 801, Alley

PR87 Lot 564-3, North of Building 5

PR87 Lot 566-2, North of Building 5

**BOWL TYPE:** Stems

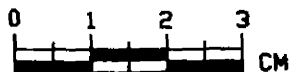
**STEM DIAMETERS:** 7/64 (3), 8/64, one unknown

**PIPES RECOVERED:** 5

**PIPEMAKER:** Unknown

**ATTRIBUTION:** See previous discussion.

**PARALLELS:** See previous discussion.



-ER-

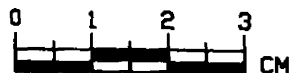
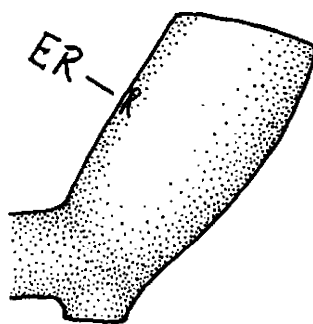
**ARTIFACT NUMBER/PROVENIENCE:**

PR82 Lot 103-5

**BOWL TYPE:** 1.52**STEM DIAMETER:** 5/64**PIPES RECOVERED:** 1**PIPEMAKER:** Edward Randall I or II

**ATTRIBUTION:** Five "ER" marked pipes were recovered bearing the mark on the backside of the bowl. One pipe bowl is unidentifiable, one is bowl Type 1.52, and three are bowl Type 3.12, the "export" heelless pipe. The "ER" marked pipes are possibly the mark of either Bristol pipemakers Edward Randall I or II. Edward Randall I was freed from his apprenticeship in 1668 and accepted a number of apprentices until 1689, when he died. His son, Edward II, apprenticed to John and Mary Sinderling and following his freedom in 1699, moved to London. Sources: Jackson and Price (1974:66), Oswald (1975:157), and Walker (1977:611, 1256-1257).

**PARALLELS:** An "ER" pipe was recovered from the St. John's site in Maryland (Hurry and Keeler 1991:69). "ER" pipes were also recovered by Mayes (1972:113, 116) and Marx (1968b:43, 45, 1968c:59, 61, 63). In both cases, the "ER" mark appeared as a cartouche on the right side of the bowl, and stamped on the backside of the bowl.



**-ER-**

**ARTIFACT NUMBER/PROVENIENCE:**

PR83 Lot 319-1, Building 1, Room 2

PR86 Lot 1100, Building 3, Room 4

PR86 Lot 1117, Building 3, Room 4

**BOWL TYPE:** 3.12

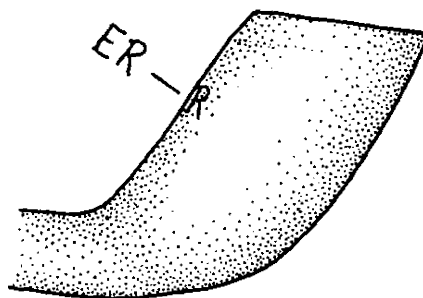
**STEM DIAMETERS:** All are 5/64.

**PIPES RECOVERED:** 3

**PIPEMAKER:** Edward Randall I or II

**ATTRIBUTION:** See previous discussion.

**PARALLELS:** See previous discussion.



**-E/REED/♥-****ARTIFACT NUMBER/PROVENIENCE:**

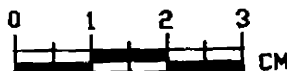
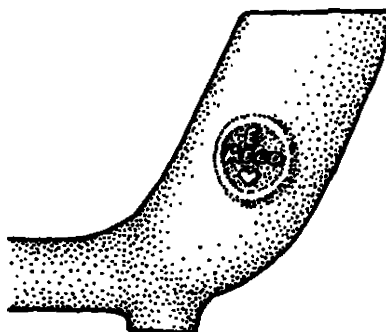
PR86 Lot 1120, Building 3, Room 4

PR86 Lot 1122, Building 3, Room 4

**BOWL TYPE:** 1.63**STEM DIAMETERS:** Both are 5/64.**PIPES RECOVERED:** 2**PIPEMAKER:** Edward Reed

**ATTRIBUTION:** Three pipes marked pipes by an E/REED/♥ cartouche were recovered. Two are bowl Type 1.63 and the other is bowl Type 2.14. The cartouches are on the right side of the bowl. These pipes are attributed to Edward Reed, a Bristol pipemaker who apprenticed to William and Mary Tippet. In 1706, he gained his freedom and by 1715, he became Master of the Pipe Makers Company and accepted several apprentices. He was last recorded in 1734. Sources: Jackson and Price (1974:66,107) and Walker (1977:611, 1258-1259, 1478-1479).

**PARALLELS:** "E/REED/♥" pipes were also recovered at Port Royal by Mayes (1972:113) and Marx (1968b:45, 47, 1968c:63).



**-E/REED/♥-**

**ARTIFACT NUMBER/PROVENIENCE:**

PR87 Lot 286-2, Building 2

**BOWL TYPE:** 2.14

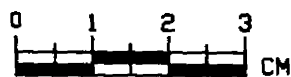
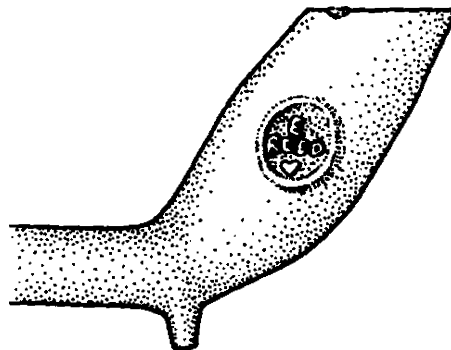
**STEM DIAMETER:** 5/64

**PIPES RECOVERED:** 1

**PIPEMAKER:** Edward Reed

**ATTRIBUTION:** See previous discussion.

**PARALLELS:** See previous discussion.





-IS-

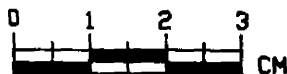
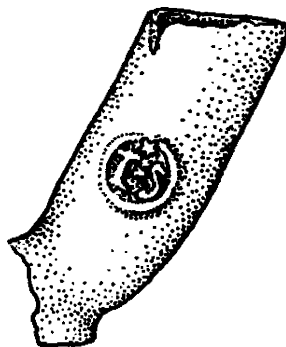
**ARTIFACT NUMBER/PROVENIENCE:**

PR90 Lot 2074-11, Ship

**BOWL TYPE:** 1.61**STEM DIAMETER:** 6/64**PIPES RECOVERED:** 1**PIPEMAKER:** Unknown

**ATTRIBUTION:** Five "IS" marked pipes with the cartouche located on the right-hand side of the bowl were recovered. One pipe is bowl Type 1.61, one is bowl Type 1.63, two are Type 3.12, or heelless "export-style" pipes, and one is a stem. As with the "IP" marked pipes, there are a number of attributions possible for Bristol pipemakers, such as James Stephens, who was active from 1708-1739. Other pipemakers include Joseph Standford Sr., active from 1683-1722, John Squibb, active from 1704-1738, or John Sinderling, who apprenticed in 1653, was freed in 1668 and was last recorded in 1690. Sources: Jackson and Price (1974:70-71), Oswald (1975:158), and Walker (1977:608, 1296, 1303-1306).

**PARALLELS:** Seven "IS" pipes were recovered from the St. John's site in Maryland and are tentatively ascribed to John Sinderling (Hurry and Keeler 1991:59, 69). One "IS" pipe was recovered at the New Street excavations at Port Royal (Brown 1996:259). "IS" pipes were also recovered at Port Royal by Mayes (1972:113114) and Marx (1968b:47, 49, 1968c:65, 67, 69), where the mark appears both as a cartouche and as letters stamped on the backside of the bowl.



-IS-

**ARTIFACT NUMBER/PROVENIENCE:**

PR87 Lot 584-3, Building 5, Sidewalk

**BOWL TYPE:** 1.63

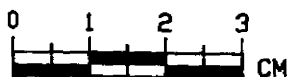
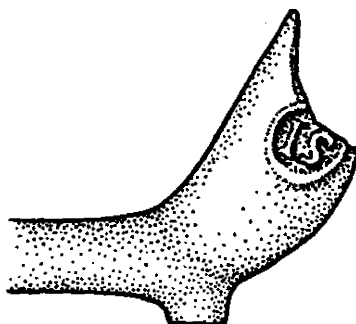
**STEM DIAMETER:** 5/64

**PIPES RECOVERED:** 1

**PIPEMAKER:** Unknown

**ATTRIBUTION:** See previous discussion.

**PARALLELS:** See previous discussion.



-IS-

**ARTIFACT NUMBER/PROVENIENCE:**

PR86 Lot 1133-2, Building 3, Room 3

PR87 Lot 404-2, Yard 4B

**BOWL TYPE:** 3.12

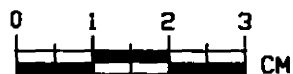
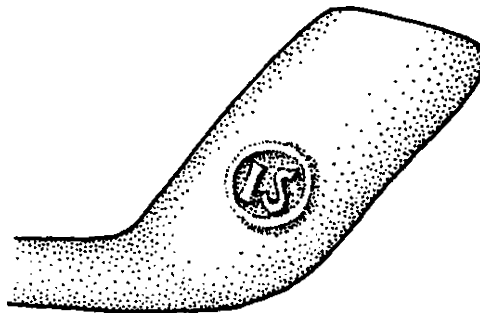
**STEM DIAMETER:** Both are  $5/64$ .

**PIPES RECOVERED:** 2

**PIPEMAKER:** Unknown

**ATTRIBUTION:** See previous discussion.

**PARALLELS:** See previous discussion.



**-IS-**

**ARTIFACT NUMBER/PROVENIENCE:**

PR82 Lot 171-2

**BOWL TYPE:** Stem

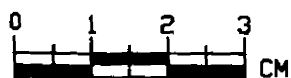
**STEM DIAMETER:** 8/64

**PIPES RECOVERED:** 1

**PIPEMAKER:** Unknown

**ATTRIBUTION:** See previous discussion.

**PARALLELS:** See previous discussion.



**-RT-****ARTIFACT NUMBER/PROVENIENCE:**

See the following pages.

**BOWL TYPE:** See the following pages.

**PIPES RECOVERED:** See the following pages.

**PIPEMAKER:** Robert Tippet and Family

**ATTRIBUTION:** Thirteen "RT" pipes were recovered. The bowl styles include the following: one unidentifiable, Type 1.61 (1 pipe), Type 1.63 (6 pipes), Type 1.72 (one pipe), Type 1.74 (one pipe), Type 2.12 (one pipe), Type 3.12 (one pipe), and Type 3.13 (one pipe). With the exception of the heelless "export" pipes, which have the cartouche on the right-hand side of the bowl, the remaining bowls are marked on the backside of the bowl. This is the mark of Bristol pipemaker Robert Tippet and his family firm. As one of the most important pipemakers in Bristol, Tippet exported his pipes to the American colonies. There are three generations of Robert Tippets, so is often difficult to distinguish the pipes of Robert Tippet I, his son, and grandson.

Robert Tippet I achieved his freedom in 1660, was active through the 1670s, and was dead by 1682. His son, Robert Tippet II apprenticed to Llewellyn and Elizabeth Evans until 1678. Although not entirely clear, it appears that he was active until 1713. Excavations in Whitson and Rosemary Streets in 1956 revealed a pipe kiln, wasters and pipes fragments bearing marks of Robert Tippet, Henry Hoar, and Isaac Evans, and indicate a date range of ca. 1680-1760. These findings suggest that Robert II and Isaac Evans were in partnership. Robert Tippet III apprenticed to his father, Robert II, was free by 1713 and probably died sometime between 1720-1722. The Port Royal "RT" pipes are probably those of Robert II, based on the date range, as well as his association with Llewellyn and Isaac Evans. Sources: Alexander (1983:205;209), (Hurry and Keeler 1991:55, 69), Jackson and Price (1974:73-74, 110, 131), Mitchell (1983:20), Oswald (1985:158), and Walker (1977:605-606, 1316-1320, 1469).

**PARALLELS:** Tippet pipes have been found on a wide range of sites from Jamaica to Newfoundland. "RT" pipes have been found at the Augustine Heerman Warehouse, New York (Dallal 1985), Nominy Plantation, Virginia (Mitchell 1983:20), Jamestown, Virginia (Cotter 1994:79), at four sites in the Patuxent River Valley, Maryland (Pogue 1991:9), the Caleb Pusey House in Pennsylvania (Alexander 1983:206), and the St. John's Site, Maryland (Hurry and Keeler 1991:69). Although "RT" pipes appear on North American sites dated after 1720, there is no documentation for the Tippets after this date. "RT" pipes were also recovered in Port Royal by Priddy (Brown 1996:259), Mayes (1972:113, 116), and Marx (1968b:49, 51, 53, 1968c:71, 73, 75, 77), where the mark was found as a cartouche, on the backside of the bowl, and on the heel.

**-RT-**

**ARTIFACT NUMBER/PROVENIENCE:**

PR81 Lot 81-1

**BOWL TYPE:** 1.61

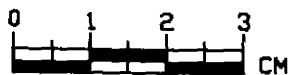
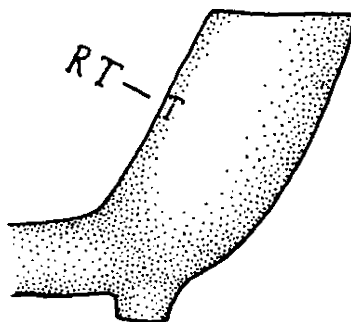
**STEM DIAMETER:** 5/64

**PIPES RECOVERED:** 1

**PIPEMAKER:** Robert Tippet and Family

**ATTRIBUTION:** See previous discussion.

**PARALLELS:** See previous discussion.



**-RT-**

**ARTIFACT NUMBER/PROVENIENCE:**

PR83 Lot 314-20, Building 1, Room 2

PR84 Lot 600, Building 1, Room 6

PR84 Lot 611-2, Building 1, Room 6

PR84 Lot 612-2, Building 1, Room 6

PR86 Lot 113-1, XU-3

PR90 Lot 814-5, Ship

**BOWL TYPE:** 1.63

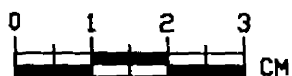
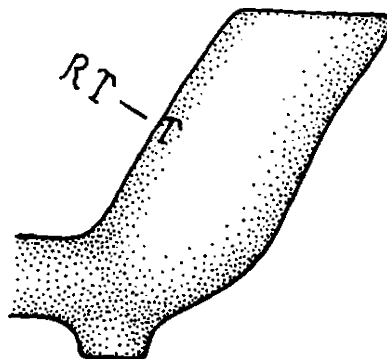
**STEM DIAMETERS:** 4/64 (2 pipes), 5/64 (3 pipes), one unknown

**PIPES RECOVERED:** 6

**PIPEMAKER:** Robert Tippet and Family

**ATTRIBUTION:** See previous discussion.

**PARALLELS:** See previous discussion.



**-RT-**

**ARTIFACT NUMBER/PROVENIENCE:**

PR90 Lot 866-1, Yard 4A

**BOWL TYPE:** 1.72

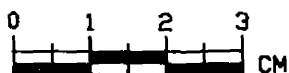
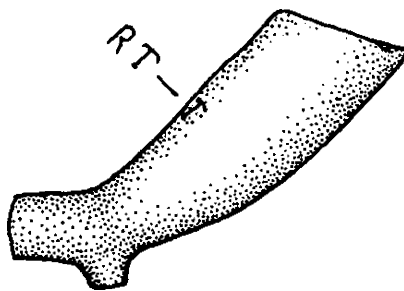
**STEM DIAMETER:** 6/64

**PIPES RECOVERED:** 1

**PIPEMAKER:** Robert Tippet and Family

**ATTRIBUTION:** See previous discussion.

**PARALLELS:** See previous discussion.





**-RT-**

**ARTIFACT NUMBER/PROVENIENCE:**

PR83 Lot 428-3, Building 1, Room 4

**BOWL TYPE:** 1.74

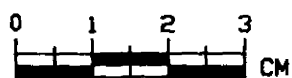
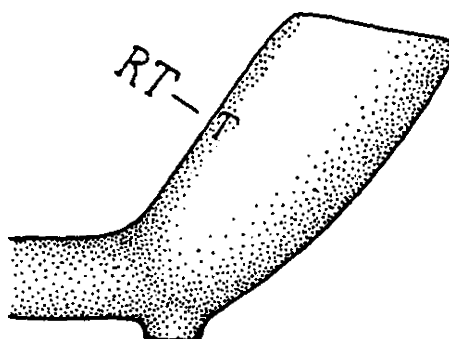
**STEM DIAMETER:** Unknown

**PIPES RECOVERED:** 1

**PIPEMAKER:** Robert Tippet and Family

**ATTRIBUTION:** See previous discussion.

**PARALLELS:** See previous discussion.



**-RT-**

**ARTIFACT NUMBER/PROVENIENCE:**

PR87 Lot 352-2

**BOWL TYPE:** 2.12

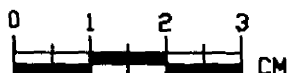
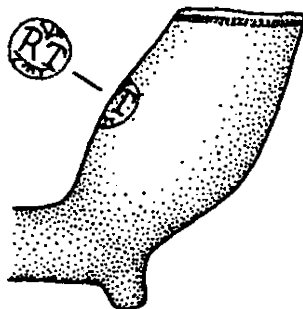
**STEM DIAMETER:** 7/64

**PIPES RECOVERED:** 1

**PIPEMAKER:** Robert Tippet and Family

**ATTRIBUTION:** See previous discussion.

**PARALLELS:** See previous discussion.



**-RT-**

**ARTIFACT NUMBER/PROVENIENCE:**

PR86 Lot 155-3, XU-3

**BOWL TYPE:** 3.12

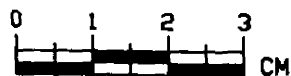
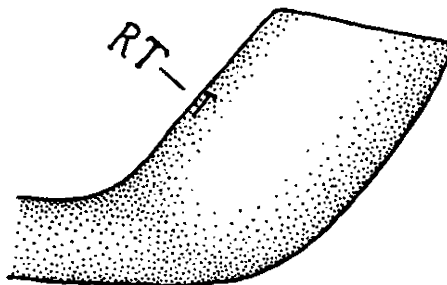
**STEM DIAMETER:** 5/64

**PIPES RECOVERED:** 1

**PIPEMAKER:** Robert Tippet and Family

**ATTRIBUTION:** See previous discussion.

**PARALLELS:** See previous discussion.



**-RT-**

**ARTIFACT NUMBER/PROVENIENCE:**

PR90 Lot 926-2, Yard 6

**BOWL TYPE:** 3.13

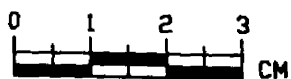
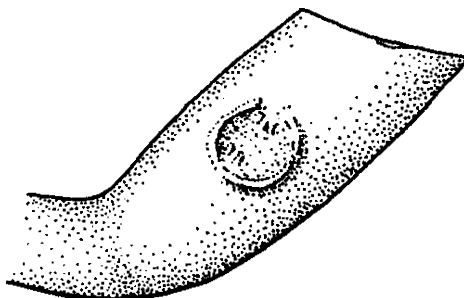
**STEM DIAMETER:** 5/64

**PIPES RECOVERED:** 1

**PIPEMAKER:** Robert Tippet and Family

**ATTRIBUTION:** See previous discussion.

**PARALLELS:** See previous discussion.

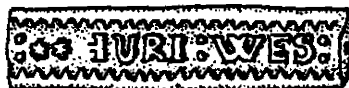


**-TERHOFF-****ARTIFACT NUMBER/PROVENIENCE:**

PR83 Lot 530-4, Building 1, Room 5

**BOWL TYPE:** Stem**STEM DIAMETER:** 4/64**PIPES RECOVERED:** 1**PIPEMAKER:** Unknown**ATTRIBUTION:** The pipemaker is unknown, but probably dates to the 19th century.**PARALLELS:** Unknown

Front side



Back side



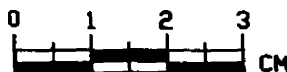
**-W.WHITE-****ARTIFACT NUMBER/PROVENIENCE:**

PR83 Lot 312-24, Building 1, Room 2

**BOWL TYPE:** Stem**STEM DIAMETER:** 4/64**PIPES RECOVERED:** 1**PIPEMAKER:** William White & Sons

**ATTRIBUTION:** This is the product of Glasgow pipemaker William White & Sons, whose firm began in 1805 and continued operations until 1955. Like the McDougall firm, the William White company was one of the leading makers and exporters of Scottish clay pipes in the 19th century. "W. White 131" appears on one side of the stem, indicating the catalog number, and "ITEGLAS" appears on the other, which represents White, Glasgow. This pipe probably was manufactured before 1891 and was recovered from Layer 2. Sources: Gallagher (1987:64, 81) and Walker (1977:343; 1983: 12-13).

