Archaeology at South Adger's Wharf:

A Study of the Redan at Tradd Street

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Acknowlegements

The search for the redan at Tradd Street began with a bold idea to excavate an area of South Adger's Wharf currently "unpaved" and "available." The entire project was conceived by Walled City Task Force co-chairs Katherine Saunders Pemberton and Peter McGee. Their knowledge and enthusiasm persuaded Mayor Joseph P. Riley, Jr. and Charleston City Council to both permit and fund the project. We are grateful to Mayor Riley and the City of Charleston for this vote of confidence. Once the City approved the project, it fell to Laura Cabiness (City of Charleston Department of Public Service), Baker Mordeci (Charleston Water Systems), Matt Compton (City Parks Department), Beth Brownlee (Capital Projects), and Harry Lesesne (Office of the Mayor) to make it happen. They met with us numerous times and provided logistical and material assistance in numerous ways.

The January 2008 field project was a very large group effort. Experienced workers from a number of agencies were assisted by a large and diverse group of students, neighbors, friends and colleagues who volunteered their time to help with screening. The 2008 project would not have been possible without the extensive and able assistance of the crew from Charleston Water Systems. We received help 'above and beyond' from James "Tiny" Bonnett and Leroy Young of Charleston Water Systems.

The experienced crew included Eric Poplin and Andrew Agha of Brockington and Associates, Martha Zierden and Ron Anthony of The Charleston Museum, Katherine Saunders Pemberton of Historic Charleston Foundation, and Nic Butler of Charleston County Library. Crew members from Brockington included Jimmy Lefebre, Blair Stec, Damon Jackson, Brian Falls, Inna Burns, and Scott Kitchens. The heart of the 2008 project was the numerous volunteers who helped us on a daily basis. The following folks spent at least one day with us, often in the cold wind, sorting the screens for an array of 18th century artifacts.

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News coverage generated considerable interest in the project. We would like to thank Debi Chard and Live5 News for their extensive coverage of the project. Robert Behre of the Post & Courier also developed in-depth stories, as a result of his solid understanding of archaeology in the lowcountry. We also received excellent coverage from Channel 4 News and the Andy Thomas Radio Show on WQSC-AM. The College of Charleston media center produced a video focusing on Dr. Borg and students from the College of Charleston.

The 2009 project was conducted by the College of Charleston field school in historical archaeology, directed by Barbara Borg (CofC), Martha Zierden (Charleston Museum) and Ronald Anthony (Charleston Museum). The field school students did the bulk of the work.

Anthony Giordano	Matt Harris	Lacy Keesler
Chase Murphree	Kristina Poston	Rachel Pruzin
Ashley Resh	Jennifer Thomas	Bryson Webb
Jake Wilkerson	Luke Wilson	Lisa Randle
Elizabeth LaForgia	Erin Robey	Lauren Bader

In addition to the students, Eric Poplin and Andrew Agha from Brockington and Associates worked in the field. Damon Jackson of Brockington established the grid and recorded the features with the total station, and produced the site maps for both projects.

We received considerable help in the field from colleagues, particularly during excavation of the waterlogged soils. Carter Hudgins and Sarah Stroud of Drayton Hall assisted with recording and stabilization of the palisades. The few leather and wood artifacts were conserved gratis by the Clemson Conservation Center, Paul Mardikian and Johanna Rivera-Diaz. Conservation of the palisades was completed by Nichole Doub at the Maryland Archaeological Conservation Laboratory.

Several experts provided insights into the construction and composition of the brick redan. We had on-site visits from Doug Scot (Historic Masonry Restoration), Frank Genello (American College of the Building Arts) and Chris Zeigler (National Park Service). Russell Horres (NPS) collected brick samples supplied to Dr. Denis Brosnan (Clemson University).

Sharing the ongoing project with the many site visitors was facilitated by the wonderful docents from Historic Charleston Foundation. The following folks followed the daily progress of the project and shared the information with the many neighbors and visitors who visited the site in 2009: Kathy Brown, Ian MacDonald, Debi Davis, and Bob Welch.

Everyone knows the formula that a week of fieldwork generates two to three weeks of lab work. Given the quantity of artifacts uncovered at the site, there was plenty of lab work. The majority of the washing, sorting and cataloguing was done by student interns from the College of Charleston.