**PARALLELS:** The pipes of the William White firm are commonly found on North American sites that have a 19th-century occupation period. Some examples include the Caleb Pusey House, Pennsylvania (Alexander 1983:220-221), the Foote House Dump site, Idaho (Pfeiffer 1983b:48), and the Hudson's Bay Company's Bellevue Farm, Washington (Pfeiffer 1983a:177). Stems of the White firm were also found by Marx (1968b:103, 1968c: 67, 69).

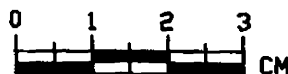
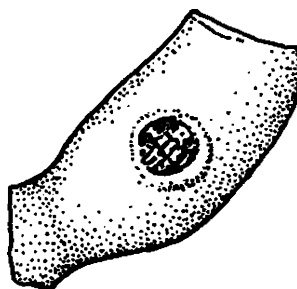


**-R/WILLIAMS-****ARTIFACT NUMBER/PROVENIENCE:**

PR90 Lot 2096-7, Ship

**BOWL TYPE:** 1.21**STEM DIAMETER:** 5/64**PIPES RECOVERED:** 1**PIPEMAKER:** Robert I or Roger Williams

**ATTRIBUTION:** One bowl with the cartouche "R/WILLIAMS" on the right-hand side of the bowl was recovered in 1990. It is possibly either the mark of Bristol pipemaker Robert Williams I or Roger Williams. Robert Williams I apprenticed to William Evans (I or II), was freed in 1685, and was last recorded in 1714. Roger Williams apprenticed to William Williams, was freed in 1668, and was probably dead by 1692. Sources: Jackson and Price (1974:79) Oswald (1975:159), and Walker (1977:1348-1350, 1508).

**PARALLELS:** Unknown

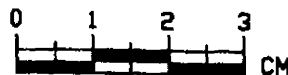
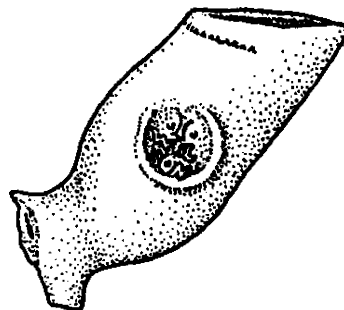
**-I/WIL/SON-****ARTIFACT NUMBER/PROVENIENCE:**

PR84 Lot 629, Building 1, Room 6

**BOWL TYPE:** 2.13**STEM DIAMETER:** Unknown**PIPES RECOVERED:** 1**PIPEMAKER:** John Wilson

**ATTRIBUTION:** One pipe bowl was recovered with the cartouche "I/WIL/SON" located on the right-hand side of the bowl. This is probably the mark of John Wilson (or Willson) of Bristol. He apprenticed to Thomas and Anne Harvey of Bristol and was freed in 1707. An apprentice of Wilson, John Wit Simmons, was turned over to James and Mary Jenkins after he complained of Wilson's repeated drunkenness and violence toward him. Wilson was last recorded in 1722 in the St. James Parish voting rolls. Walker notes that his cartouche often appears on the left side of the bowl, which is unusual among Bristol pipemakers. Sources: Jackson and Price (1974:77), Oswald (1975:159), and Walker (1977:622, 1354; 1509).

**PARALLELS:** "I/WIL/SON" pipes were also recovered by Marx. The mark was found as a cartouche (1968b:55, 1968c:81).

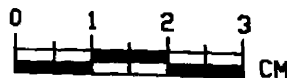
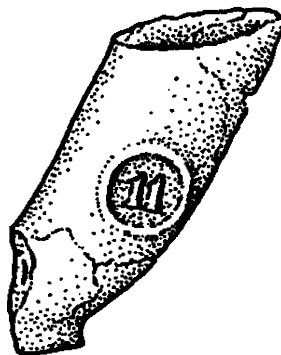




-11-

**ARTIFACT NUMBER/PROVENIENCE:**

PR83 Lot 506-1

**BOWL TYPE:** 1.63**STEM DIAMETER:** 5/64**PIPES RECOVERED:** 1**PIPEMAKER:** Unknown**ATTRIBUTION:** One pipe bowl was recovered with the cartouche "11" on the right-hand side of the bowl. The maker is unknown.**PARALLELS:** A similar pipe was found at Port Royal in the Old Naval Dockyard by Mayes (1972:114).

**- CROWNED A-****ARTIFACT NUMBER/PROVENIENCE:**

PR89 Lot 640, Building 5, Room 1

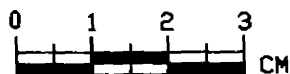
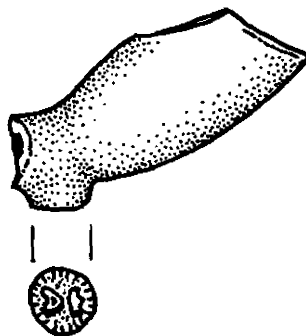
**BOWL TYPE:** Dutch

**PIPES RECOVERED:** 1

**PIPEMAKER:** Unknown

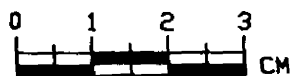
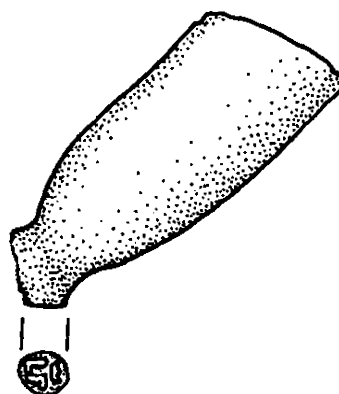
**ATTRIBUTION:** Unknown

**PARALLELS:** A crowned "A" pipe was recovered at the St. John's site in Maryland (Hurry and Keeler 1991:69).



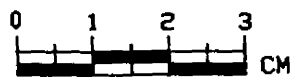
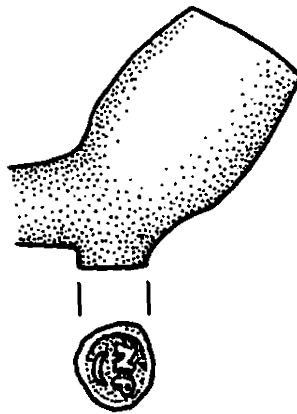
**-CROWNED LF-****ARTIFACT NUMBER/PROVENIENCE:**

PR81 Provenience unknown

**BOWL TYPE:** Dutch (Crowned LF)**PIPES RECOVERED:** 1**PIPEMAKER:** Unknown**ATTRIBUTION:** Unknown**PARALLELS:** Unknown

**-NP/CRESCENT MOON-****ARTIFACT NUMBER/PROVENIENCE:**

PR86 Lot 126-3, XU-3,

**BOWL TYPE:** Dutch (NP/half-moon)**PIPES RECOVERED:** 1**PIPEMAKER:** Unknown**ATTRIBUTION:** Unknown**PARALLELS:** Unknown

**-DOTS-****ARTIFACT NUMBER/PROVENIENCE:**

PR85 Lot 956-4, North of Building 1

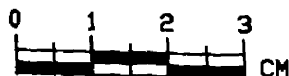
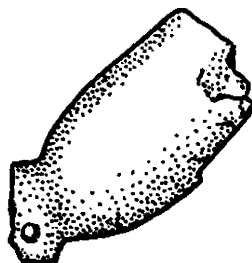
**BOWL TYPE:** Dutch

**PIPES RECOVERED:** 1

**PIPEMAKER:** Unknown

**ATTRIBUTION:** Unknown

**PARALLELS:** Dutch pipes with dot patterns have been found at European and North American sites and are a common stylistic motif on Dutch pipes. These pipes were also recovered by Marx in a raised grape pattern on the right-hand side of the bowl (1968c:85, No. 206).



**-TUDOR ROSE-****ARTIFACT NUMBER/PROVENIENCE:**

PR87 Lot 256-1, Building 2

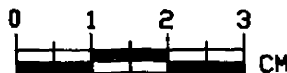
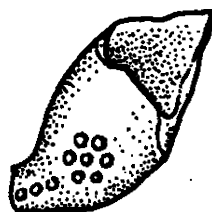
**BOWL TYPE:** Dutch

**PIPES RECOVERED:** 1

**PIPEMAKER:** Unknown

**ATTRIBUTION:** Although the attribution is unknown, the tudor rose, is one of the most popular marks found on Dutch pipes. The Tudor rose originated during the reign of Elizabeth (1558-1603), and became associated with Protestant pipemakers who adopted this design, signifying their allegiance with the House of Tudor during the reign of James I (1603-1625), especially among those who fled to Holland for religious and economic reasons (Duco 1981:376).

**PARALLELS:** Because this is a common motif found on Dutch pipes, tudor-rose marked pipes have been found in England and North American sites. Marx also recovered tudor rose pipes, where the mark was found on either side of the bowl (1968b:59).



**-CROWNED TUDOR ROSE-****ARTIFACT NUMBER/PROVENIENCE:**

PR87 Lot 284-2, Building 2

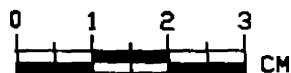
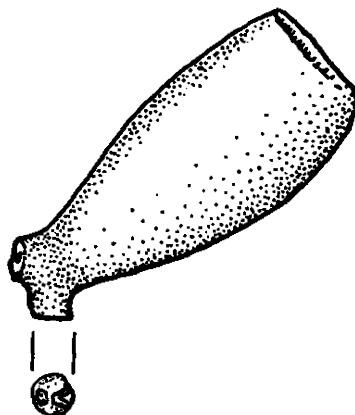
**BOWL TYPE:** Dutch

**PIPES RECOVERED:** 1

**PIPEMAKER:** Unknown

**ATTRIBUTION:** Please see previous explanation.

**PARALLELS:** This is a common motif found on Dutch pipes, which have been found in England and North American sites.



**-WHEEL-****ARTIFACT NUMBER/PROVENIENCE:**

PR84 Lot 618, Building 1, Room 6

**BOWL TYPE:** 2.23

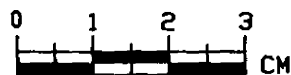
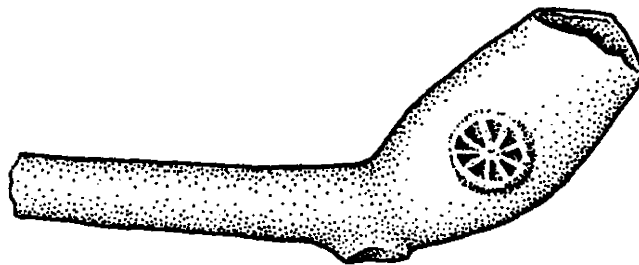
**STEM DIAMETER:** 5/64

**PIPES RECOVERED:** 1

**PIPEMAKER:** Unknown

**ATTRIBUTION:** Unknown

**PARALLELS:** Two "Wheel" pipes were also recovered by Marx. The mark is on the right-hand side of the bowl (1968c:83, No. 197).





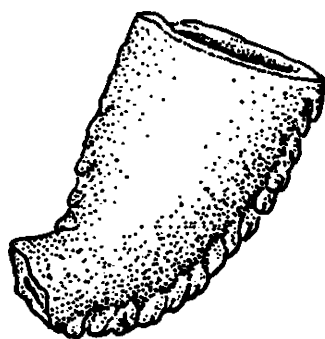
**-LEAF/FOLIATE-****ARTIFACT NUMBER/PROVENIENCE:**

PR83 Lot 545-3, Building 3, Room 1

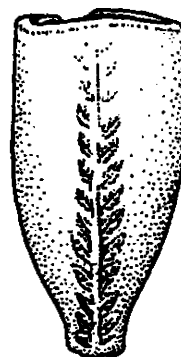
**BOWL TYPE:** 4.12**STEM DIAMETER:** 5/64**PIPES RECOVERED:** 1**PIPEMAKER:** Unknown

**ATTRIBUTION:** Although the pipemaker is unknown, it is possible that the pipe may have been manufactured by James White of Bristol, who was known to be active from 1837 to 1847 (Jackson and Price 1974:74). Another possibility is the R.F. Ring Company of Bristol.

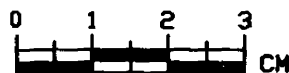
**PARALLELS:** An identical pipe is pictured in Ayto (1994:7), which he dates between 1840-1870. Another pipe similar to the Port Royal pipe is pictured in Jackson and Price (1974:129, Appendix VII), which they ascribe to James White. Oswald (1975:99, No.8) shows a similar leaf motif, which dates to about 1860 and was manufactured at the Warwick Factory in England. "Leaf" pipes were also recovered by Marx. (1968b:45, No. 96, 1968c:85, No. 207).



Side view



Front view



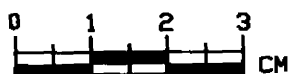
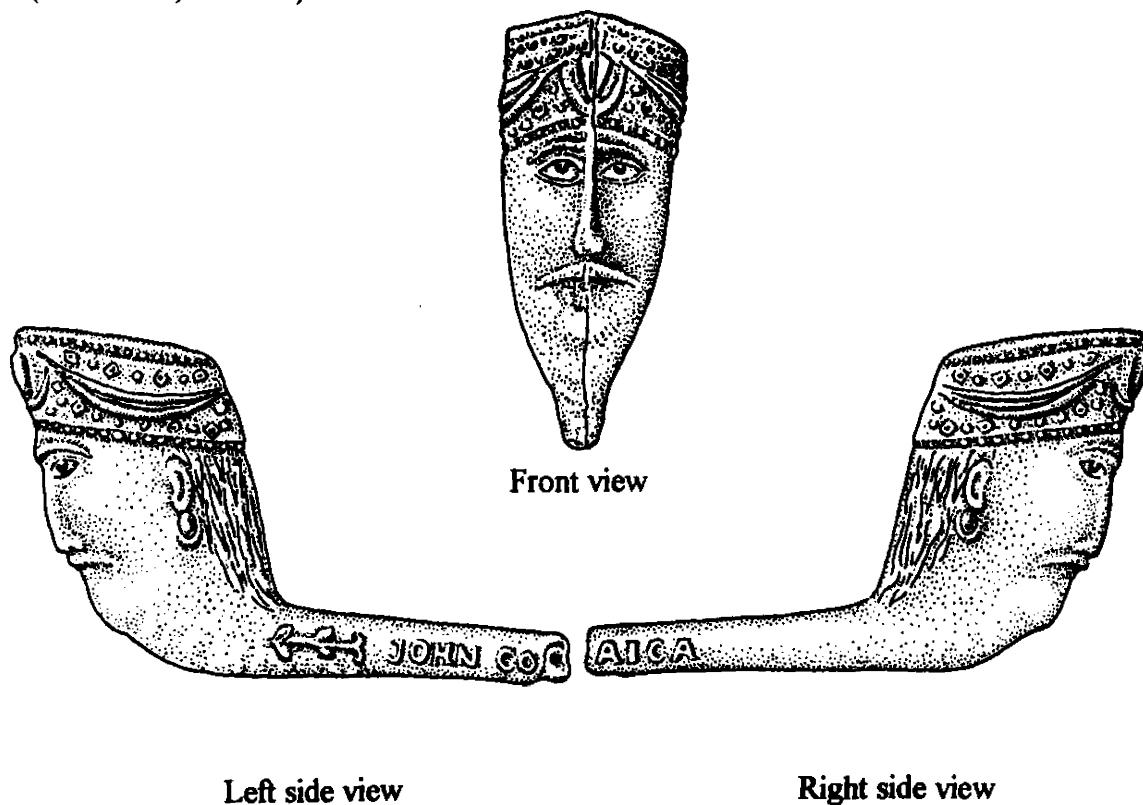
**-TURK'S HEAD-****ARTIFACT NUMBER/PROVENIENCE:**

PR84 Lot 617, Building 1, Room 6

**BOWL TYPE:** 4.14**STEM DIAMETER:** 4/64**PIPES RECOVERED:** 1**PIPEMAKER:** William Hensell (?)

**ATTRIBUTION:** The Turk's Head design is attributed to William Hensell of Norwich, England, whose pipes date from 1825 to 1853. His pipes were copied extensively.

**PARALLELS:** Turk's head pipes have been recovered from numerous 19th-century North American and British sites. A similar pipe was also recovered by Marx (1968c:101, No. 242).



MAKER'S MARK	DATE	ARTIFACT NUMBER/ PROVENIENCE	INA BOWL TYPE	NEW BOWL TYPE	STEM DIAMETER
IA	PR86	Lot 262, East of Yard 4B	9	1.63	4/64
IA	PR89	Lot 783, Ship	9	1.63	5/64
IA	PR90	Lot 2074-3, Ship	46	2.13	6/64
RA	PR87	Lot 353-2, East of Yard 4B	73	1.29	—
EB	PR81	Lot 66-248	—	—	7/64
EB	PR84	Lot 813, Alley	—	—	6/64
EB	PR81	Lot 66-243	16	1.13	7/64
EB	PR86	Lot 1135-4, Building 3, Room 3	16	1.13	7/64
EB	PR89	Lot 653-2, Building 5, Room 1	43	1.12	—
EB	PR85	Lot 1023-3, Building 3, Room 1	43	1.12	6/64
EB	PR81	Lot 56-32	52	1.11	7/64
EB	PR85	Lot 1075-1, Building 3, Room 1	52	1.11	7/64
EB	PR83	Lot 328, Building 1, Room 2	55	1.42	7/64
EB	PR85	Lot 1025-2, Building 3, Room 1	55	1.42	6/64
EB	PR86	Lot 1055-3, Building 3, Room 4	55	1.42	7/64
EB	PR85	Lot 1064-4, Building 3, Room 1	55	1.42	7/64
EB	PR85	Lot 1073-3, Building 3, Room 1	55	1.42	7/64
IB	PR85	Lot 1084-1, Building 3, Room 2	1	1.77	7/64
IB	PR85	Lot 1086-2, Building 3, Room 2	1	1.77	6/64
IB	PR86	Lot 165, XU-3	2	1.74	7/64
IB	PR83	Lot 500, Building 1, Room 5	2	1.74	7/64
IB	PR85	Lot 1086-2, Building 3, Room 1	2	1.74	6/64
IB	PR85	Lot 1088-2, Building 3, Room 2	2	1.74	6/64
IB	PR85	Lot 1078, Building 3, Room 2	2	1.74	7/64
IB	PR85	Lot 1083, Building 3, Room 2	2	1.74	6/64
IB	PR85	Lot 1084-1, Building 3, Room 2	2	1.74	6/64
IB	PR83	Lot 500, Building 1, Room 5	3	1.73	7/64
IB	PR85	Lot 1067-2, Building 3, Room 2	3	1.73	6/64
IB	PR85	Lot 1084-1, Building 3, Room 2	5	2.12	6/64
IB	PR85	Lot 1084-1, Building 3, Room 2	5	2.12	6/64
IB	PR85	Lot 1085-1, Building 3, Room 2	5	2.12	6/64
IB	PR83	Lot 500, Building 1, Room 5	6	1.91	—
IB	PR83	Lot 523-4, Building 1, Room 5	6	1.91	6/64

MAKER'S MARK	DATE	ARTIFACT NUMBER/ PROVENIENCE	INA BOWL TYPE	NEW BOWL TYPE	STEM DIAMETER
IB	PR83	Lot 531-4, Building 1, Room 5	6	1.91	6/64
IB	PR83	Lot 547-1, Building 1, Room 5	6	1.91	6/64
IB	PR85	Lot 1064-4, Building 3, Room 1	6	1.91	6/64
IB	PR85	Lot 1065-4, Building 3, Room 1	6	1.91	6/64
IB	PR85	Lot 1077-1, Building 3, Room 2	6	1.91	—
IB	PR85	Lot 1083, Building 3, Room 2	6	1.91	6/64
IB	PR85	Lot 1085-3, Building 3, Room 2	6	1.91	7/64
IB	PR86	Lot 1134-2, Building 3, Room 3	6	1.91	6/64
IB	PR86	Lot 1135-4, Building 3, Room 3	6	1.91	6/64
IB	PR86	Lot 1135-4, Building 3, Room 3	6	1.91	6/64
IB	PR86	Lot 1136-3, Building 3, Room 3	6	1.91	6/64
IB	PR88	Lot 1136-4, Building 3, Room 3	6	1.91	6/64
IB	PR90	Lot 904-2, Yard 5	6	1.91	7/64
IB	PR86	Lot 132, XU-3	47	1.27	5/64
LB	PR85	Lot 1084-2, Building 3, Room 2	2	1.74	6/64
LB	PR83	Lot 303-1, Building 2	4	2.22	6/64
LB	PR85	Lot 1068-1, Building 3, Room 2	5	2.12	—
MOR/BROWN	PR83	Lot 522-3, Building 1, Room 5	—	1.16	6/64
RC	PR83	Lot 312-41, Building 1, Room 2	9	1.83	5/64
RC	PR87	Lot 556-2, North of Building 5	—	—	4/64
TC	PR87	Lot 442, Yard 4B	66	1.24	5/64
TD	PR81	Lot 62-47	70	2.24	5/64
TD	PR87	Lot 331, Building 2	70	2.24	4/64
EDWARDS	PR89	Lot 733-1, Building 5, Room 3	—	—	—
EDWARDS	PR83	Lot 308-2, Building 1, Room 2	25	1.81	7/64
IE	PR85	Lot 1093-3, Building 3, Room 2	2	1.74	6/64
IE	PR90	Lot 887-4, Hearth 7	2	1.74	5/64
IE	PR84	Lot 617, Building 1, Room 6	9	1.83	6/64
IE	PR87	Lot 325-1, Building 2	9	1.83	5/64
IE	PR87	Lot 435-1, Yard 4B	9	1.83	5/64
IE	PR87	Lot 556-2, North of Building 5	9	1.83	5/64
IE	PR90	Lot 1054-1, Ship	24	1.53	5/64
IE	PR90	Lot 2074-16, Ship	64	2.23	5/64

MAKER'S MARK	DATE	ARTIFACT NUMBER/ PROVENIENCE	INA BOWL TYPE	NEW BOWL TYPE	STEM DIAMETER
IE	PR90	Lot 886-4, Hearth 7	69	1.62	5/64
IE	PR89	Lot 654-2, Building 5, Room 1	Stem	---	7/64
IE & SON	PR85	No Provenience	---	4.15	---
LE	PR81	Lot 65-59	---	---	8/64
LE	PR83	Lot 303-42, Building 1, Room 2	---	---	---
LE	PR83	Lot 325-4, Building 1, Room 2	---	---	---
LE	PR83	Lot 325-4, Building 1, Room 2	---	---	---
LE	PR83	Lot 524-4, Building 1, Room 5	---	---	---
LE	PR84	Lot 213-4, Building 1, Room 3	---	---	---
LE	PR84	Lot 638-3, Building 1, Room 6	---	---	---
LE	PR85	Lot 1078-3, Building 3, Room 2	---	---	---
LE	PR85	Lot 1083, Building 3, Room 2	---	---	6/64
LE	PR86	Lot 144-1, XU-3	---	---	7/64
LE	PR86	Lot 236-4, Building 2	---	---	7/64
LE	PR87	Lot 406-4, Yard 4B	---	---	---
LE	PR90	Lot 100, West of Building 5	---	---	7/64
LE	PR90	Lot 962-2, Yard 6, Cistern	---	---	---
LE	PR90	Lot 9612, Yard 6	---	---	8/64
LE	PR83	Lot 308-42, Building 1, Room 2	1	1.77	6/64
LE	PR83	Lot 500, Building 1, Room 5	1	1.77	7/64
LE	PR83	Lot 522-4, Building 1, Room 5	1	1.77	6/64
LE	PR83	Lot 531-4, Building 1, Room 5	1	1.77	7/64
LE	PR83	Lot 547-1, Building 1, Room 5	1	1.77	6/64
LE	PR87	Lot 403-1, Yard 4A	1	1.77	7/64
LE	PR83	Lot 316-18, Building 1, Room 2	2	1.74	6/64
LE	PR83	Lot 316-28, Building 1, Room 2	2	1.74	7/64
LE	PR83	Lot 500, Building 1, Room 5	2	1.74	6/64
LE	PR83	Lot 500, Building 1, Room 5	2	1.74	6/64
LE	PR83	Lot 500, Building 1, Room 5	2	1.74	6/64
LE	PR83	Lot 500, Building 1, Room 5	2	1.74	6/64
LE	PR83	Lot 522-2, Building 1, Room 5	2	1.74	7/64
LE	PR83	Lot 528-2, Building 1, Room 5	2	1.74	6/64
LE	PR83	Lot 529-1, Building 1, Room 5	2	1.74	7/64

MAKER'S MARK	DATE	ARTIFACT NUMBER/ PROVENIENCE	INA BOWL TYPE	NEW BOWL TYPE	STEM DIAMETER
LE	PR83	Lot 531-3, Building 1, Room 5	2	1.74	7/64
LE	PR83	Lot 531-3, Building 1, Room 5	2	1.74	6/64
LE	PR83	Lot 531-4, Building 1, Room 5	2	1.74	6/64
LE	PR83	Lot 531-4, Building 1, Room 5	2	1.74	7/64
LE	PR83	Lot 531-4, Building 1, Room 5	2	1.74	6/64
LE	PR84	Lot 842-1, Building 1, Room 6	2	1.74	7/64
LE	PR84	Lot 1025-3, Building 3, Room 1	2	1.74	7/64
LE	PR85	Lot 1025-3, Building 3, Room 1	2	1.74	7/64
LE	PR85	Lot 1064-3, Building 3, Room 1	2	1.74	6/74
LE	PR85	Lot 1064-4, Building 3, Room 1	2	1.74	6/64
LE	PR85	Lot 1068-2, Building 3, Room 2	2	1.74	6/64
LE	PR85	Lot 1078-2, Building 3, Room 2	2	1.74	6/64
LE	PR85	Lot 1078-2, Building 3, Room 2	2	1.74	7/64
LE	PR85	Lot 1083, Building 3, Room 2	2	1.74	6/64
LE	PR87	Lot 312, Building 2	2	1.74	7/64
LE	PR87	Lot 353-1, East of Yard 4B	2	1.74	6/64
LE	PR87	Lot 372, Hearth 4B	2	1.74	—
LE	PR87	Lot 435-1, Yard 4B	2	1.74	6/64
LE	PR87	Lot 435-1, Yard 4B	2	1.74	6/64
LE	PR89	Lot 723, Building 4, Room 4A	2	1.74	7/64
LE	PR89	Lot 869-1, Yard 4A	2	1.74	7/64
LE	PR83	Lot 531-3, Building 1, Room 5	3	1.73	6/64
LE	PR83	Lot 531-3, Building 1, Room 5	3	1.73	6/64
LE	PR83	Lot 809, Alley	3	1.73	6/64
LE	PR85	Lot 1066-1, Building 3, Room 1	3	1.73	6/64
LE	PR85	Lot 1077-2, Building 3, Room 2	3	1.73	6/64
LE	PR85	Lot 132, XU-3	3	1.73	7/64
LE	PR86	Lot 143-2, XU-3	3	1.73	7/64
LE	PR86	Lot 215-2, Building 2	3	1.73	—
LE	PR86	Lot 1126-3, Building 3, Room 3	3	1.73	7/64
LE	PR87	Lot 383-3, Yard 4B	3	1.73	—
LE	PR87	Lot 384-2, Yard 4B	3	1.73	7/64
LE	PR87	Lot 384-2, Yard 4B	3	1.73	7/64

MAKER'S MARK	DATE	ARTIFACT NUMBER/ PROVENIENCE	INA BOWL TYPE	NEW BOWL TYPE	STEM DIAMETER
LE	PR87	Lot 400, Yard 4B	3	1.73	7/64
LE	PR87	Lot 403-2, Yard 4B	3	1.73	6/64
LE	PR87	Lot 403-2, Yard 4B	3	1.73	6/64
LE	PR87	Lot 405-2, Yard 4B	3	1.73	6/64
LE	PR87	Lot 405-2, Yard 4B	3	1.73	7/64
LE	PR87	Lot 406-3, Yard 4B	3	1.73	7/64
LE	PR87	Lot 432, Yard 4B	3	1.73	6/64
LE	PR87	Lot 433-1, Yard 4B	3	1.73	7/64
LE	PR87	Lot 433-1, Yard 4B	3	1.73	7/64
LE	PR87	Lot 433-1, Yard 4B	3	1.73	7/64
LE	PR87	Lot 433-1, Yard 4B	3	1.73	7/64
LE	PR87	Lot 434-3, Yard 4B	3	1.73	6/64
LE	PR87	Lot 434-3, Yard 4B	3	1.73	7/64
LE	PR87	Lot 435-1, Yard 4B	3	1.73	6/64
LE	PR87	Lot 435-1, Yard 4B	3	1.73	6/64
LE	PR87	Lot 435-1, Yard 4B	3	1.73	6/64
LE	PR87	Lot 436-1, Yard 4B	3	1.73	6/64
LE	PR87	Lot 436-2, Yard 4B	3	1.73	7/64
LE	PR89	Lot 754-2, Yard 4A	3	1.73	6/64
LE	PR89	Lot 763-2, Yard 4B	3	1.73	6/64
LE	PR89	Lot 764-2, Yard 4B	3	1.73	6/64
LE	PR90	Lot 463-1, Yard 4A	3	1.73	6/64
LE	PR90	Lot 463-4, Yard 4A	3	1.73	7/64
LE	PR90	Lot 463-4, Yard 4A	3	1.73	6/64
LE	PR90	Lot 464-1, Yard 4A	3	1.73	7/64
LE	PR90	Lot 464-2, Yard 4A	3	1.73	6/64
LE	PR90	Lot 464-2, Yard 4A	3	1.73	6/64
LE	PR90	Lot 464-2, Yard 4A	3	1.73	6/64
LE	PR90	Lot 464-3, Yard 4A	3	1.73	7/64
LE	PR90	Lot 466-3, Yard 4A	3	1.73	7/64
LE	PR90	Lot 467-4, Yard 4A	3	1.73	7/64
LE	PR90	Lot 467-4, Yard 4A	3	1.73	7/64
LE	PR90	Lot 961-2, Yard 6, Cistern	3	1.73	6/64





MAKER'S MARK	DATE	ARTIFACT NUMBER/ PROVENIENCE	INA BOWL TYPE	NEW BOWL TYPE	STEM DIAMETER
LE	PR87	Lot 403-2, Yard 4B	72	1.23	8/64
LE	PR87	Lot 403-2, Yard 4B	72	1.23	8/64
LE	PR90	Lot 465-3, Yard 4A	75	1.44	—
LE	PR90	Lot 961-2, Yard 6, Cistern	75	1.44	8/64
LE	PR81	Lot 65-2	Stem	—	7/64
LE	PR82	Lot 161-37, Building 1, Room 2	Stem	—	7/64
LE	PR83	Lot 304-8, Building 1, Room 5	Stem	—	7/64
LE	PR83	Lot 500, Building 1, Room 5	Stem	—	7/64
LE	PR87	Lot 568-2, Building 8	Stem	—	8/64
LE	PR89	Lot 625-2, Building 5, Room 1	Stem	—	7/64
PE	PR86	Lot 125-4, XU-3	—	—	7/64
WE	PR81	Lot 50-29	—	—	—
WE	PR81	Lot 65-57	—	—	—
WE	PR83	Lot 547-1, Building 1, Room 5	—	—	8/64
WE	PR85	Lot 1083, Building 3, Room 2	—	—	—
WE	PR85	Lot 815-3, North Building 1	—	—	7/64
WE	PR89	Lot 748-2, Yard 4A	—	—	7/64
WE	PR89	Lot 839-1, Building 4, Room 4B	—	—	—
WE	PR83	Lot 316-36, Building 1, Room 2	2	1.74	7/64
WE	PR85	Lot 916-3, North of Building 1	2	1.74	7/64
WE	PR85	Lot 956-3, North of Building 1	2	1.74	7/64
WE	PR87	Lot 362-2, South of Building 4	2	1.74	7/64
WE	PR83	Lot 311-116, Building 1, Room2	3	1.73	8/64
WE	PR84	Lot 816, Alley	4	2.12	—
WE	PR90	Lot 887-9, Yard 7	25	1.81	7/64
WE	PR89	Lot 653-3, Building 5, Room 1	41	2.14	7/64
WE	PR87	Lot 534-4, Building 8	41	2.14	—
WE	PR86	Lot 124-4, XU-3	56	1.54	7/64
WE	PR87	Lot 353-2, East of Yard 4B	56	1.54	7/64
WE	PR81	Lot 52-24	Stem	—	7/64
WE	PR83	Lot 328, Building 1	Stem	—	7/64
WE	PR83	Lot 328, Building 1	Stem	—	7/64
WE	PR87	Lot 404-2, Yard 4B	Stem	—	7/64

MAKER'S MARK	DATE	ARTIFACT NUMBER/ PROVENIENCE	INA BOWL TYPE	NEW BOWL TYPE	STEM DIAMETER
GF	PR83	Lot 316-31, Building 1, Room 2	63	1.22	6/64
LF	PR81	Lot 1	—	—	6/64
LF	PR87	Lot 423-1, Yard 4B	3	1.73	8/64
LF	PR90	Lot 465-1, Yard 4A	25	1.61	7/64
RF	PR87	Lot 543-2, Building 5, Sidewalk	6	1.91	7/64
IH	PR89	Lot 633-1, Building 5, Sidewalk	24	1.53	5/64
IH	PR83	Lot 429-45, Building 1, Room 4	25	1.61	5/64
IH	PR86	Lot 115-1, XU-3	25	1.61	5/64
IH	PR89	Lot 823-4, Building 4, Room 4B	69	1.62	8/64
IH	PR89	Lot 897-2, Yard 4A	Stem	—	7/64
RH	PR89	Lot 864-1, Yard 4A	77	1.28	8/64
VJENK/INS	PR87	Lot 556-1, North Building 5	8	1.52	5/64
VJENK/INS	PR87	No Provenience	9	1.63	5/64
VJENK/INS	PR90	Lot 556-1, North Building 5	9	1.63	5/64
VJENK/INS	PR90	Lot 843-6, Ship	62	1.21	5/64
D/JONES	PR84	Lot 629-3, Building 1, Room 6	69	1.62	5/64
D/JONES	PR90	Lot 847-1, Yard 5	69	1.62	5/64
D/JONES	PR90	Lot 1083-2, Ship	69	1.62	5/64
LL	PR87	Lot 521, North of Building 5	71	1.56	7/64
CM	PR83	Lot 303-51, Building 1, Room 2	23	1.28	6/64
McDOUGALL	PR84	Lot 826, Alley	Stem	—	4/64
N	PR89	Lot 741-4, Yard 4A	23	1.28	7/64
RN	PR81	Lot 58-21	—	—	7/64
TO	PR89	Lot 825, Yard 4B	5	2.12	7/64
IP	PR87	Lot 353-1, East of Yard 4B	3	1.73	6/64
IP	PR81	Lot 58-15	Stem	—	—
IP	PR81	Lot 67-12	Stem	—	6/64
IP	PR84	Lot 801, Alley	Stem	—	7/64
IP	PR87	Lot 564-3, North of Building 5	Stem	—	7/64
IP	PR87	Lot 566-2, North of Building 5	Stem	—	7/64
ER	PR82	Lot 403-81, Building 1, Room 4	—	—	—
ER	PR83	Lot 319-1, Building 1, Room 2	7b	3.12	5/64
ER	PR86	Lot 1100, Building 3, Room 4	7b	3.12	6/64

MAKER'S MARK	DATE	ARTIFACT NUMBER/ PROVENIENCE	INA BOWL TYPE	NEW BOWL TYPE	STEM DIAMETER
ER	PR86	Lot 1117, Building 3, Room 4	7b	3.12	5/64
ER	PR82	Lot 103-5	8	1.52	5/64
E/REED/♥	PR86	Lot 1120, Building 3, Room 4	9	1.63	5/64
E/REED/♥	PR86	Lot 1122, Building 3, Room 4	9	1.63	5/64
E/REED/♥	PR87	Lot 286-2, Building 2	41	2.14	5/64
IS	PR86	Lot 1133-2, Building 3, Room 3	7b	3.12	5/64
IS	PR87	Lot 404-2, Yard 4B	7b	3.12	5/64
IS	PR87	Lot 584-3, Building 5, Sidewalk	9	1.63	5/64
IS	PR90	Lot 2074-11, Ship	25	1.61	6/64
IS	PR82	Lot 171-1	Stem	—	8/64
RT	PR90	Lot 466-3, Yard 4A	—	—	—
RT	PR83	Lot 428-3, Building 1, Room 4	2	1.74	—
RT	PR87	Lot 352-2, East of Yard 4B	5	2.12	7/64
RT	PR86	Lot 155-3, XU-3	7b	3.12	5/64
RT	PR90	Lot 928-2, Yard 6	7c	3.13	5/64
RT	PR83	Lot 314-20, Building 1, Room 2	9	1.63	5/64
RT	PR84	Lot 600, Building 1, Room 6	9	1.63	4/64
RT	PR84	Lot 611-2, Building 1, Room 6	9	1.63	—
RT	PR84	Lot 612-2, Building 1, Room 6	9	1.63	4/64
RT	PR86	Lot 113-1, XU-3	9	1.63	5/64
RT	PR90	Lot 814-5, Ship	9	1.63	5/64
RT	PR90	Lot 886-1, Yard 4A	10	1.72	6/64
RT	PR81	Lot 81-1	25	1.61	5/64
TERHOF	PR83	Lot 530-4, Building 1, Room 5	Stem	—	4/64
W. WHITE	PR83	Lot 312-24, Building 1, Room 2	Stem	—	—
WILLIAMS	PR90	Lot 2086-7, Ship	62	1.21	5/64
WILSON	PR84	Lot 629, Building 1, Room 6	46	2.13	—
M73	PR86	Lot 125-1, XU-3	Stem	—	—
11	PR83	Lot 506-1, Building 1, Room 5	9	1.63	5/64

**APPENDIX B**  
**KAOLIN PIPE BOWL TYPES AT PORT ROYAL**  
**AND THEIR PROVENIENCES, 1981-1990**

INA BOWL TYPE	NEW BOWL TYPE	YEAR	ARTIFACT NUMBER/ PROVENIENCE	STEM DIAMETER	QUANTITY	MAKERS MARK
1	1.77	PR83	Lot 170-8, Building 1	5/64	2	---
1	1.77	PR83	Lot 170-8, Building 1	6/64	2	---
1	1.77	PR83	Lot 303-69, Building 1, Room 2	7/64	1	---
1	1.77	PR83	Lot 308-42, Building 1, Room 2	6/64	1	LE
1	1.77	PR83	Lot 408-25, Building 1, Room 4	6/64	1	---
1	1.77	PR83	Lot 420-34, Building 1, Room 4	6/64	1	---
1	1.77	PR83	Lot 500, Building 1, Room 5	5/64	1	---
1	1.77	PR83	Lot 500, Building 1, Room 5	6/64	85	---
1	1.77	PR83	Lot 500, Building 1, Room 5	7/64	1	LE
1	1.77	PR83	Lot 502, Building 1, Room 5	6/64	1	---
1	1.77	PR83	Lot 503-2, Building 1, Room 5	4/64	1	---
1	1.77	PR83	Lot 503-2, Building 1, Room 5	6/64	2	---
1	1.77	PR83	Lot 503-3, Building 1, Room 5	6/64	1	---
1	1.77	PR83	Lot 503-4, Building 1, Room 5	6/64	15	---
1	1.77	PR83	Lot 504-1, Building 1, Room 5	6/64	5	---
1	1.77	PR83	Lot 504-3, Building 1, Room 5	6/64	2	---
1	1.77	PR83	Lot 504-4, Building 1, Room 5	6/64	5	---
1	1.77	PR83	Lot 505-2, Building 1, Room 5	6/64	15	---
1	1.77	PR83	Lot 506-1, Building 1, Room 5	6/64	9	---
1	1.77	PR83	Lot 506-2, Building 1, Room 5	6/64	2	---
1	1.77	PR83	Lot 506-2, Building 1, Room 5	7/64	1	---
1	1.77	PR83	Lot 506-3, Building 1, Room 5	6/64	1	---
1	1.77	PR83	Lot 506-4, Building 1, Room 5	6/64	2	---
1	1.77	PR83	Lot 508, Building 1, Room 5	6/64	2	---
1	1.77	PR83	Lot 509-4, Building 1, Room 5	6/64	5	---
1	1.77	PR83	Lot 510-1, Building 1, Room 5	6/64	9	---
1	1.77	PR83	Lot 510-2, Building 1, Room 5	6/64	7	---
1	1.77	PR83	Lot 510-3, Building 1, Room 5	6/64	29	---
1	1.77	PR83	Lot 510-3, Building 1, Room 5	7/64	1	---
1	1.77	PR83	Lot 510-4, Building 1, Room 5	---	1	---
1	1.77	PR83	Lot 510-4, Building 1, Room 5	6/64	5	---