Mary Antly	Shannon Crow	Lauren Johnson
Lacy Keesler	John Wall	Britton Williams
Matt Harris	Luke Wilson	Michael Jowers
Elizabeth LaForgia	Kat Hardin	Alison Welser
Connor Bender	Brittany Nycum	

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Lee Stevens	Barb Aldrich	Bill Turner
Marvin Verone	Linda Wilson	

Graphics were provided by talented staff at Brockington and Associates, including Inna Moore, Damon Jackson, Michael Walsh, and Dave Dellenbach.

We could not have completed the project without the assistance of the City of Charleston and Charleston Water Systems. Fencing was provided by Rick Rockwell and Meadors Construction.

Nicholas Butler spent countless hours combing through documents relating to the wall. Documents donated by Susan Baldwin Bates and Harriott Cheves Leland, from the research of Agnes Baldwin, included numerous plats of the Lower Market.

The on-site exhibition was designed and produced by History Workshop, Inc, under the direction of Carol Poplin. Laura Cabiness (Department of Public Service) and Dustin Clemens (Capital Projects) of the City of Charleston worked with us on design and placement. Jim Barker and his crew from City Parks installed the brick parapet and the wayside panels. Brooks Signs designed and installed the label for the brick feature. Funding for the exhibit was provided by the Southeastern Archaeological Conference 2012 Public Outreach Grant, the City of Charleston, and several private donations.

Finally, we would like to thank our many friends and colleagues from museums, preservation organizations, colleges, national and state parks, and consulting firms who visited the site. Your support helped ensure continued interest in the walled city. We would especially like to thank Tony Youmans and Michael Coker of the Old Exchange and Provost and Allan Stello of the Powder Magazine for their ongoing support and their partnership on the many public projects sponsored by the Walled City Task Force.

Chapter I
Introduction

Charleston was the only English walled city built in North America. Beginning in the 1690s, thick walls of brick and earth enclosed roughly 60 acres of high ground fronting the Cooper River. Nestled between tidal creeks and salt marshes, the fortifications provided protection to the inhabitants of Charles Town. Perceived threats from sea and land, from the French, Spanish, and hostile Native Americans, caused the citizens of Charles Town to complete the fortifications, including a substantial brick seawall, by 1711. By the 1730s, as these threats diminished and Charles Town expanded economically and physically, the landward fortifications were abandoned and demolished. The brick seawall along the Bay (East Bay Street) remained intact through the American Revolution, when the British army and navy commenced their siege of the city. Following the American victory, the South Carolina legislature authorized demolition of the city's fortifications in 1784.

Figure 1: Inset from the Crisp map of 1711, showing Charles Town as a walled city (Library of Congress).

The well-know painting by Bishop Roberts of 1739 shows colonial Charles Town as a thriving port town, full of medieval-style buildings focused on the waterfront. In this image, the town is crowded behind a protective brick seawall, outfitted with bastions, redan and cannons. Virtually none of this city remains. A year later, the fire of 1740 would destroy at least half of the buildings depicted. Later growth, expansion, and modernization would claim many of the rest, including the wall itself.

Figure 2: Charles Town Harbor, 1739" by Bishop Roberts (Colonial Williamsburg Foundation)

Scholars have long expected that the brick wall was not destroyed, but simply buried beneath the demolition rubble, with newer city features constructed on top of the foundation. The wall could be preserved beneath the city's streets, sidewalks, and historic houses. Two small areas were encountered in excavation in the first half of the 20th century, but not enough to connect the dots, and ascertain the precise location, condition, and details of the city's early wall. When the opportunity to explore a third location, at the foot of Tradd Street, arose in 2008, local scholars eagerly took it.

The Walled City Task Force

Though the footprint of the fortifications is generally known, no trace of the original wall is visible above the ground. Two small portions were exposed in excavations during the 20th century, and the public can only see the wall in a single location. Understanding and interpreting the early Charleston landscape without reference to the walls that enclosed the town is challenging. To protect this important, but largely undocumented, historical artifact from the degradations of construction and erosion was equally challenging.

In an attempt to ameliorate the invisibility of the early walled city, the Walled City Task Force was appointed by Charleston Mayor Joseph P. Riley, Jr. in 2005. The Task Force was charged to further the identification, protection, and interpretation of the walled city of Charleston. The Task Force is headed by two leaders of Charleston's historic preservation community, Katherine Saunders Pemberton, Associate Director of Preservation at Historic Charleston Foundation, and Peter McGee, local attorney and member of the Commission on Arts and History for the City of Charleston. The Commission includes historians, archaeologists, and preservationists, and also representatives from City Parks, Charleston Water Systems, and other city and county agencies whose work involves excavation into the historic soils of Charleston.