INA BOWL TYPE	NEW BOWL TYPE	YEAR	ARTIFACT NUMBER/ PROVENIENCE	STEM DIAMETER	QUANTITY	MAKERS MARK
1	1.77	PR83	Lot 510-4, Building 1, Room 5	7/64	1	---
1	1.77	PR83	Lot 511-6, Building 1, Room 5	6/64	2	---
1	1.77	PR83	Lot 511-7, Building 1, Room 5	6/64	1	---
1	1.77	PR83	Lot 511-1, Building 1, Room 5	7/64	1	---
1	1.77	PR83	Lot 511-7, Building 1, Room 5	6/64	1	---
1	1.77	PR83	Lot 512-1, Building 1, Room 5	6/64	6	---
1	1.77	PR83	Lot 512-2, Building 1, Room 5	6/64	19	---
1	1.77	PR83	Lot 512-2, Building 1, Room 5	7/64	1	---
1	1.77	PR83	Lot 512-3, Building 1, Room 5	6/64	4	---
1	1.77	PR83	Lot 512-4, Building 1, Room 5	6/64	14	---
1	1.77	PR83	Lot 513-4, Building 1, Room 5	6/64	1	---
1	1.77	PR83	Lot 521-1, Building 1, Room 5	6/64	1	---
1	1.77	PR83	Lot 522, Building 1, Room 5	6/64	4	---
1	1.77	PR83	Lot 522-1, Building 1, Room 5	6/64	13	---
1	1.77	PR83	Lot 522-2, Building 1, Room 5	6/64	6	---
1	1.77	PR83	Lot 522-2, Building 1, Room 5	7/64	1	---
1	1.77	PR83	Lot 522-3, Building 1, Room 5	6/64	51	---
1	1.77	PR83	Lot 522-3, Building 1, Room 5	7/64	1	---
1	1.77	PR83	Lot 522-4, Building 1, Room 5	6/64	103	---
1	1.77	PR83	Lot 522-4, Building 1, Room 5	6/64	1	LE
1	1.77	PR83	Lot 523-2, Building 1, Room 5	---	1	---
1	1.77	PR83	Lot 523-2, Building 1, Room 5	6/64	1	---
1	1.77	PR83	Lot 523-3, Building 1, Room 5	6/64	22	---
1	1.77	PR83	Lot 524, Building 1, Room 5	6/64	2	---
1	1.77	PR83	Lot 524-1, Building 1, Room 5	5/64	1	---
1	1.77	PR83	Lot 524-1, Building 1, Room 5	6/64	57	---
1	1.77	PR83	Lot 524-2, Building 1, Room 5	6/64	29	---
1	1.77	PR83	Lot 524-3, Building 1, Room 5	5/64	1	---
1	1.77	PR83	Lot 524-4, Building 1, Room 5	6/64	1	---
1	1.77	PR83	Lot 525, Building 1, Room 5	6/64	1	---
1	1.77	PR83	Lot 525-2, Building 1, Room 5	6/64	21	---

INA BOWL TYPE	NEW BOWL TYPE	YEAR	ARTIFACT NUMBER/ PROVENIENCE	STEM DIAMETER	QUANTITY	MAKERS MARK
1	1.77	PR83	Lot 525-3, Building 1, Room 5	6/64	2	---
1	1.77	PR83	Lot 525-4, Building 1, Room 5	6/64	15	---
1	1.77	PR83	Lot 525-5, Building 1, Room 5	6/64	1	---
1	1.77	PR83	Lot 528-2, Building 1, Room 5	6/64	2	---
1	1.77	PR83	Lot 528-3, Building 1, Room 5	6/64	6	---
1	1.77	PR83	Lot 529-1, Building 1, Room 5	---	1	---
1	1.77	PR83	Lot 529-1, Building 1, Room 5	6/64	23	---
1	1.77	PR83	Lot 529-3, Building 1, Room 5	6/64	8	---
1	1.77	PR83	Lot 530-1, Building 1, Room 5	6/64	1	---
1	1.77	PR83	Lot 530-4, Building 1, Room 5	5/64	2	---
1	1.77	PR83	Lot 531-1, Building 1, Room 5	6/64	10	---
1	1.77	PR83	Lot 531-2, Building 1, Room 5	6/64	1	---
1	1.77	PR83	Lot 531-3, Building 1, Room 5	6/64	1	---
1	1.77	PR83	Lot 531-4, Building 1, Room 5	6/64	5	---
1	1.77	PR83	Lot 531-4, Building 1, Room 5	7/64	1	LE
1	1.77	PR83	Lot 535-2, Building 1, Room 5	6/64	1	---
1	1.77	PR83	Lot 541-2, Building 1, Room 5	5/64	1	---
1	1.77	PR83	Lot 547-1, Building 1, Room 5	6/64	4	---
1	1.77	PR83	Lot 547-1, Building 1, Room 5	6/64	1	LE
1	1.77	PR83	Lot 548-4, Building 1, Room 5	6/64	3	---
1	1.77	PR83	Lot 601-1, Building 1, Room 6	6/64	3	---
1	1.77	PR84	Lot 200, Building 1, Room 3	6/64	1	---
1	1.77	PR84	Lot 219-4, Building 1, Room 3	5/64	1	---
1	1.77	PR84	Lot 221, Building 1, Room 3	6/64	1	---
1	1.77	PR84	Lot 600, Building 1, Room 6	6/64	4	---
1	1.77	PR84	Lot 605-3, Building 1, Room 6	6/64	3	---
1	1.77	PR84	Lot 609-2, Building 1, Room 6	6/64	2	---
1	1.77	PR84	Lot 613-1, Building 1, Room 6	6/64	3	---
1	1.77	PR84	Lot 613-4, Building 1, Room 6	6/64	1	---
1	1.77	PR84	Lot 614-2, Building 1, Room 6	6/64	5	---
1	1.77	PR84	Lot 614-3, Building 1, Room 6	6/64	1	---

INA BOWL TYPE	NEW BOWL TYPE	YEAR	ARTIFACT NUMBER/ PROVENIENCE	STEM DIAMETER	QUANTITY	MAKERS MARK
1	1.77	PR84	Lot 614-4, Building 1, Room 6	6/64	7	—
1	1.77	PR84	Lot 615-1, Building 3, Room 2	6/64	2	—
1	1.77	PR84	Lot 615-3, Building 3, Room 2	6/64	6	—
1	1.77	PR84	Lot 615-4, Building 3, Room 2	5/64	1	—
1	1.77	PR84	Lot 615-4, Building 3, Room 2	6/64	15	—
1	1.77	PR84	Lot 615-4, Building 3, Room 2	7/64	1	—
1	1.77	PR84	Lot 629-2, Outside Building 1/3	6/64	1	—
1	1.77	PR84	Lot 630-1, Building 3, Room 2	6/64	6	—
1	1.77	PR84	Lot 630-1, Building 3, Room 2	7/64	3	—
1	1.77	PR84	Lot 630-1, Building 3, Room 2	8/64	2	—
1	1.77	PR84	Lot 630-4, Building 3, Room 2	6/64	17	—
1	1.77	PR84	Lot 647-4, Building 1, Room 6	6/64	2	—
1	1.77	PR85	Lot 912, North of Building 1	—	2	—
1	1.77	PR85	Lot 916-4, North of Building 1	7/64	1	—
1	1.77	PR85	Lot 1011, North of Building 3	8/64	1	—
1	1.77	PR85	Lot 1011, North of Building 3	7/64	1	—
1	1.77	PR85	Lot 1023-1, Building 3, Room 1	—	6	—
1	1.77	PR85	Lot 1023-3, Building 3, Room 1	6/64	2	—
1	1.77	PR85	Lot 1023-3, Building 3, Room 1	7/64	1	—
1	1.77	PR85	Lot 1023-3, Building 3, Room 1	6/64	1	—
1	1.77	PR85	Lot 1025-1, Building 3, Room 1	—	7	—
1	1.77	PR85	Lot 1025-2, Building 3, Room 1	—	1	—
1	1.77	PR85	Lot 1025-3, Building 3, Room 1	6/64	1	—
1	1.77	PR85	Lot 1025-3, Building 3, Room 1	7/64	1	—
1	1.77	PR85	Lot 1034-36, Building 3, Room 1	—	2	—
1	1.77	PR85	Lot 1041, North of Building 3	6/64	1	—
1	1.77	PR85	Lot 1051, Building 3, Room 4	8/64	1	—
1	1.77	PR85	Lot 1063-4, Building 3, Room 1	—	1	—
1	1.77	PR85	Lot 1064-3, Building 3, Room 1	8/64	1	—
1	1.77	PR85	Lot 1065-2, Building 3, Room 1	6/64	2	—
1	1.77	PR85	Lot 1065-3, Building 3, Room 1	7/64	1	—



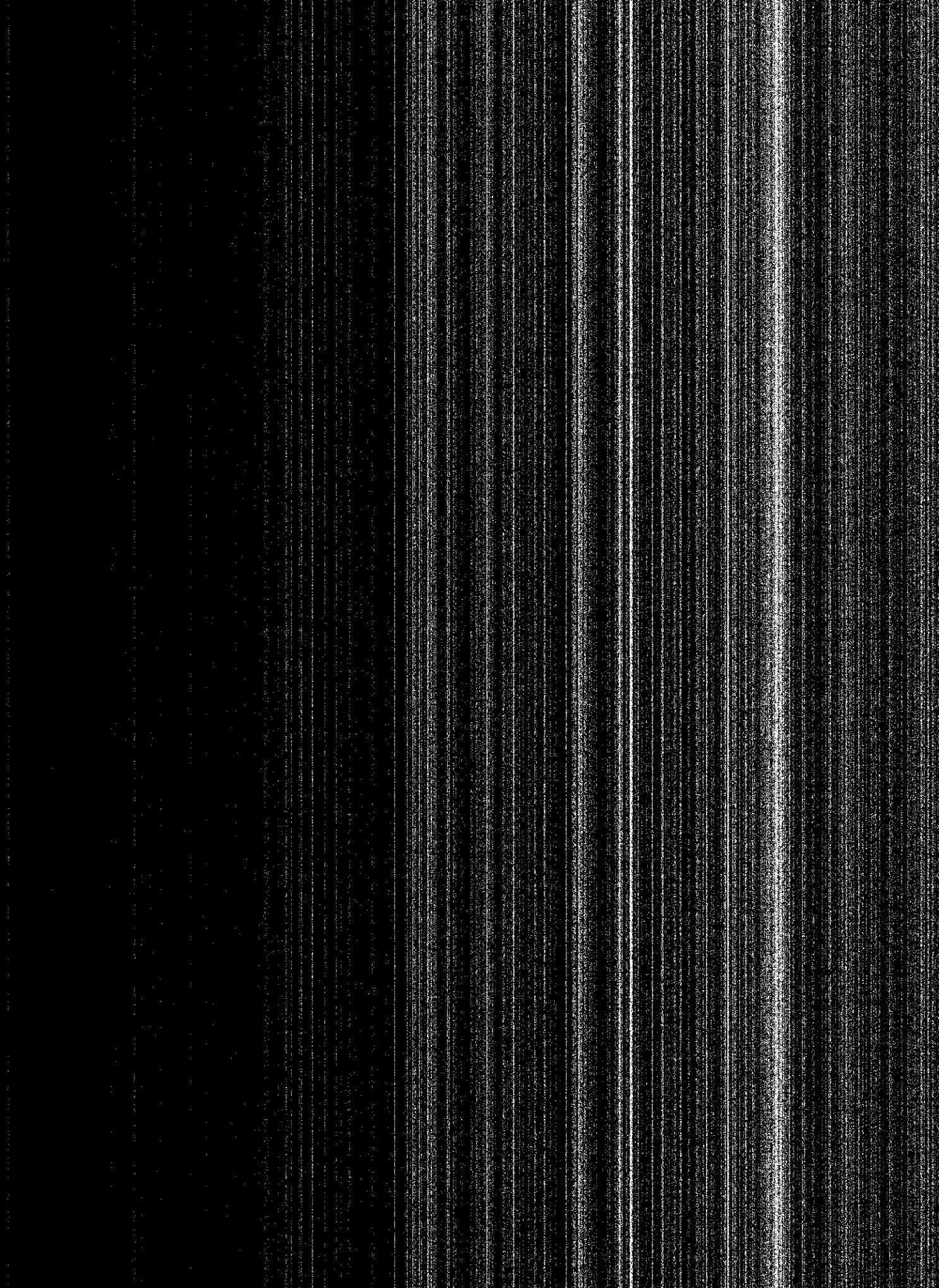
INA BOWL TYPE	NEW BOWL TYPE	YEAR	ARTIFACT NUMBER/ PROVENIENCE	STEM DIAMETER	QUANTITY	MAKERS MARK
1	1.77	PR85	Lot 1065-4, Building 3, Room 1	---	1	---
1	1.77	PR85	Lot 1065-4, Building 3, Room 1	5/64	1	---
1	1.77	PR85	Lot 1065-4, Building 3, Room 1	6/64	1	---
1	1.77	PR85	Lot 1066-2, Building 3, Room 1	---	1	---
1	1.77	PR85	Lot 1066-1, Building 3, Room 2	7/64	2	---
1	1.77	PR85	Lot 1068-1, Building 3, Room 2	8/64	1	---
1	1.77	PR85	Lot 1071, Building 3, Room 1	8/64	1	---
1	1.77	PR85	Lot 1077-2, Building 3, Room 2	6/64	1	---
1	1.77	PR85	Lot 1083-1, Building 3, Room 2	6/64	2	---
1	1.77	PR85	Lot 1083-2, Building 3, Room 2	7/64	1	---
1	1.77	PR85	Lot 1083-4, Building 3, Room 2	6/64	1	---
1	1.77	PR85	Lot 1084-1, Building 3, Room 2	7/64	1	IB
1	1.77	PR85	Lot 1084-2, Building 3, Room 2	8/64	1	---
1	1.77	PR85	Lot 1086-2, Building 3, Room 2	6/64	1	IB
1	1.77	PR85	Lot 1086-3, Building 3, Room 2	7/64	1	---
1	1.77	PR85	Lot 1087-1, Outside Building 3	6/64	2	---
1	1.77	PR85	Lot 1093-1, Building 3, Room 2	6/64	2	---
1	1.77	PR85	Lot 1093-1, Building 3, Room 2	7/64	1	---
1	1.77	PR86	Lot 143-1, XU-3	---	1	---
1	1.77	PR86	Lot 156-4, XU-3	---	1	---
1	1.77	PR86	Lot 1135-4, Building 3, Room 3	6/64	1	---
1	1.77	PR87	Lot 353-1, Hearth 4A/4B	7/64	1	---
1	1.77	PR87	Lot 354-1, Hearth 4A/4B	7/64	1	---
1	1.77	PR87	Lot 374-2, Hearth 4A/4B	7/64	1	---
1	1.77	PR87	Lot 403-1, Yard 4B	7/64	1	LE
1	1.77	PR87	Lot 435-2, Yard 4B	---	1	---
1	1.77	PR89	Lot 654-4, Building 5, Room 1	8/64	1	---
2	1.74	PR81	Lot 65-24	7/64	1	---
2	1.74	PR82	Lot 101-44	7/64	1	---
2	1.74	PR82	Lot 161-18, Building 1, Room 2	5/64	1	---
2	1.74	PR82	Lot 161-44, Building 1, Room 2	7/64	1	---

INA BOWL TYPE	NEW BOWL TYPE	YEAR	ARTIFACT NUMBER/ PROVENIENCE	STEM DIAMETER	QUANTITY	MAKERS MARK
2	1.74	PR82	Lot 161-186, Building 1, Room 2	6/64	1	---
2	1.74	PR83	Lot 252-2, East Yard 4B	5/64	1	---
2	1.74	PR83	Lot 308-9, Building 1	7/64	1	---
2	1.74	PR83	Lot 309-163, Building 1	6/64	1	---
2	1.74	PR83	Lot 316-18, Building 1, Room 2	6/64	1	LE
2	1.74	PR83	Lot 316-28, Building 1, Room 2	7/64	1	LE
2	1.74	PR83	Lot 316-52, Building 1, Room 2	---	1	---
2	1.74	PR83	Lot 403-46, Building 1, Room 4	6/64	1	---
2	1.74	PR83	Lot 408-25, Building 1, Room 4	6/64	2	---
2	1.74	PR83	Lot 428-3, Building 1, Room 4	---	1	RT
2	1.74	PR83	Lot 500, Building 1, Room 5	5/64	13	---
2	1.74	PR83	Lot 500, Building 1, Room 5	6/64	26	---
2	1.74	PR83	Lot 500, Building 1, Room 5	6/64	3	LE
2	1.74	PR83	Lot 500, Building 1, Room 5	6/64	1	IB
2	1.74	PR83	Lot 500, Building 1, Room 5	7/64	1	LE
2	1.74	PR83	Lot 503-4, Building 1, Room 5	6/64	3	---
2	1.74	PR83	Lot 504-1, Building 1, Room 5	5/64	1	---
2	1.74	PR83	Lot 504-4, Building 1, Room 5	6/64	2	---
2	1.74	PR83	Lot 506-1, Building 1, Room 5	5/64	1	---
2	1.74	PR83	Lot 506-2, Building 1, Room 5	5/64	1	---
2	1.74	PR83	Lot 510-1, Building 1, Room 5	5/64	1	---
2	1.74	PR83	Lot 510-2, Building 1, Room 5	5/64	1	---
2	1.74	PR83	Lot 510-3, Building 1, Room 5	5/64	3	---
2	1.74	PR83	Lot 510-3, Building 1, Room 5	6/64	3	---
2	1.74	PR83	Lot 512-2, Building 1, Room 5	5/64	3	---
2	1.74	PR83	Lot 512-3, Building 1, Room 5	5/64	1	---
2	1.74	PR83	Lot 522-1, Building 1, Room 5	5/64	3	---
2	1.74	PR83	Lot 522-1, Building 1, Room 5	6/64	1	---
2	1.74	PR83	Lot 522-2, Building 1, Room 5	5/64	2	---
2	1.74	PR83	Lot 522-2, Building 1, Room 5	7/64	1	LE
2	1.74	PR83	Lot 522-3, Building 1, Room 5	5/64	5	---

INA BOWL TYPE	NEW BOWL TYPE	YEAR	ARTIFACT NUMBER/ PROVENIENCE	STEM DIAMETER	QUANTITY	MAKERS MARK
2	1.74	PR83	Lot 522-4, Building 1, Room 5	5/64	18	---
2	1.74	PR83	Lot 523-3, Building 1, Room 5	5/64	1	---
2	1.74	PR83	Lot 523-3, Building 1, Room 5	6/64	1	---
2	1.74	PR83	Lot 524-1, Building 1, Room 5	5/64	8	---
2	1.74	PR83	Lot 524-1, Building 1, Room 5	6/64	1	---
2	1.74	PR83	Lot 524-2, Building 1, Room 5	5/64	1	---
2	1.74	PR83	Lot 524-2, Building 1, Room 5	6/64	1	---
2	1.74	PR83	Lot 525-2, Building 1, Room 5	5/64	2	---
2	1.74	PR83	Lot 528-1, Building 1, Room 5	6/64	1	---
2	1.74	PR83	Lot 528-2, Building 1, Room 5	5/64	1	---
2	1.74	PR83	Lot 528-2, Building 1, Room 5	6/64	2	---
2	1.74	PR83	Lot 528-2, Building 1, Room 5	6/64	1	LE
2	1.74	PR83	Lot 528-8, Building 1, Room 5	6/64	1	---
2	1.74	PR83	Lot 528-10, Building 1, Room 5	6/64	1	---
2	1.74	PR83	Lot 529-1, Building 1, Room 5	5/64	4	---
2	1.74	PR83	Lot 529-1, Building 1, Room 5	6/64	1	---
2	1.74	PR83	Lot 529-1, Building 1, Room 5	7/64	1	LE
2	1.74	PR83	Lot 529-3, Building 1, Room 5	5/64	3	---
2	1.74	PR83	Lot 529-3, Building 1, Room 5	6/64	1	---
2	1.74	PR83	Lot 529-4, Building 1, Room 5	5/64	1	---
2	1.74	PR83	Lot 529-4, Building 1, Room 5	6/64	1	---
2	1.74	PR83	Lot 529-4, Building 1, Room 5	7/64	1	---
2	1.74	PR83	Lot 530-1, Building 1, Room 5	5/64	1	---
2	1.74	PR83	Lot 530-3, Building 1, Room 5	5/64	2	---
2	1.74	PR83	Lot 530-4, Building 1, Room 5	5/64	1	---
2	1.74	PR83	Lot 530-4, Building 1, Room 5	6/64	3	---
2	1.74	PR83	Lot 531-1, Building 1, Room 5	6/64	1	---
2	1.74	PR83	Lot 531-2, Building 1, Room 5	5/64	3	---
2	1.74	PR83	Lot 531-2, Building 1, Room 5	6/64	4	---
2	1.74	PR83	Lot 531-3, Building 1, Room 5	5/64	2	---
2	1.74	PR83	Lot 531-3, Building 1, Room 5	6/64	7	---

INA BOWL TYPE	NEW BOWL TYPE	YEAR	ARTIFACT NUMBER/ PROVENIENCE	STEM DIAMETER	QUANTITY	MAKERS MARK
2	1.74	PR83	Lot 531-3, Building 1, Room 5	6/64	1	LE
2	1.74	PR83	Lot 531-3, Building 1, Room 5	7/64	2	---
2	1.74	PR83	Lot 531-3, Building 1, Room 5	7/64	1	LE
2	1.74	PR83	Lot 531-4, Building 1, Room 5	5/64	1	---
2	1.74	PR83	Lot 531-4, Building 1, Room 5	6/64	12	---
2	1.74	PR83	Lot 531-4, Building 1, Room 5	6/64	2	LE
2	1.74	PR83	Lot 531-4, Building 1, Room 5	7/64	1	---
2	1.74	PR83	Lot 531-4, Building 1, Room 5	7/64	2	LE
2	1.74	PR83	Lot 545-3, Building 1, Room 5	6/64	1	---
2	1.74	PR83	Lot 547-1, Building 1, Room 5	5/64	16	---
2	1.74	PR83	Lot 547-1, Building 1, Room 5	6/64	22	---
2	1.74	PR83	Lot 548-4, Building 1, Room 5	6/64	1	---
2	1.74	PR84	Lot 200, Building 1, Room 3	5/64	1	---
2	1.74	PR84	Lot 200, Building 1, Room 3	6/64	1	---
2	1.74	PR84	Lot 220-3, Building 1, Room 3	7/64	1	---
2	1.74	PR84	Lot 232-2, Building 1, Room 3	6/64	1	---
2	1.74	PR84	Lot 614-2, Building 1, Room 6	5/64	1	---
2	1.74	PR84	Lot 615-3, Building 3, Room 2	6/64	1	---
2	1.74	PR86	Lot 615-3, Building 3, Room 2	7/64	1	---
2	1.74	PR84	Lot 615-4, Building 3, Room 2	5/64	12	---
2	1.74	PR84	Lot 615-4, Building 3, Room 2	6/64	16	---
2	1.74	PR84	Lot 617-3, Building 1, Room 6	6/64	1	---
2	1.74	PR84	Lot 630-1, Building 3, Room 2	6/64	15	---
2	1.74	PR84	Lot 630-4, Building 1, Room 6	6/64	6	---
2	1.74	PR84	Lot 630-4, Building 1, Room 6	7/64	17	---
2	1.74	PR84	Lot 842-1, Building 1, Room 6	7/64	1	LE
2	1.74	PR84	Lot 809, Alley	7/64	2	---
2	1.74	PR85	Lot 912, North of Building 1	---	1	---
2	1.74	PR85	Lot 915-4, North of Building 1	6/64	12	---
2	1.74	PR85	Lot 916-3, North of Building 1	7/64	1	---
2	1.74	PR85	Lot 916-3, North of Building 1	7/64	1	WE

INA BOWL TYPE	NEW BOWL TYPE	YEAR	ARTIFACT NUMBER/ PROVENIENCE	STEM DIAMETER	QUANTITY	MAKERS MARK
2	1.74	PR85	Lot 956-3, North of Building 1	7/64	1	WE
2	1.74	PR85	Lot 1011, North of Building 3	5/64	1	---
2	1.74	PR85	Lot 1023-1, Building 3, Room 1	6/64	5	---
2	1.74	PR85	Lot 1023-3, Building 3, Room 1	5/64	3	---
2	1.74	PR85	Lot 1025-1, Building 3, Room 1	---	12	---
2	1.74	PR85	Lot 1025-2, Building 3, Room 1	---	6	---
2	1.74	PR85	Lot 1025-3, Building 3, Room 1	7/64	2	LE
2	1.74	PR85	Lot 1025-4, Building 3, Room 1	6/64	2	---
2	1.74	PR85	Lot 1026-1, Building 3, Room 1	---	1	---
2	1.74	PR85	Lot 1026-4, Building 3, Room 1	---	1	---
2	1.74	PR85	Lot 1060, Building 3, Room 1	6/64	1	---
2	1.74	PR85	Lot 1063-4, Building 3, Room 1	---	1	---
2	1.74	PR85	Lot 1064-1, Building 3, Room 1	6/64	1	---
2	1.74	PR85	Lot 1064-3, Building 3, Room 1	6/64	1	LE
2	1.74	PR85	Lot 1064-3, Building 3, Room 1	7/64	1	---
2	1.74	PR85	Lot 1064-4, Building 3, Room 1	6/64	1	LE
2	1.74	PR85	Lot 1065-1, Building 3, Room 1	6/64	1	---
2	1.74	PR85	Lot 1065-2, Building 3, Room 1	5/64	1	---
2	1.74	PR85	Lot 1065-2, Building 3, Room 1	6/64	3	---
2	1.74	PR85	Lot 1066-1, Building 3, Room 1	6/64	5	---
2	1.74	PR85	Lot 1066-1, Building 3, Room 1	7/64	1	---
2	1.74	PR85	Lot 1066-2, Building 3, Room 1	6/64	1	IB
2	1.74	PR85	Lot 1067, Building 3, Room 2	6/64	105	---
2	1.74	PR85	Lot 1067-1, Building 3, Room 2	6/64	1	---
2	1.74	PR85	Lot 1067-2, Building 3, Room 2	6/64	10	---
2	1.74	PR85	Lot 1068-1, Building 3, Room 2	---	2	---
2	1.74	PR85	Lot 1068-1, Building 3, Room 2	6/64	8	---
2	1.74	PR85	Lot 1068-2, Building 3, Room 2	6/64	22	---
2	1.74	PR85	Lot 1068-2, Building 3, Room 2	6/64	1	IB
2	1.74	PR85	Lot 1068-2, Building 3, Room 2	6/64	1	LE
2	1.74	PR85	Lot 1077-1, Building 3, Room 2	6/64	3	---



INA BOWL TYPE	NEW BOWL TYPE	YEAR	ARTIFACT NUMBER/ PROVENIENCE	STEM DIAMETER	QUANTITY	MAKERS MARK
2	1.74	PR85	Lot 1077-2, Building 3, Room 2	6/64	1	---
2	1.74	PR85	Lot 1077-3, Building 3, Room 2	6/64	1	---
2	1.74	PR85	Lot 1078, Building 3, Room 2	7/64	1	IB
2	1.74	PR85	Lot 1078-2, Building 3, Room 2	6/64	1	LE
2	1.74	PR85	Lot 1078-2, Building 3, Room 2	7/64	1	LE
2	1.74	PR85	Lot 1083, Building 3, Room 2	6/64	1	IB
2	1.74	PR85	Lot 1083, Building 3, Room 2	6/64	1	LE
2	1.74	PR85	Lot 1083-1, Building 3, Room 2	6/64	3	---
2	1.74	PR85	Lot 1083-2, Building 3, Room 2	6/64	20	---
2	1.74	PR85	Lot 1083-2, Building 3, Room 2	7/64	20	---
2	1.74	PR85	Lot 1083-4, Building 3, Room 2	6/64	19	---
2	1.74	PR85	Lot 1084-1, Building 3, Room 2	5/64	2	---
2	1.74	PR85	Lot 1084-1, Building 3, Room 2	6/64	7	---
2	1.74	PR85	Lot 1084-1, Building 3, Room 2	6/64	1	IB
2	1.74	PR85	Lot 1084-1, Building 3, Room 2	7/64	1	---
2	1.74	PR85	Lot 1084-2, Building 3, Room 2	6/64	1	---
2	1.74	PR85	Lot 1084-2, Building 3, Room 2	6/64	1	LB
2	1.74	PR85	Lot 1085-1, Building 3, Room 2	5/64	5	---
2	1.74	PR85	Lot 1085-3, Building 3, Room 2	6/64	1	---
2	1.74	PR85	Lot 1093-1, Building 3, Room 2	6/64	1	---
2	1.74	PR85	Lot 1093-3, Building 3, Room 2	6/64	1	IE
2	1.74	PR85	Lot 1094-4, Building 3, Room 2	6/64	1	---
2	1.74	PR85	Lot 1095-1, Building 3, Room 2	6/64	2	---
2	1.74	PR85	Lot 1096-2, Building 3, Room 2	6/64	1	---
2	1.74	PR85	Lot 1096-3, Building 3, Room 2	6/64	1	---
2	1.74	PR85	Lot 134-1, XU-3	7/64	1	---
2	1.74	PR85	Lot 143-2, XU-3	---	1	---
2	1.74	PR85	Lot 165-3, XU-3	7/64	1	IB
2	1.74	PR86	Lot 1134-3, Building 3, Room 3	7/64	1	---
2	1.74	PR87	Lot 236, Building 2	7/64	1	---
2	1.74	PR87	Lot 273-2, Building 2	---	2	---

INA BOWL TYPE	NEW BOWL TYPE	YEAR	ARTIFACT NUMBER/ PROVENIENCE	STEM DIAMETER	QUANTITY	MAKERS MARK
2	1.74	PR87	Lot 312, Building 2	7/64	1	---
2	1.74	PR87	Lot 312, Building 2	7/64	1	LE
2	1.74	PR87	Lot 325-2, Building 2	7/64	1	---
2	1.74	PR87	Lot 345-3, Building 2	---	1	---
2	1.74	PR87	Lot 353-1, Hearth 4A/4B	6/64	1	---
2	1.74	PR87	Lot 353-1, Hearth 4A/4B	6/64	1	LE
2	1.74	PR87	Lot 353-1, Hearth 4A/4B	7/64	1	---
2	1.74	PR87	Lot 362, South of Yard 4B	7/64	1	WE
2	1.74	PR87	Lot 372, Hearth 4A/4B	---	1	LE
2	1.74	PR87	Lot 374-2, Hearth 4A/4B	---	1	---
2	1.74	PR87	Lot 403-2, Yard 4B	7/64	10	---
2	1.74	PR87	Lot 406-3, Yard 4B	7/64	1	---
2	1.74	PR87	Lot 430, Yard 4B	---	2	---
2	1.74	PR87	Lot 432, Yard 4B	---	1	---
2	1.74	PR87	Lot 433-1, Yard 4B	---	1	---
2	1.74	PR87	Lot 434-1, Yard 4B	6/64	1	---
2	1.74	PR87	Lot 434-3, Yard 4B	6/64	1	---
2	1.74	PR87	Lot 435-1, Yard 4B	6/64	1	---
2	1.74	PR87	Lot 435-1, Yard 4B	6/64	2	LE
2	1.74	PR87	Lot 435-2, Yard 4B	7/64	1	---
2	1.74	PR87	Lot 453-1, East of Yard 4B	7/64	1	---
2	1.74	PR87	Lot 467-4, Yard 4A	---	1	---
2	1.74	PR87	Lot 561, North of Building 5	---	1	---
2	1.74	PR87	Lot 633-1, Building 5, Room 1	7/64	1	---
2	1.74	PR89	Lot 646-3, Building 5, Room 1	6/64	1	---
2	1.74	PR89	Lot 723-3, Building 4, Room 4A	7/64	1	LE
2	1.74	PR89	Lot 839-3, Building 4, Room 4B	7/64	1	---
2	1.74	PR89	Lot 869-1, Yard 4A	7/64	1	LE
2	1.74	PR89	Lot 887-4, Hearth 7	7/64	1	IE
2	1.74	PR89	Lot 892, Yard 4A	7/64	1	---
2	1.74	PR89	Lot 897-2, Yard 4A	7/64	1	---



INA BOWL TYPE	NEW BOWL TYPE	YEAR	ARTIFACT NUMBER/ PROVENIENCE	STEM DIAMETER	QUANTITY	MAKERS MARK
2	1.74	PR90	Lot 959-3, Yard 5	---	1	---
2a	1.75	PR85	Lot 1034-36, Building 3, Room 1	---	1	---
2a	1.75	PR85	Lot 1065-4, Building 3, Room 1	5/64	1	---
2a	1.75	PR85	Lot 1083-1, Building 3, Room 2	6/64	1	---
2a	1.75	PR90	Lot 465-3, Yard 4A	---	1	---
3	1.73	PR81	Lot 58-38	---	1	---
3	1.73	PR82	Lot 177-2, Building 1	6/64	1	---
3	1.73	PR83	Lot 303-14, Building 1, Room 2	6/64	1	---
3	1.73	PR83	Lot 305-3, Building 1, Room 2	6/64	1	---
3	1.73	PR83	Lot 311-116, Building 1, Room 2	6/64	1	WE
3	1.73	PR83	Lot 316-38, Building 1, Room 2	7/64	1	WE
3	1.73	PR83	Lot 428-3, Building 1, Room 4	5/64	1	---
3	1.73	PR83	Lot 500, Building 1, Room 5	5/64	1	---
3	1.73	PR83	Lot 500, Building 1, Room 5	7/64	1	IB
3	1.73	PR83	Lot 500, Building 1, Room 5	6/64	1	---
3	1.73	PR83	Lot 511-1, Building 1, Room 5	6/64	1	---
3	1.73	PR83	Lot 522-4, Building 1, Room 5	6/64	9	---
3	1.73	PR83	Lot 523-3, Building 1, Room 5	6/64	1	---
3	1.73	PR83	Lot 531-1, Building 1, Room 5	6/64	1	---
3	1.73	PR83	Lot 531-2, Building 1, Room 5	6/64	1	---
3	1.73	PR83	Lot 531-3, Building 1, Room 5	6/64	1	---
3	1.73	PR83	Lot 531-3, Building 1, Room 5	6/64	2	LE
3	1.73	PR83	Lot 535-1, Building 1, Room 5	6/64	1	---
3	1.73	PR83	Lot 545-3, Building 1, Room 5	7/64	1	---
3	1.73	PR84	Lot 615-3, Outside Building 1	6/64	1	---
3	1.73	PR84	Lot 647-3, Building 1, Room 6	6/64	1	---
3	1.73	PR84	Lot 801, Alley	7/64	1	---
3	1.73	PR84	Lot 809, Alley	6/64	1	LE
3	1.73	PR85	Lot 912, North of Building 1	---	1	---
3	1.73	PR85	Lot 1020, Building 3, Room 1	6/64	1	---
3	1.73	PR85	Lot 1022, Building 3, Room 1	6/64	3	---

INA BOWL TYPE	NEW BOWL TYPE	YEAR	ARTIFACT NUMBER/ PROVENIENCE	STEM DIAMETER	QUANTITY	MAKERS MARK
3	1.73	PR85	Lot 1023-3, Building 3, Room 1	5/64	1	---
3	1.73	PR85	Lot 1025-2, Building 3, Room 1	---	4	---
3	1.73	PR85	Lot 1025-3, Building 3, Room 1	6/64	5	---
3	1.73	PR85	Lot 1025-3, Building 3, Room 1	7/64	1	---
3	1.73	PR85	Lot 1025-4, Building 3, Room 1	---	3	---
3	1.73	PR85	Lot 1041, North of Building 3	6/64	1	---
3	1.73	PR85	Lot 1056-3, Building 3, Room 4	7/64	1	---
3	1.73	PR85	Lot 1065-2, Building 3, Room 1	6/64	1	---
3	1.73	PR85	Lot 1065-3, Building 3, Room 1	5/64	10	---
3	1.73	PR85	Lot 1065-3, Building 3, Room 1	6/64	6	---
3	1.73	PR85	Lot 1065-4, Building 3, Room 1	6/64	4	---
3	1.73	PR85	Lot 1066-1, Building 3, Room 1	6/64	4	---
3	1.73	PR85	Lot 1066-1, Building 3, Room 1	6/64	1	LE
3	1.73	PR85	Lot 1066-2, Building 3, Room 1	6/64	1	---
3	1.73	PR85	Lot 1067-2, Building 3, Room 2	6/64	1	IB
3	1.73	PR85	Lot 1068-1, Building 3, Room 2	5/64	4	---
3	1.73	PR85	Lot 1066-1, Building 3, Room 2	6/64	8	---
3	1.73	PR85	Lot 1066-2, Building 3, Room 2	5/64	2	---
3	1.73	PR85	Lot 1072, Building 3, Room 1	5/64	1	---
3	1.73	PR85	Lot 1072, Building 3, Room 1	6/64	1	---
3	1.73	PR85	Lot 1075-1, Building 3, Room 1	6/64	1	---
3	1.73	PR85	Lot 1077-2, Building 3, Room 2	5/64	1	---
3	1.73	PR85	Lot 1077-2, Building 3, Room 2	6/64	1	LE
3	1.73	PR85	Lot 1083-1, Building 3, Room 2	5/64	1	---
3	1.73	PR85	Lot 1083-1, Building 3, Room 2	6/64	1	---
3	1.73	PR85	Lot 1085-1, Building 3, Room 2	6/64	1	---
3	1.73	PR85	Lot 1093-1, Building 3, Room 2	5/64	2	---
3	1.73	PR85	Lot 1093-1, Building 3, Room 2	6/64	2	---
3	1.73	PR85	Lot 1093-2, Building 3, Room 2	5/64	1	---
3	1.73	PR86	Lot 132, XU-3	7/64	1	LE
3	1.73	PR86	Lot 135-3, XU-3	6/64	1	---

INA BOWL TYPE	NEW BOWL TYPE	YEAR	ARTIFACT NUMBER/ PROVENIENCE	STEM DIAMETER	QUANTITY	MAKERS MARK
3	1.73	PR86	Lot 143-2, XU-3	---	1	---
3	1.73	PR86	Lot 143-2, XU-3	7/64	1	LE
3	1.73	PR86	Lot 143-4, XU-3	---	1	---
3	1.73	PR86	Lot 215-2, Building 2	---	1	LE
3	1.73	PR86	Lot 225-3, XU-3	7/64	1	---
3	1.73	PR86	Lot 1100, Near Building 3	---	2	---
3	1.73	PR86	Lot 1124-4, Building 3, Room 4	6/64	1	---
3	1.73	PR86	Lot 1125-4, Building 3, Room 4	---	1	---
3	1.73	PR86	Lot 1126-3, Building 3, Room 4	7/64	1	LE
3	1.73	PR86	Lot 1134-3, Building 3, Room 3	---	1	---
3	1.73	PR87	Lot 215-3, Building 2	7/64	1	---
3	1.73	PR87	Lot 255-3, Building 2	7/64	1	---
3	1.73	PR87	Lot 274-2, Building 2	6/64	1	---
3	1.73	PR87	Lot 316-1, Building 2	---	1	---
3	1.73	PR87	Lot 325-3, Building 2	---	1	---
3	1.73	PR87	Lot 353-1, Hearth 4A/4B	---	1	---
3	1.73	PR87	Lot 353-1, Hearth 4A/ 4B	6/64	1	IP
3	1.73	PR87	Lot 373-1, Hearth 4A	7/64	1	---
3	1.73	PR87	Lot 375-4, Hearth 4A	6/64	1	---
3	1.73	PR87	Lot 383-2, Hearth 4A	7/64	1	---
3	1.73	PR87	Lot 383-3, Hearth 4A	---	1	LE
3	1.73	PR87	Lot 384-2, Yard 4A	7/64	2	LE
3	1.73	PR87	Lot 400, Yard 4B	7/64	1	LE
3	1.73	PR87	Lot 403-1, Yard 4B	7/64	2	---
3	1.73	PR87	Lot 403-2, Yard 4B	6/64	2	LE
3	1.73	PR87	Lot 403-2, Yard 4B	7/64	1	---
3	1.73	PR87	Lot 404-2, Yard 4B	7/64	1	---
3	1.73	PR87	Lot 405-2, Yard 4B	6/64	1	LE
3	1.73	PR87	Lot 405-2, Yard 4B	7/64	1	LE
3	1.73	PR87	Lot 406-3, Yard 4B	7/64	1	LE
3	1.73	PR87	Lot 406-4, Yard 4B	6/64	1	---

INA BOWL TYPE	NEW BOWL TYPE	YEAR	ARTIFACT NUMBER/ PROVENIENCE	STEM DIAMETER	QUANTITY	MAKERS MARK
3	1.73	PR87	Lot 413-3, Yard 4B	6/64	1	---
3	1.73	PR87	Lot 421, Yard 4B	6/64	1	---
3	1.73	PR87	Lot 422, Yard 4B	---	2	---
3	1.73	PR87	Lot 423-1, Yard 4B	8/64	1	LF
3	1.73	PR87	Lot 430, Yard 4B	7/64	1	---
3	1.73	PR87	Lot 432, Yard 4B	8/64	1	---
3	1.73	PR87	Lot 432, Yard 4B	6/64	1	LE
3	1.73	PR87	Lot 433-1, Yard 4B	---	3	---
3	1.73	PR87	Lot 433-1, Yard 4B	7/64	1	LE
3	1.73	PR87	Lot 434-3, Yard 4B	6/64	1	LE
3	1.73	PR87	Lot 434-3, Yard 4B	7/64	1	---
3	1.73	PR87	Lot 434-3, Yard 4B	7/64	1	LE
3	1.73	PR87	Lot 435-1, Yard 4B	6/64	2	---
3	1.73	PR87	Lot 435-1, Yard 4B	6/64	3	LE
3	1.73	PR87	Lot 435-1, Yard 4B	7/64	2	---
3	1.73	PR87	Lot 435-2, Yard 4B	7/64	1	---
3	1.73	PR87	Lot 436-1, Yard 4B	6/64	1	LE
3	1.73	PR87	Lot 436-2, Yard 4B	7/64	3	---
3	1.73	PR87	Lot 436-2, Yard 4B	7/64	1	LE
3	1.73	PR87	Lot 455-4, East of Yard 4B	7/64	1	---
3	1.73	PR87	Lot 521, Near Building 8	---	1	---
3	1.73	PR87	Lot 534-2, Building 8	---	2	---
3	1.73	PR87	Lot 574-3, Building 5, Room 1	7/64	1	---
3	1.73	PR89	Lot 654-4, Building 5, Room 1	7/64	1	---
3	1.73	PR89	Lot 679-1, Building 5, Room 1	7/64	1	---
3	1.73	PR89	Lot 679-3, Building 5, Room 1	7/64	1	---
3	1.73	PR89	Lot 679-4, Building 5, Room 1	6/64	1	---
3	1.73	PR89	Lot 682, Building 5, Room 2	---	1	---
3	1.73	PR89	Lot 688-2, Building 5, Room 2	6/64	1	---
3	1.73	PR89	Lot 743-7, Yard 4A	---	1	---
3	1.73	PR89	Lot 754-2, Yard 4A	6/64	1	LE

INA BOWL TYPE	NEW BOWL TYPE	YEAR	ARTIFACT NUMBER/ PROVENIENCE	STEM DIAMETER	QUANTITY	MAKERS MARK
3	1.73	PR89	Lot 756-4, Yard 4A	---	1	---
3	1.73	PR89	Lot 763-2, Yard 4B	---	1	---
3	1.73	PR89	Lot 763-2, Yard 4B	6/64	1	LE
3	1.73	PR89	Lot 764-2, Yard 4B	6/64	1	LE
3	1.73	PR89	Lot 823-4, Building 4, Room 4B	5/64	1	---
3	1.73	PR89	Lot 852, Building 5, Room 4	6/64	1	---
3	1.73	PR89	Lot 888-8, Hearth 7	7/64	1	---
3	1.73	PR89	Lot 888-9, Hearth 7	6/64	1	---
3	1.73	PR89	Lot 897-2, Yard 4A	---	1	---
3	1.73	PR90	Lot 463-1, Yard 4A	6.0	1	LE
3	1.73	PR90	Lot 463-2, Yard 4A	7/64	1	---
3	1.73	PR90	Lot 463-4, Yard 4A	6/64	1	LE
3	1.73	PR90	Lot 463-4, Yard 4A	7/64	1	LE
3	1.73	PR90	Lot 464-1, Yard 4A	7/64	1	LE
3	1.73	PR90	Lot 464-2, Yard 4A	6/64	3	LE
3	1.73	PR90	Lot 464-3, Yard 4A	7/64	1	LE
3	1.73	PR90	Lot 465-1, Yard 4A	6/64	1	---
3	1.73	PR90	Lot 466-3, Yard 4A	7/64	3	---
3	1.73	PR90	Lot 466-3, Yard 4A	7/64	1	LE
3	1.73	PR90	Lot 467-4, Yard 4A	---	1	---
3	1.73	PR90	Lot 467-4, Yard 4A	7/64	2	LE
3	1.73	PR90	Lot 883-1, Hearth 7	---	1	---
3	1.73	PR90	Lot 886-11, Hearth 7	6/64	1	---
3	1.73	PR90	Lot 887-2, Hearth 7	6/64	1	---
3	1.73	PR90	Lot 888, Hearth 7	7/64	1	---
3	1.73	PR90	Lot 907, Yard 5	7/64	1	---
3	1.73	PR90	Lot 942, Yard 5	8/64	1	---
3	1.73	PR90	Lot 961-2, Yard 6, Cistern	6/64	1	LE
3	1.73	PR90	Lot 962-2, Yard 6	6/64	1	LE
3	1.73	PR90	Lot 993-3, Yard 7	5/64	1	---
3	1.73	PR90	Lot 994-1, Yard 4A	---	1	---

INA BOWL TYPE	NEW BOWL TYPE	YEAR	ARTIFACT NUMBER/ PROVENIENCE	STEM DIAMETER	QUANTITY	MAKERS MARK
3	1.73	PR90	Lot 2074-3, Ship	5/64	1	---
3	1.73	PR90	Lot 2074-3, Ship	6/64	1	---
3	1.73	PR90	Lot 2075-2, Ship	6/64	1	---
3	1.73	PR90	Lot 2076-1, Ship	7/64	1	---
3	1.73	PR90	Lot 2127, Ship	---	1	---
3	1.73	PR90	Lot 9612, Yard 6	6/64	1	LE
4a	2.22	PR81	Lot 25-4, XU-1	7/64	1	---
4a	2.22	PR83	Lot 303-1, Building 2	6/64	1	LB
4a	2.22	PR83	Lot 303-34, Building 2	6/64	1	---
4a	2.22	PR83	Lot 327, Building 2	7/64	1	---
4a	2.22	PR83	Lot 426-5, Building 1, Room 4	7/64	1	---
4a	2.22	PR83	Lot 500, Building 1, Room 5	6/64	3	---
4a	2.22	PR83	Lot 500, Building 1, Room 5	6/64	2	LE
4a	2.22	PR83	Lot 500, Building 1, Room 5	7/64	5	---
4a	2.22	PR83	Lot 500, Building 1, Room 5	6/64	3	---
4a	2.22	PR83	Lot 503-3, Building 1, Room 5	7/64	1	---
4a	2.22	PR83	Lot 504-4, Building 1, Room 5	7/64	3	---
4a	2.22	PR83	Lot 506-1, Building 1, Room 5	7/64	1	---
4a	2.22	PR83	Lot 510-3, Building 1, Room 5	6/64	1	---
4a	2.22	PR83	Lot 511-4, Building 1, Room 5	6/64	1	---
4a	2.22	PR83	Lot 511-6, Building 1, Room 5	7/64	1	---
4a	2.22	PR83	Lot 512-2, Building 1, Room 5	7/64	2	---
4a	2.22	PR83	Lot 522-4, Building 1, Room 5	7/64	2	---
4a	2.22	PR83	Lot 523-3, Building 1, Room 5	6/64	1	---
4a	2.22	PR83	Lot 525-4, Building 1, Room 5	6/64	1	---
4a	2.22	PR83	Lot 525-4, Building 1, Room 5	6/64	1	LE
4a	2.22	PR83	Lot 525-4, Building 1, Room 5	7/64	1	---
4a	2.22	PR83	Lot 528-2, Building 1, Room 5	6/64	1	---
4a	2.22	PR83	Lot 528-2, Building 1, Room 5	7/64	3	---
4a	2.22	PR83	Lot 529-1, Building 1, Room 5	6/64	1	---
4a	2.22	PR83	Lot 529-1, Building 1, Room 5	6/64	1	LE

INA BOWL TYPE	NEW BOWL TYPE	YEAR	ARTIFACT NUMBER/ PROVENIENCE	STEM DIAMETER	QUANTITY	MAKERS MARK
4a	2.22	PR83	Lot 529-1, Building 1, Room 5	7/64	5	---
4a	2.22	PR83	Lot 529-2, Building 1, Room 5	7/64	1	---
4a	2.22	PR83	Lot 529-3, Building 1, Room 5	6/64	1	LE
4a	2.22	PR83	Lot 529-3, Building 1, Room 5	7/64	2	---
4a	2.22	PR83	Lot 529-4, Building 1, Room 5	6/64	1	---
4a	2.22	PR83	Lot 530-1, Building 1, Room 5	7/64	5	---
4a	2.22	PR83	Lot 530-4, Building 1, Room 5	6/64	1	LE
4a	2.22	PR83	Lot 531-1, Building 1, Room 5	7/64	16	---
4a	2.22	PR83	Lot 531-3, Building 1, Room 5	6/64	2	LE
4a	2.22	PR83	Lot 531-3, Building 1, Room 5	7/64	2	---
4a	2.22	PR83	Lot 531-4, Building 1, Room 5	6/64	1	---
4a	2.22	PR83	Lot 531-4, Building 1, Room 5	7/64	1	---
4a	2.22	PR83	Lot 545-3, Building 1, Room 5	7/64	1	---
4a	2.22	PR83	Lot 547-1, Building 1, Room 5	7/64	7	---
4a	2.22	PR84	Lot 200, Building 1, Room 3	7/64	1	---
4a	2.22	PR84	Lot 200, Building 1, Room 3	8/64	1	---
4a	2.22	PR84	Lot 219-3, Building 1, Room 3	8/64	1	---
4a	2.22	PR84	Lot 226-3, Building 1, Room 3	6/64	1	---
4a	2.22	PR84	Lot 613-4, Building 1, Room 6	7/64	1	---
4a	2.22	PR84	Lot 615-4, Building 3, Room 2	7/64	2	---
4a	2.22	PR84	Lot 615-4, Building 3, Room 2	8/64	2	---
4a	2.22	PR84	Lot 630-4, Building 3, Room 2	7/64	1	---
4a	2.22	PR84	Lot 719-1, Building 1, Room 1	8/64	1	---
4a	2.22	PR84	Lot 813, Alley	7/64	1	---
4a	2.22	PR84	Lot 814, Alley	7/64	1	LE
4a	2.22	PR84	Lot 816, Alley	---	1	WE
4a	2.22	PR84	Lot 818, Alley	8/64	1	---
4a	2.22	PR85	Lot 1034-36, Building 3, Room 1	---	1	---
4a	2.22	PR85	Lot 1065-4, Building 3, Room 1	7/64	1	---
4a	2.22	PR85	Lot 1068-1, Building 3, Room 1	6/64	1	---
4a	2.22	PR85	Lot 124-2, XU-3	7/64	1	---

INA BOWL TYPE	NEW BOWL TYPE	YEAR	ARTIFACT NUMBER/ PROVENIENCE	STEM DIAMETER	QUANTITY	MAKERS MARK
4a	2.22	PR86	Lot 1130, Building 3, Room 3	---	1	---
4a	2.22	PR86	Lot 1135-4, Building 3, Room 3	7/64	1	---
4a	2.22	PR87	Lot 200	6/64	1	---
4a	2.22	PR87	Lot 353-3, East of Yard 4B	7/64	2	---
4a	2.22	PR87	Lot 384-2, Hearth 4A	---	1	---
4a	2.22	PR87	Lot 400, Yard 4B	---	1	LE
4a	2.22	PR87	Lot 434-2, Yard 4B	8/64	1	---
4a	2.22	PR89	Lot 670-1, Building 5, Room 2	---	1	---
4	1.78	PR83	Lot 500, Building 1, Room 5	7/64	3	---
4	1.78	PR83	Lot 547-1, Building 1, Room 5	7/64	2	---
5	2.12	PR82	Lot 153	7/64	1	---
5	2.12	PR83	Lot 170, Building 1	7/64	1	---
5	2.12	PR83	Lot 170-8, Building 1	6/64	1	---
5	2.12	PR83	Lot 329-1, Building 1, Room 2	7/64	1	---
5	2.12	PR83	Lot 426-6, Building 1, Room 4	7/64	1	---
5	2.12	PR83	Lot 429-27, Building 1, Room 4	5/64	1	---
5	2.12	PR83	Lot 500, Building 1, Room 5	8/64	1	---
5	2.12	PR83	Lot 500, Building 1, Room 5	7/64	6	---
5	2.12	PR83	Lot 500, Building 1, Room 5	8/64	3	---
5	2.12	PR83	Lot 503, Building 1, Room 5	7/64	1	---
5	2.12	PR83	Lot 510-1, Building 1, Room 5	8/64	1	---
5	2.12	PR83	Lot 510-3, Building 1, Room 5	7/64	2	---
5	2.12	PR83	Lot 510-4, Building 1, Room 5	7/64	1	---
5	2.12	PR83	Lot 512-2, Building 1, Room 5	7/64	1	---
5	2.12	PR83	Lot 512-4, Building 1, Room 5	7/64	1	---
5	2.12	PR83	Lot 522-1, Building 1, Room 5	7/64	1	LE
5	2.12	PR83	Lot 523-2, Building 1, Room 5	7/64	2	---
5	2.12	PR83	Lot 523-4, Building 1, Room 5	8/64	1	---
5	2.12	PR83	Lot 524-2, Building 1, Room 5	7/64	1	---
5	2.12	PR83	Lot 525-4, Building 1, Room 5	7/64	1	---
5	2.12	PR83	Lot 527-1, Building 1, Room 5	7/64	1	---



INA BOWL TYPE	NEW BOWL TYPE	YEAR	ARTIFACT NUMBER/ PROVENIENCE	STEM DIAMETER	QUANTITY	MAKERS MARK
5	2.12	PR83	Lot 528-4, Building 1, Room 5	7/64	1	---
5	2.12	PR83	Lot 528-9, Building 1, Room 5	7/64	1	---
5	2.12	PR83	Lot 529-1, Building 1, Room 5	6/64	1	---
5	2.12	PR83	Lot 529-1, Building 1, Room 5	7/64	10	---
5	2.12	PR83	Lot 529-3, Building 1, Room 5	7/64	5	---
5	2.12	PR83	Lot 529-4, Building 1, Room 5	6/64	2	---
5	2.12	PR83	Lot 529-4, Building 1, Room 5	7/64	7	---
5	2.12	PR83	Lot 531-1, Building 1, Room 5	8/64	4	---
5	2.12	PR83	Lot 531-2, Building 1, Room 5	7/64	1	---
5	2.12	PR83	Lot 531-3, Building 1, Room 5	---	1	---
5	2.12	PR83	Lot 531-3, Building 1, Room 5	7/64	4	---
5	2.12	PR83	Lot 541-2, Building 1, Room 5	7/64	1	---
5	2.12	PR83	Lot 541-3, Building 1, Room 5	7/64	1	---
5	2.12	PR83	Lot 547-1, Building 1, Room 5	5/64	1	---
5	2.12	PR83	Lot 547-1, Building 1, Room 5	7/64	2	---
5	2.12	PR84	Lot 208-2, Building 1, Room 3	7/64	1	---
5	2.12	PR84	Lot 219-1, Building 1, Room 3	7/64	1	---
5	2.12	PR84	Lot 219-1, Building 1, Room 3	8/64	2	---
5	2.12	PR84	Lot 615-3, Building 3, Room 2	8/64	1	---
5	2.12	PR84	Lot 615-4, Building 3, Room 2	7/64	2	---
5	2.12	PR84	Lot 615-4, Building 3, Room 2	8/64	3	---
5	2.12	PR84	Lot 630-4, Building 3, Room 2	7/64	3	---
5	2.12	PR85	Lot 1015-3, North of Building 3	---	2	---
5	2.12	PR85	Lot 1023-3, Building 3, Room 1	7/64	2	---
5	2.12	PR85	Lot 1025-1, Building 3, Room 1	---	3	---
5	2.12	PR85	Lot 1060, Building 3	8/64	1	---
5	2.12	PR85	Lot 1062, Building 3	8/64	2	---
5	2.12	PR85	Lot 1065-3, Building 3, Room 1	8/64	5	---
5	2.12	PR85	Lot 1066-1, Building 3, Room 1	8/64	2	---
5	2.12	PR85	Lot 1066-2, Building 3, Room 1	8/64	1	---
5	2.12	PR85	Lot 1066-1, Building 3, Room 2	---	1	LB

INA BOWL TYPE	NEW BOWL TYPE	YEAR	ARTIFACT NUMBER/ PROVENIENCE	STEM DIAMETER	QUANTITY	MAKERS MARK
5	2.12	PR85	Lot 1068-1, Building 3, Room 2	7/64	2	—
5	2.12	PR85	Lot 1068-2, Building 3, Room 2	6/64	1	—
5	2.12	PR85	Lot 1068-2, Building 3, Room 2	7/64	3	—
5	2.12	PR85	Lot 1077-1, Building 3, Room 2	7/64	1	—
5	2.12	PR85	Lot 1077-3, Building 3, Room 2	8/64	1	LE
5	2.12	PR85	Lot 1083-1, Building 3, Room 2	7/64	3	—
5	2.12	PR85	Lot 1083-2, Building 3, Room 2	6/64	9	—
5	2.12	PR85	Lot 1083-2, Building 3, Room 2	7/64	3	—
5	2.12	PR85	Lot 1083-4, Building 3, Room 2	8/64	3	—
5	2.12	PR85	Lot 1083-4, Building 3, Room 2	7/64	1	—
5	2.12	PR85	Lot 1083-4, Building 3, Room 2	8/64	2	—
5	2.12	PR85	Lot 1084-1, Building 3, Room 2	6/64	1	IB
5	2.12	PR85	Lot 1084-1, Building 3, Room 2	7/64	1	—
5	2.12	PR85	Lot 1084-1, Building 3, Room 2	8/64	1	—
5	2.12	PR85	Lot 1084-2, Building 3, Room 2	6/64	3	—
5	2.12	PR85	Lot 1085-1, Building 3, Room 2	8/64	1	IB
5	2.12	PR85	Lot 1086-2, Building 3, Room 2	8/64	1	—
5	2.12	PR86	Lot 126-3, XU-3	7/64	1	—
5	2.12	PR86	Lot 143-1, XU-3	7/64	1	—
5	2.12	PR86	Lot 144-2, XU-3	7/64	1	—
5	2.12	PR86	Lot 143-2, XU-3	—	1	—
5	2.12	PR86	Lot 152, XU-3	6/64	1	—
5	2.12	PR86	Lot 1114-3, Building 3, Room 4	7/64	1	—
5	2.12	PR86	Lot 1125-3, Building 3, Room 4	—	1	—
5	2.12	PR86	Lot 1135-1, Building 3, Room 3	—	1	—
5	2.12	PR86	Lot 1135-3, Building 3, Room 3	8/64	1	LE
5	2.12	PR87	Lot 304-2, Building 2	6/64	1	—
5	2.12	PR87	Lot 352-2, Hearth 4A/4B	5/64	1	RT
5	2.12	PR87	Lot 353-2, East of Building 4	7/64	2	—
5	2.12	PR87	Lot 353-3, East of Building 4	7/64	1	—
5	2.12	PR87	Lot 354-3, East of Building 4	7/64	1	—

INA BOWL TYPE	NEW BOWL TYPE	YEAR	ARTIFACT NUMBER/ PROVENIENCE	STEM DIAMETER	QUANTITY	MAKERS MARK
5	2.12	PR87	Lot 374-2, Hearth 4B	---	1	---
5	2.12	PR87	Lot 400, Yard 4B	7/64	1	---
5	2.12	PR87	Lot 402, Yard 4B	6/64	1	---
5	2.12	PR87	Lot 403-1, Yard 4B	6/64	1	---
5	2.12	PR87	Lot 403-2, Yard 4B	6/64	1	---
5	2.12	PR87	Lot 406-4, Yard 4B	6/64	1	---
5	2.12	PR87	Lot 434-3, Yard 4B	6/64	1	---
5	2.12	PR87	Lot 435-1, Yard 4B	6/64	2	---
5	2.12	PR87	Lot 435-1, Yard 4B	7/64	1	---
5	2.12	PR87	Lot 442, Yard 4B	6/64	1	---
5	2.12	PR87	Lot 534-4, North of Building 5	---	1	---
5	2.12	PR87	Lot 535-3, North of Building 5	---	1	---
5	2.12	PR87	Lot 546-2, North of Building 5	---	1	---
5	2.12	PR87	Lot 556-2, North of Building 5	---	1	---
5	2.12	PR87	Lot 574-2, Building 5, Room 1	7/64	1	---
5	2.12	PR87	Lot 576-1, Building 5, Room 1	6/64	1	---
5	2.12	PR87	Lot 576-3, Building 5, Room 1	6/64	1	---
5	2.12	PR89	Lot 654-3, Building 5, Room 1	7/64	1	---
5	2.12	PR89	Lot 6710, Building 5, Room 2	---	1	---
5	2.12	PR90	Lot 682, Building 5, Room 2	---	1	---
5	2.12	PR90	Lot 825, Building 4, Room 4B	7/64	1	TO
5	2.12	PR89	Lot 896-2, Lot Yard 4A	---	1	---
5	2.12	PR90	Lot 100, North of Building 5	7/64	1	---
5	2.12	PR90	Lot 462, Yard 4A	6/64	2	---
5	2.12	PR90	Lot 506-3, North of Building 5	7/64	1	---
5	2.12	PR90	Lot 783, Ship	7/64	1	---
5	2.12	PR90	Lot 864-4, Yard 4A	---	1	---
5	2.12	PR90	Lot 866-2, Yard 4A	---	1	---
5	2.12	PR90	Lot 883-1, Yard 8	---	1	---
5	2.12	PR90	Lot 947-1, Yard 5	5/64	1	---
5	2.12	PR90	Lot 966-1, Yard 8	---	1	---

INA BOWL TYPE	NEW BOWL TYPE	YEAR	ARTIFACT NUMBER/ PROVENIENCE	STEM DIAMETER	QUANTITY	MAKERS MARK
5	2.12	PR90	Lot 2075-2, Ship	7/64	2	---
5	2.12	PR90	Lot 3711-1, North of Building 5	---	1	---
5	2.12	PR90	Lot 9410, Yard 5	---	1	---
6	1.91	PR83	Lot 500, Building 1, Room 5	---	1	IB
6	1.91	PR83	Lot 500, Building 1, Room 5	6/64	1	---
6	1.91	PR83	Lot 500, Building 1, Room 5	6/64	1	LE
6	1.91	PR83	Lot 500, Building 1, Room 5	7/64	1	---
6	1.91	PR83	Lot 510-4, Building 1, Room 5	6/64	1	---
6	1.91	PR83	Lot 512-2, Building 1, Room 5	6/64	1	---
6	1.91	PR83	Lot 522-1, Building 1, Room 5	6/64	1	---
6	1.91	PR83	Lot 523-4, Building 1, Room 5	6/64	1	IB
6	1.91	PR83	Lot 528-2, Building 1, Room 5	7/64	1	---
6	1.91	PR83	Lot 528-2, Building 1, Room 5	7/64	1	---
6	1.91	PR83	Lot 530-4, Building 1, Room 5	6/64	1	---
6	1.91	PR83	Lot 530-4, Building 1, Room 5	7/64	2	---
6	1.91	PR83	Lot 531-2, Building 1, Room 5	6/64	1	---
6	1.91	PR83	Lot 531-3, Building 1, Room 5	7/64	1	---
6	1.91	PR83	Lot 531-4, Building 1, Room 5	6/64	2	---
6	1.91	PR83	Lot 531-4, Building 1, Room 5	6/64	1	IB
6	1.91	PR83	Lot 547-1, Building 1, Room 5	6/64	1	---
6	1.91	PR83	Lot 547-1, Building 1, Room 5	6/64	1	IB
6	1.91	PR84	Lot 630-1, Building 3, Room 2	6/64	1	---
6	1.91	PR84	Lot 818, Alley	6/64	1	---
6	1.91	PR85	Lot 1064-4, Building 3, Room 1	6/64	1	IB
6	1.91	PR85	Lot 1065-4, Building 3, Room 1	6/64	1	IB
6	1.91	PR85	Lot 1077-1, Building 3, Room 2	---	1	IB
6	1.91	PR85	Lot 1083, Building 3, Room 2	6/64	1	IB
6	1.91	PR85	Lot 1085-3, Building 3, Room 2	7/64	1	IB
6	1.91	PR86	Lot 126-4, XU-3	7/64	1	---
6	1.91	PR86	Lot 1130, Building 3, Room 3	---	1	---
6	1.91	PR86	Lot 1134-2, Building 3, Room 3	6/64	1	IB

INA BOWL TYPE	NEW BOWL TYPE	YEAR	ARTIFACT NUMBER/ PROVENIENCE	STEM DIAMETER	QUANTITY	MAKERS MARK
6	1.91	PR86	Lot 1135-4, Building 3, Room 3	6/64	2	IB
6	1.91	PR86	Lot 1136-3, Building 3, Room 3	6/64	1	---
6	1.91	PR86	Lot 1136-3, Building 3, Room 3	6/64	1	IB
6	1.91	PR86	Lot 1136-4, Building 3, Room 3	6/64	1	IB
6	1.91	PR86	Lot 1136-4, Building 3, Room 3	7/64	1	IB
6	1.91	PR87	Lot 284-1, Building 2	6/64	1	---
6	1.91	PR87	Lot 354-3, East of Yard 4B	6/64	2	LE
6	1.91	PR87	Lot 400, Yard 4B	---	1	---
8	1.91	PR87	Lot 412, Yard 4B	7/64	1	---
8	1.91	PR87	Lot 413-4, Yard 4B	7/64	1	---
6	1.91	PR87	Lot 423-1, Yard 4B	7/64	1	---
6	1.91	PR87	Lot 543-2, North of Building 5	7/64	1	RF
6	1.91	PR90	Lot 904-2, Yard 5	7/64	1	IB
7a	3.11	PR87	Lot 432, Yard 4B	---	1	---
7a	3.11	PR90	Lot 982, Yard 7	---	1	---
7b	3.12	PR82	Lot 141-1, Building 1	4/64	1	---
7b	3.12	PR82	Lot 147-23, Building 1	5/64	1	---
7b	3.12	PR82	Lot 167-3, Building 1	5/64	1	---
7b	3.12	PR83	Lot 308-3, Building 1, Room 2	5/64	1	---
7b	3.12	PR83	Lot 311-22, Building 1, Room 2	5/64	1	---
7b	3.12	PR83	Lot 319-1, Building 1, Room 2	5/64	1	ER
7b	3.12	PR83	Lot 500, Building 1, Room 5	5/64	3	---
7b	3.12	PR83	Lot 530-1, Building 1, Room 5	4/64	8	---
7b	3.12	PR84	Lot 704-3, Building 1, Room 1	---	1	---
7b	3.12	PR84	Lot 711, Building 1, Room 1	5/64	1	---
7b	3.12	PR85	Lot 1011, Outside of Building 3	5/64	1	---
7b	3.12	PR86	Lot 155-3, XU-3	6/64	1	RT
7b	3.12	PR86	Lot 218-2, Building 2	---	1	---
7b	3.12	PR86	Lot 1053-4, Building 3, Room 4	7/64	1	LE
7b	3.12	PR86	Lot 1100, Outside of Building 3	5/64	1	ER
7b	3.12	PR86	Lot 1117, Building 3, Room 4	5/64	1	ER

INA BOWL TYPE	NEW BOWL TYPE	YEAR	ARTIFACT NUMBER/ PROVENIENCE	STEM DIAMETER	QUANTITY	MAKERS MARK
7b	3.12	PR86	Lot 1117, Building 3, Room 4	5/64	1	ER
7b	3.12	PR86	Lot 1122, Outside of Building 3	—	1	—
7b	3.12	PR86	Lot 1133-2, Building 3, Room 3	5/64	1	IS
7b	3.12	PR86	Lot 1135-1, Building 3, Room 3	—	1	—
7b	3.12	PR87	Lot 295-4, Building 2	—	1	—
7b	3.12	PR87	Lot 372, Hearth 4A	4/64	1	—
7b	3.12	PR87	Lot 404-2, Yard 4B	5/64	1	IS
7b	3.12	PR87	Lot 404-3, Yard 4B	7/64	1	—
7b	3.12	PR87	Lot 415-1, Yard 4B	6/64	1	—
7b	3.12	PR87	Lot 552, North of Building 5	5/64	1	—
7b	3.12	PR87	Lot 556, North of Building 5	—	1	—
7b	3.12	PR87	Lot 586-1, Building 5, Sidewalk	6/64	1	—
7b	3.12	PR89	Lot 884-3, Hearth 7	5/64	1	—
7b	3.12	PR90	Lot 887-4, Yard 7	—	1	LE
7b	3.12	PR90	Lot 942, Yard 5	6/64	1	—
7b	3.12	PR90	Lot 965-2, Yard 6	—	1	—
7b	3.12	PR90	Lot 982, Yard 7	5/64	1	—
7c	3.13	PR90	Lot 926-2, Yard 6	5/64	1	RT
7c	3.13	PR90	Lot 964-4, Yard 6	5/64	1	—
7c	3.13	PR90	Lot 1083-9, Ship	6/64	1	—
8	1.52	PR82	Lot 103-5	5/64	1	ER
8	1.52	PR85	Lot 1035-4, Building 3, Room 1	5/64	1	—
8	1.52	PR87	Lot 435-1, Yard 4B	7/64	1	—
8	1.52	PR87	Lot 556-1, North of Building 5	5/64	1	JENKINS
6	1.52	PR89	Lot 897-2, Yard 4A	—	1	—
8	1.52	PR90	Lot 966-2, Yard 6	7/64	1	—
9	1.63	PR83	Lot 312-41, Building 1, Room 2	5/64	1	RC
9	1.63	PR83	Lot 314-20, Building 1, Room 2	5/64	1	RT
9	1.63	PR83	Lot 429-12, Building 1, Room 4	—	1	—
9	1.63	PR83	Lot 506-1, Building 1, Room 5	5/64	1	11
9	1.63	PR83	Lot 529-3, Building 1, Room 5	4/64	1	—

INA BOWL TYPE	NEW BOWL TYPE	YEAR	ARTIFACT NUMBER/ PROVENIENCE	STEM DIAMETER	QUANTITY	MAKERS MARK
9	1.63	PR84	Lot 600, Building 1, Room 6	4/64	1	RT
9	1.63	PR84	Lot 611-2, Building 1, Room 6	---	1	RT
9	1.63	PR84	Lot 812-2, Building 1, Room 6	4/64	1	RT
9	1.63	PR84	Lot 817, Building 1, Room 6	5/64	1	IE
9	1.63	PR84	Lot 636-2, Building 1, Room 8	5/64	1	---
9	1.63	PR85	Lot 1078-2, Building 3, Room 2	6/64	2	---
9	1.63	PR85	Lot 1083-1, Building 3, Room 2	6/64	15	---
9	1.63	PR85	Lot 1083-2, Building 3, Room 2	6/64	24	---
9	1.63	PR85	Lot 1083-4, Building 3, Room 2	6/64	7	---
9	1.63	PR85	Lot 1094-1, Building 3, Room 3	7/64	1	---
9	1.63	PR85	Lot 1094-3, Building 3, Room 3	6/64	1	---
9	1.63	PR86	Lot 113-1, XU-3	5/64	1	RT
9	1.63	PR86	Lot 123-2, XU-3	6/64	1	---
9	1.63	PR86	Lot 146-1, XU-3	---	1	---
9	1.63	PR86	Lot 262, Building 2/Yard 4B	4/64	1	IA
9	1.63	PR86	Lot 1120, Building 3, Room 4	5/64	1	E/REED/♥
9	1.63	PR86	Lot 1122, Building 3, Room 4	5/64	1	E/REED/♥
9	1.63	PR87	No Provenience	5/64	1	JENKINS
9	1.63	PR87	Lot 325-1, Building 2	6/64	1	IE
9	1.63	PR87	Lot 372, Hearth 4A	6/64	1	---
9	1.63	PR87	Lot 435-1, Yard 4B	5/64	1	IE
9	1.63	PR87	Lot 556-1, North of Building 5	---	1	JENKINS
9	1.63	PR87	Lot 556-2, North of Building 5	5/64	1	IE
9	1.63	PR87	Lot 584-3, Building 5	5/64	1	IS
9	1.63	PR89	Lot 783, Ship	5/64	1	IA
9	1.63	PR90	Lot 814-5, Ship	5/64	1	RT
9	1.63	PR90	Lot 983-2, Yard 7	6/64	1	---
10	1.72	PR82	Lot 141-16, Building 1	---	2	---
10	1.72	PR82	Lot 161-18, Building 1	6/64	2	---
10	1.72	PR63	Lot 305-25, Building 1, Room 2	6/64	1	---
10	1.72	PR83	Lot 311-20, Building 1, Room 2	6/64	1	---

INA BOWL TYPE	NEW BOWL TYPE	YEAR	ARTIFACT NUMBER/ PROVENIENCE	STEM DIAMETER	QUANTITY	MAKERS MARK
10	1.72	PR83	Lot 311-119, Building 1, Room 2	7/64	1	---
10	1.72	PR83	Lot 311-119, Building 1, Room 2	8/64	1	---
10	1.72	PR83	Lot 316-19, Building 1, Room 2	6/64	1	---
10	1.72	PR83	Lot 502-3, Building 1, Room 5	7/64	1	---
10	1.72	PR83	Lot 510-3, Building 1, Room 5	7/64	1	---
10	1.72	PR83	Lot 545-3, Building 1, Room 5	6/64	1	---
10	1.72	PR83	Lot 547-1, Building 1, Room 5	6/64	1	---
10	1.72	PR84	Lot 224-1, Building 1, Room 3	6/64	1	---
10	1.72	PR84	Lot 226-2, Building 1, Room 3	6/64	1	---
10	1.72	PR84	Lot 719-1, Building 1, Room 1	6/64	1	---
10	1.72	PR84	Lot 726-3, Building 1, Room 1	5/64	1	---
10	1.72	PR84	Lot 809, Alley	6/64	2	---
10	1.72	PR84	Lot 813, Alley	7/64	1	---
10	1.72	PR85	Lot 1032, Building 3, Room 1	8/64	2	---
10	1.72	PR86	Lot 1125-3, Building 3, Room 4	---	1	---
10	1.72	PR86	Lot 1135-4, Building 3, Room 4	---	1	---
10	1.72	PR87	Lot 233-3, Building 2	8/64	1	---
10	1.72	PR87	Lot 242, Building 2/Yard 4B	6/64	1	---
10	1.72	PR87	Lot 252, Building 2/Yard 4B	7/64	1	---
10	1.72	PR87	Lot 264-2, Building 2/Yard 4B	---	1	---
10	1.72	PR87	Lot 354, East of Yard 4B	7/64	1	---
10	1.72	PR87	Lot 374-2, Hearth 4A	---	2	---
10	1.72	PR87	Lot 403-1, Yard 4B	8/64	2	---
10	1.72	PR87	Lot 403-2, Yard 4B	8/64	2	---
10	1.72	PR87	Lot 403-2, Yard 4B	7/64	5	---
10	1.72	PR87	Lot 405-2, Yard 4B	7/64	1	---
10	1.72	PR87	Lot 413-1, Yard 4B	---	1	---
10	1.72	PR87	Lot 432, Yard 4B	---	1	---
10	1.72	PR87	Lot 435-1, Yard 4B	6/64	2	---
10	1.72	PR87	Lot 436-1, Yard 4B	---	1	---
10	1.72	PR87	Lot 453-1, East of Yard 4B	5/64	1	---



INA BOWL TYPE	NEW BOWL TYPE	YEAR	ARTIFACT NUMBER/ PROVENIENCE	STEM DIAMETER	QUANTITY	MAKERS MARK
10	1.72	PR89	Lot 656-4, Building 5, Room 1	6/64	1	---
10	1.72	PR89	Lot 745-1, Yard 4A	6/64	1	---
10	1.72	PR89	Lot 754-2, Yard 4A	---	1	---
10	1.72	PR89	Lot 763-4, Yard 4B	---	1	---
10	1.72	PR89	Lot 764-1	---	1	---
10	1.72	PR89	Lot 832, Building 4, Room 4B	6/64	1	---
10	1.72	PR90	Lot 466-3, Yard 4A	6/64	2	---
10	1.72	PR90	Lot 467-1, Yard 4A	---	1	---
10	1.72	PR90	Lot 467-3, Yard 4A	---	1	---
10	1.72	PR90	Lot 866-1, Yard 4A	6/64	1	RT
10	1.72	PR90	Lot 966-1, Yard 6	---	1	---
10	1.72	PR90	Lot 980, Yard 7	---	1	---
10	1.72	PR90	Lot 9010-3, Yard 5	8/63	1	---
10a	1.71	PR90	Lot 963-4, Yard 6	---	1	---
14	1.15	PR85	Lot 1065-3, Building 3, Room 1	6/74	1	---
15	2.11	PR89	Lot 655-2, Building 5, Room 1	7/64	1	---
15	2.11	PR89	Lot 826-1, Building 4, Room 4B	---	1	---
15	2.11	PR90	Lot 824, Building 4, Room 4B	---	1	---
16	1.13	PR81	Lot 66-243	7/64	1	EB
16	1.13	PR86	Lot 1135-4, Building 3, Room 3	7/64	1	EB
20	1.14	PR85	Lot 1026, Building 3, Room 1	7/64	1	---
20	1.14	PR85	Lot 1083-1, Building 3, Room 2	7/64	1	---
20	1.14	PR85	Lot 1094, Building 3, Room 3	6/64	1	---
21	1.43	PR85	Lot 1065-3, Building 3, Room 1	6/64	11	---
21	1.43	PR85	Lot 1065-4, Building 3, Room 1	6/64	2	---
21	1.43	PR85	Lot 1093-3, Building 3, Room 2	5/64	1	---
21	1.43	PR86	Lot 113-2, XU-3	---	1	---
21	1.43	PR87	Lot 435-1, Yard 4B	7/64	2	---
21	1.43	PR90	Lot 463-1, Yard 4B	6/64	1	---
21	1.43	PR90	Lot 467-4, Yard 4B	---	2	---
21	1.43	PR90	Lot 883-2, Hearth 7	7/64	1	---

INA BOWL TYPE	NEW BOWL TYPE	YEAR	ARTIFACT NUMBER/ PROVENIENCE	STEM DIAMETER	QUANTITY	MAKERS MARK
22	1.31	PR86	Lot 144-1, XU-3	7/64	1	---
22	1.31	PR87	Lot 375-3, Hearth 4B	---	1	---
22	1.31	PR87	Lot 406-4, Yard 4B	7/64	1	---
22	1.31	PR90	Lot 994-3, Yard 7	---	1	---
23	1.28	PR83	Lot 303-20, Building 1, Room 2	6/64	1	---
23	1.28	PR83	Lot 303-51, Building 1, Room 2	6/64	1	CM
23	1.28	PR83	Lot 306-8, Building 1, Room 2	6/64	1	---
23	1.28	PR83	Lot 309-16, Building 1, Room 2	---	1	---
23	1.28	PR83	Lot 319-25, Building 1, Room 2	6/64	1	---
23	1.28	PR83	Lot 327, Building 1, Room 2	6/64	1	---
23	1.28	PR83	Lot 500, Building 1, Room 5	7/64	1	---
23	1.28	PR83	Lot 524-1, Building 1, Room 5	5/64	1	---
23	1.28	PR83	Lot 529-2, Building 1, Room 5	6/64	1	---
23	1.28	PR86	Lot 216-2, Building 1, Room 3	---	1	---
23	1.28	PR86	Lot 1100, Outside Building 3	---	1	---
23	1.28	PR89	Lot 653-4, Building 5, Room 1	---	1	---
23	1.28	PR89	Lot 741-4, Yard 4A	7/64	1	N
23	1.28	PR90	Lot 467-1, Yard 4A	---	1	---
23	1.28	PR90	Lot 467-3, Yard 4A	---	1	---
23	1.28	PR90	Lot 467-4, Yard 4A	---	1	---
23	1.28	PR90	Lot 946-4, Yard 5	7/64	1	---
23	1.28	PR90	Lot 947-2, Yard 5	---	1	---
24	1.53	PR85	Lot 1094, Building 3, Room 3	6/64	1	---
24	1.53	PR87	Lot 341, Building 2	---	1	---
24	1.53	PR89	Lot 633-1, Building 5, Room 1	5/64	1	IH
24	1.53	PR89	Lot 681, Building 5, Room 2	---	1	---
24	1.53	PR89	Lot 747-9, Yard 4A	7/64	1	---
24	1.53	PR90	Lot 464-4, Yard 4A	---	1	LE
24	1.53	PR90	Lot 466-3, Yard 4A	7/64	1	---
24	1.53	PR90	Lot 843-6, Ship	---	1	---
24	1.53	PR90	Lot 903-2, Yard 5	5/64	1	---

INA BOWL TYPE	NEW BOWL TYPE	YEAR	ARTIFACT NUMBER/ PROVENIENCE	STEM DIAMETER	QUANTITY	MAKERS MARK
24	1.53	PR90	Lot 944-24, Yard 5	---	1	---
24	1.53	PR90	Lot 1054-1, Ship	5/64	1	IE
24	1.53	PR90	Lot 2074-3, Ship	6/64	1	---
24	1.53	PR90	Lot 9010, Yard 5	7/64	1	---
24	1.53	PR90	Lot 9612, Yard 6	6/64	1	---
25	1.61	PR61	Lot 1	5/64	1	RT
25	1.61	PR83	Lot 308-2, Building 1, Room 2	7/64	1	EDWARDS
25	1.61	PR83	Lot 308-68, Building 1, Room 2	5/64	1	---
25	1.61	PR83	Lot 429-45, Building 1, Room 4	5/64	1	IH
25	1.61	PR84	Lot 615-4, Building 1, Room 6	5/64	1	---
25	1.61	PR86	Lot 115-2, XU-3	5/64	1	IH
25	1.61	PR87	Lot 353-2, East of Yard 4B	7/64	1	---
25	1.61	PR87	Lot 403-2, Yard 4B	6/64	1	---
25	1.61	PR87	Lot 566-1, Building 5, Sidewalk	7/64	1	---
25	1.61	PR89	Lot 732, Building 5, Room 3	---	1	---
25	1.61	PR89	Lot 774-3, Building 4, Room 4B	5/64	1	---
25	1.61	PR89	Lot 882, Hearth 7	5/64	1	---
25	1.61	PR90	Lot 465-1, Yard 4A	7/64	1	LF
25	1.61	PR90	Lot 467-4, Yard 4A	7/64	1	LE
25	1.61	PR90	Lot 887-9, Hearth 7	7/64	1	WE
25	1.61	PR90	Lot 958-1, Yard 5	8/64	1	---
25	1.61	PR90	Lot 2074-11, Ship	6/64	1	IS
26	1.64	PR87	Lot 256-2, Building 2	5/64	1	---
26	1.64	PR87	Lot 284-3, East of Yard 4B	6/64	1	---
26	1.64	PR87	Lot 353-2, East of Yard 4B	5/64	1	---
26	1.64	PR90	Lot 860, Yard 4A	---	1	---
35	4.12	PR90	Lot 545-3, North of Building 5	5/64	1	Leaf
41	2.14	PR85	Lot 1068-2, Building 3, Room 2	8/64	1	---
41	2.14	PR85	Lot 1093-3, Ship	6/64	1	---
41	2.14	PR87	Lot 286-2, Building 2	5/64	1	ER
41	2.14	PR87	Lot 534-4, North of Building 5	---	1	WE

INA BOWL TYPE	NEW BOWL TYPE	YEAR	ARTIFACT NUMBER/ PROVENIENCE	STEM DIAMETER	QUANTITY	MAKERS MARK
41	2.14	PR89	Lot 653-3, Building 5, Room 1	7/64	1	WE
41	2.14	PR90	Lot 467-4, Yard 4A	6/64	1	---
41	2.14	PR90	Lot 865-3, Yard 4A	---	1	LE
41	2.14	PR90	Lot 964-4, Yard 6	7/64	1	---
42	1.92	PR85	Lot 1068-2, Building 3, Room 2	6/64	1	---
42	1.92	PR87	Lot 254-2, Building 2	---	1	---
42	1.92	PR87	Lot 256-1, Hearth 4B	7/64	1	---
42	1.92	PR87	Lot 403-2, Yard 4B	7/64	1	---
42	1.92	PR87	Lot 404-4, Yard 4B	---	1	---
43	1.12	PR85	Lot 1023-3, Building 3, Room 1	6/64	1	EB
43	1.12	PR85	Lot 1068-1, Building 3, Room 2	7/64	1	---
43	1.12	PR89	Lot 653-2, Building 5, Room 1	---	1	EB
43	1.12	PR89	Lot 674, Building 5, Room 2	7/64	1	---
43	1.12	PR89	Lot 825-18, Building 4, Room 4B	6/64	1	---
43	1.12	PR89	Lot 897-2, Yard 4A	7/64	3	---
43	1.12	PR90	Lot 886-2, Hearth 7	7/64	1	---
43	1.12	PR90	Lot 886-2, Hearth 7	6/64	1	---
43	1.12	PR90	Lot 886-6, Hearth 7	6/64	1	---
43	1.12	PR90	Lot 886-7, Hearth 7	---	1	---
43	1.12	PR90	Lot 1053-1, Ship	6/64	1	---
43	1.12	PR90	Lot 7410, Yard 4A	7/64	1	---
44	1.41	PR87	Lot 236-4, Building 2	5/64	1	---
44	1.41	PR89	Lot 714-2, Building 4, Room 4A	---	1	---
45	2.21	PR81	Lot 67-14	---	1	---
45	2.21	PR83	Lot 524-1, Building 1, Room 5	6/64	1	LE
45	2.21	PR84	Lot 809, Alley	6/65	1	---
45	2.21	PR87	Lot 283-4, Building 2	5/64	1	V
45	2.21	PR87	Lot 403-2, Yard 4B	---	1	---
45	2.21	PR87	Lot 403-2, Yard 4B	7/64	9	---
45	2.21	PR87	Lot 423-3, Yard 4B	7/64	1	---
45	2.21	PR87	Lot 433-3, Yard 4B	7/64	1	---

INA BOWL TYPE	NEW BOWL TYPE	YEAR	ARTIFACT NUMBER/ PROVENIENCE	STEM DIAMETER	QUANTITY	MAKERS MARK
45	2.21	PR87	Lot 433-4, Yard 4B	7/64	1	---
45	2.21	PR87	Lot 434-1, Yard 4B	6/64	1	---
45	2.21	PR87	Lot 435-1, Yard 4B	6/64	7	---
45	2.21	PR87	Lot 435-2, Yard 4B	---	2	---
45	2.21	PR87	Lot 545-1, North of Building 5	7/64	1	---
45	2.21	PR87	Lot 594-3, Building 5, Room 1	7/64	1	---
45	2.21	PR89	Lot 613-3, Building 5, Room 1	7/64	1	---
45	2.21	PR89	Lot 642, Building 5, Room 1	6/64	1	---
45	2.21	PR89	Lot 646-2, Building 5, Room 1	6/64	1	---
45	2.21	PR89	Lot 654-2, Building 5, Room 1	6/64	1	---
45	2.21	PR89	Lot 654-2, Building 5, Room 1	7/64	1	---
45	2.21	PR89	Lot 654-3, Building 5, Room 1	---	1	---
45	2.21	PR89	Lot 675-6, Building 5, Room 2	6/64	1	---
45	2.21	PR89	Lot 679-1, Building 5, Room 2	---	1	---
45	2.21	PR89	Lot 679-3, Building 5, Room 2	6/64	15	---
45	2.21	PR89	Lot 679-3, Building 5, Room 2	7/64	1	---
45	2.21	PR89	Lot 679-4, Building 5, Room 2	6/64	4	---
45	2.21	PR89	Lot 679-6, Building 5, Room 2	6/64	1	---
45	2.21	PR89	Lot 679-7, Building 5, Room 2	5/64	1	---
45	2.21	PR89	Lot 679-8, Building 5, Room 2	5/64	1	---
45	2.21	PR89	Lot 683-2, Building 5, Room 2	6/64	1	---
45	2.21	PR89	Lot 683-7, Building 5, Room 2	6/64	1	---
45	2.21	PR89	Lot 684-7, Building 5, Room 2	6/64	1	---
45	2.21	PR89	Lot 687-5, Building 5, Room 2	6/64	1	---
45	2.21	PR89	Lot 688-3, Building 5, Room 2	7/64	1	---
45	2.21	PR89	Lot 690, North of Building 5	6/64	1	---
45	2.21	PR89	Lot 743-1, Yard 4A	6/64	1	LE
45	2.21	PR89	Lot 754-2, Yard 4A	6/64	1	---
45	2.21	PR89	Lot 775-6, Yard 4B	6/64	1	---
45	2.21	PR89	Lot 839-1, Building 4, Room 4B	7/64	1	---
45	2.21	PR89	Lot 862, Yard 4A	---	1	---

INA BOWL TYPE	NEW BOWL TYPE	YEAR	ARTIFACT NUMBER/ PROVENIENCE	STEM DIAMETER	QUANTITY	MAKERS MARK
45	2.21	PR89	Lot 863-1, Yard 4A	---	1	---
45	2.21	PR89	Lot 867-3, Yard 4A	6/64	1	---
45	2.21	PR89	Lot 898, Yard 4A	6/64	1	---
45	2.21	PR90	Lot 106-3, North of Building 5	---	1	---
45	2.21	PR90	Lot 463-1, Yard 4A	---	1	---
45	2.21	PR90	Lot 466-3, Yard 4A	6/64	3	---
45	2.21	PR90	Lot 466-3, Yard 4A	7/64	1	---
45	2.21	PR90	Lot 467-4, Yard 4A	---	2	---
45	2.21	PR90	Lot 467-4, Yard 4A	6/64	1	---
45	2.21	PR90	Lot 866-2, Yard 4A	7/64	1	---
45	2.21	PR90	Lot 906-4, Yard 5	---	1	---
45	2.21	PR90	Lot 922, Yard 6	7/64	1	---
46	2.13	PR84	Lot 629, Near Building 3	---	1	WILSON
46	2.13	PR90	Lot 2074-3, Ship	6/64	1	IA
47	1.27	PR86	132, XU-3	5/64	1	IB
47	1.27	PR89	Lot 679-3, Building 5, Room 1	6/64	3	---
47	1.27	PR90	Lot 466-6, Yard 4A	---	1	---
50	1.51	PR86	Lot 122, XU-3	---	1	---
50	1.51	PR87	Lot 312, Building 2	6/64	1	---
50	1.51	PR87	Lot 403-2, Yard 4B	7/64	1	---
50	1.51	PR87	Lot 413-2, Yard 4B	7/64	1	---
50	1.51	PR90	Lot 3005-5, North of Building 8	5/64	1	---
51	1.81	PR86	Lot 1100, Outside of Building 3	---	1	---
51	1.81	PR86	Lot 1136-3, Building 3, Room 3	8/64	1	---
51	1.81	PR87	Lot 315-2, Building 2	---	1	---
52	1.11	PR81	Lot 56-32	7/64	1	EB
52	1.11	PR83	Lot 311-21, Building 1, Room 2	5/64	1	---
52	1.11	PR83	Lot 500, Building 1, Room 5	7/64	1	---
52	1.11	PR83	Lot 531-4, Building 1, Room 5	6/64	1	---
52	1.11	PR83	Lot 531-4, Building 1, Room 5	7/64	1	---
52	1.11	PR84	Lot 813, Alley	6/64	1	---

INA BOWL TYPE	NEW BOWL TYPE	YEAR	ARTIFACT NUMBER/ PROVENIENCE	STEM DIAMETER	QUANTITY	MAKERS MARK
52	1.11	PR85	Lot 1075-1, Building 3, Room 1	7/64	1	EB
54	1.32	PR84	Lot 615-4, Building 3, Room 2	6/64	1	---
55	1.42	PR83	Lot 328, Building 2	7/64	1	EB
55	1.42	PR85	Lot 1025-2, Building 3, Room 1	6/64	1	EB
55	1.42	PR85	Lot 1064-4, Building 3, Room 1	7/64	1	EB
55	1.42	PR85	Lot 1073-3, Building 3, Room 1	7/64	1	EB
55	1.42	PR86	Lot 1055-3, Building 3, Room 4	7/64	1	EB
55	1.42	PR90	Lot 987-2, Yard 7	---	1	---
56	1.54	PR86	Lot 124-4, XU-3	7/64	1	WE
56	1.54	PR87	Lot 353-2, East of Yard 4B	7/64	1	WE
60	1.76	PR82	Lot 101-13	7/64	1	---
61	1.82	PR82	Lot 99-21	5/64	1	---
61	1.82	PR82	Lot 171-2	7/64	1	---
62	1.21	PR83	Lot 308-99, Building 1, Room 2	6/64	1	---
62	1.21	PR83	Lot 512-4, Building 1, Room 5	6/64	1	---
62	1.21	PR90	Lot 466-3, Yard 4A	6/64	1	---
62	1.21	PR90	Lot 843-6, Ship	5/64	1	JENKINS
62	1.21	PR90	Lot 2096-7, Ship	5/64	1	WILLIAMS
63	1.22	PR83	Lot 311-93, Building 1, Room 2	6/64	1	---
63	1.22	PR83	Lot 316-31, Building 1, Room 2	6/64	1	GF
63	1.22	PR83	Lot 316-43, Building 1, Room 2	6/64	1	---
63	1.22	PR83	Lot 324, Building 1	7/64	1	---
63	1.22	PR84	Lot 233, Building 1, Room 3	6/64	1	---
63	1.22	PR90	Lot 463-1, Yard 4A	7/64	1	---
63	1.22	PR90	Lot 889-6, Hearth 7	7/64	1	---
84	2.23	PR85	Lot 618-2, Building 1, Room 6	5/64	1	WHEEL
64	2.23	PR87	Lot 456-3, East of Yard 4B	6/64	1	---
64	2.23	PR90	Lot 373-1, Hearth 4A/4B	6/64	1	---
64	2.23	PR90	Lot 466-3, Yard 4A	6/64	1	---
84	2.23	PR90	Lot 2074-16, Ship	5/64	1	IE
66	1.24	PR87	Lot 442, Yard 4B	5/64	1	TC

INA BOWL TYPE	NEW BOWL TYPE	YEAR	ARTIFACT NUMBER/ PROVENIENCE	STEM DIAMETER	QUANTITY	MAKERS MARK
66	1.24	PR90	Lot 380-1, Near Hearth 4A	7/64	1	---
66	1.24	PR90	Lot 465-3, Yard 4A	6/64	1	---
66	1.24	PR90	Lot 467-4, Yard 4A	6/64	1	LE
66	1.24	PR90	Lot 887-7, Hearth 7	7/64	1	---
66	1.24	PR90	Lot 940, Yard 5	---	1	---
66	1.24	PR90	Lot 982-8, Yard 7	---	1	---
68	1.25	PR84	Lot 628, Near Building 1	---	1	---
68	1.25	PR84	Lot 630-1, Near Building 1	6/64	1	---
69	1.62	PR84	Lot 629-3, Outside Building 1	---	1	JONES
69	1.62	PR87	Lot 302, Building 2	7/64	1	---
69	1.62	PR89	Lot 823-4, Building 4, Room 4B	---	1	---
69	1.62	PR89	Lot 823-4, Building 4, Room 4B	4/64	1	IH
69	1.62	PR90	Lot 886-4, Hearth 7	5/64	1	IE
69	1.62	PR90	Lot 944-2, Yard 5	5/64	1	---
69	1.62	PR90	Lot 947-1, Yard 5	5/64	1	JONES
69	1.62	PR90	Lot 1083-2, Ship	5/64	1	JONES
70	2.24	PR81	Lot 62-47	5/64	1	TD
70	2.24	PR87	Lot 331, Building 2	4/64	1	TD
71	1.56	PR87	Lot 521, Building 8	7/64	1	LL
72	1.23	PR81	Lot 58-20	---	2	---
72	1.23	PR87	Lot 403-2, Yard 4B	6/64	9	LE
73	1.29	PR87	Lot 353-2, Hearth 4A/4B	---	1	RA
75	1.44	PR90	Lot 465-3, Yard 4A	---	1	LE
75	1.44	PR90	Lot 467-4, Yard 4A	7/64	1	---
75	1.44	PR90	Lot 981-2, Yard 8	8/64	1	LE
77	1.26	PR89	Lot 864-1, Yard 4A	6/64	1	RH
---	1.55	PR81	Lot 62-6	8/64	1	---
---	1.57	PR81	Lot 66-235	---	1	---
---	1.45	PR81	Lot 64-4	7/64	1	---
---	1.16	PR83	Lot 522-3, Building 1, Room 5	---	1	Mor/Brown
---	4.11	PR67	Lot 531-1, Building 8	5/64	1	Thistle



INA BOWL TYPE	NEW BOWL TYPE	YEAR	ARTIFACT NUMBER/ PROVENIENCE	STEM DIAMETER	QUANTITY	MAKERS MARK
—	4.13	PR87	Lot 302-7, Building 2	5/64	1	Tree Bark
—	4.14	PR84	Lot 617, Building 1, Room 6	4/64	1	Turk's Head
—	4.15	PR85	No Provenience	—	1	IE & SON

**APPENDIX C**  
**LETTERS OF PERMISSION**



## The Wallace Collection

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admin@wallcoll.demon.co.uk

Ms. Georgia Fox  
Department of Anthropology  
Texas A & M University  
College Station  
Texas 77843 U.S.A.

27th November 1996

Dear Ms. Fox,

Here at last are the black-and-white prints of Sir Walter Raleigh's pipe-pouch and its contents that we promised to send to you so long ago. Please accept them with my compliments.

I do apologise for the length of time that you have had to wait for these. It is most unfortunate that (a.) we are all seemingly hopeless photographers here, repeatedly producing absolutely terrible images not even worth sending you, and (b.) due to the major re-building of the workshops and third floor offices here, pressure of work was such that your request (with others) had necessarily to be postponed until staff time and facilities were once more available. I trust that you find the quality of the prints enclosed to be worth the wait!

It goes without saying that we would be most interested in any conclusions that you may come to regarding the dating and authenticity of the pipes, and indeed in the fruits of your research generally. We are further prepared to waive all copyright fees should you wish to publish pictures of the pipe-pouch.

With apologies again for the delay, I remain

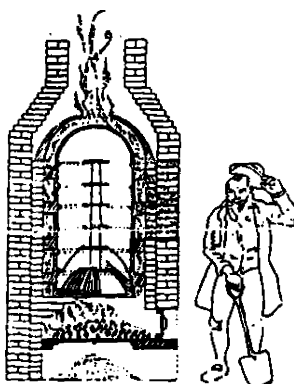
Yours sincerely,

David Edge (Armoury Curator and Conservator)

Dr Allan Peacey

Clay tobacco pipe & kiln specialist

110 Cainscross Road  
Stroud  
Gloucestershire  
GL5 4HN  
Telephone 01453 757367



8 January 1997

Dear Georgia

Ref Permission to reproduce figures.

Your request to reproduce figures 50, 51 and 127 from my book on clay tobacco pipe kilns has been passed on to me by Tempus Reparatum of Oxford. Copyrights on all of their publications is retained by authors. I have signed the enclosed form agreeing to permission within the limits requested.

I am interested to see that you are working on the clay pipes from Port Royal and in this context I was wondering if you have any evidence for manufacture there. Some years ago I was shown some clay pipes from Port Royal which were made from a sandy red clay but in imitation of London 18th century forms. When I saw these I felt that they were probably of local manufacture. I would be interested to here your views on this point.

Good luck with your PhD. Best wishes

Dr Allan Peacey

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Pg. 298: Figure 96. Stem diameter histogram.

Pg. 302: Figure 97. Clay pipe typology.

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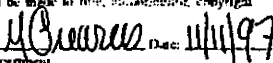
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