Since its inception, the Task Force has sponsored numerous lectures, a living history program and encampment, and three successful "Walk the Walls" events. To date, more than 50,000 *Walk the Walls* brochures have been distributed, encouraging the public to take a self-guided tour of the early Walled City boundaries. In addition, there is a podcast tour available on *City Slicker*, a blog maintained by the task force and Dr. Nic Butler (www.walledcitytaskforce.org), and web site information maintained by Historic Charleston Foundation and The Charleston Museum. Task Force members have been called to several construction and maintenance sites to identify brick foundations. The project at South Adger's Wharf is the first controlled archaeological investigation conducted by the Task Force.

The Walled City

Charleston's earliest defensive works were built along a low bluff facing the mudflats of the Cooper River. At its eastern edge, parallel to the river, early settlers laid

out a "wharf" or landing that became modern East Bay Street. Between 1680, the date of settlement of the peninsula, and 1686 an earthen "tranchee" or entrenchment was built along the front of this landing, stretching approximately one thousand feet southward from Broad Street. This earthen barrier, which formed a curtain line between two small wooden forts, was probably designed to both protect the landing from tidal surges and to screen defenders during an attack. Details of the early fortifications are shown in a 1686 map (Leland and Ressinger 2006; 2008).

After several years of watching the town's waterfront erode, in 1694 the South Carolina General Assembly ratified the first of many statutes authorizing the construction of a brick "wharf wall" or "curtain line." Construction commenced in 1696 and continued for more than a decade, requiring several million bricks. Also in 1696, the legislature commissioned a brick "fortress" to replace the timber structure at the southeast corner of town, later christened Granville Bastion. In 1699 a brick "half-moon" battery was also begun at the eastern end of Broad Street to replace an earlier fort on that site.

At the beginning of Queen Anne's War in 1703, the South Carolina legislature ratified an act to enclose the entire town with a system of entrenchments, flankers, parapets, sally ports, a gate, drawbridges, and blinds. In addition to the existing "fortress" and "half-moon," the new works included four more bastions, a ravelin with two drawbridges guarding the town gate, and eight redans or salient angles. A broad earthen wall with wooden platforms for cannons connected all of these features, and the entire "enceinte" (enclosed settlement) was surrounded by a moat and palisade fence. The well-known illustration of Charles Town published in London by Edward Crisp in 1711 depicts the settlement as a miniature "walled city."

The fortifications were severely damaged by strong hurricanes in 1713 and 1714, and the Yamasee War of 1715-1717 consumed all the money and resources for repair. In the early 1720s, Governor Francis Nicholson urged the repair and expansion of Charles Town's fortifications, but a legislative impasse effectively consigned the old works, save the sea wall, to a state of virtual abandonment. The destructive hurricanes of 1723 and 1728 and the widespread pilfering of earth and building materials quietly erased the 1703 entrenchments on the back part of the town.

Between the mid-1730s and the late 1750s, a variety of defensive works were planned and constructed, but none of these later fortifications created a fully enclosed "enceinte." When the British army and navy commenced their siege of Charles Town in the spring of 1780, they faced a heavily-fortified city. Despite this, the city capitulated on May 12, 1780 and was occupied for two years.

The new South Carolina legislature passed an act in March 1784 to authorize demolition of the city's fortifications. In the months and years that followed, the defensive works were leveled and the fortified lands subdivided, sold, and built over.

The Present Project

Explorations of the redan at the foot of Tradd Street began with the fortuitous discovery of a 1785 plat of the area, drawn by Charleston's premier surveyor Joseph Purcell. The detailed plat shows the curtain line intact along East Bay Street, a projecting redan recently demolished, and the c. 1750 Lower Market in front of the redan. Also shown were a series of waterfront buildings along the north side of the Tradd Street extension, and various plots of land purchased by the Commissioners of the Markets. This location, now known as South Adger's Wharf, is currently a public street, paved in historic cobblestone. In 2007, the precise portion shown in the 1785 plat was temporarily paved in asphalt, the historic cobblestones removed during replacement of the City's sewer tunnel system. At the urging of Katherine Pemberton and Peter McGee, the City of Charleston and Mayor Joseph Riley agreed to a two-week opportunity to excavate and document the redan prior to replacement of the cobblestones.

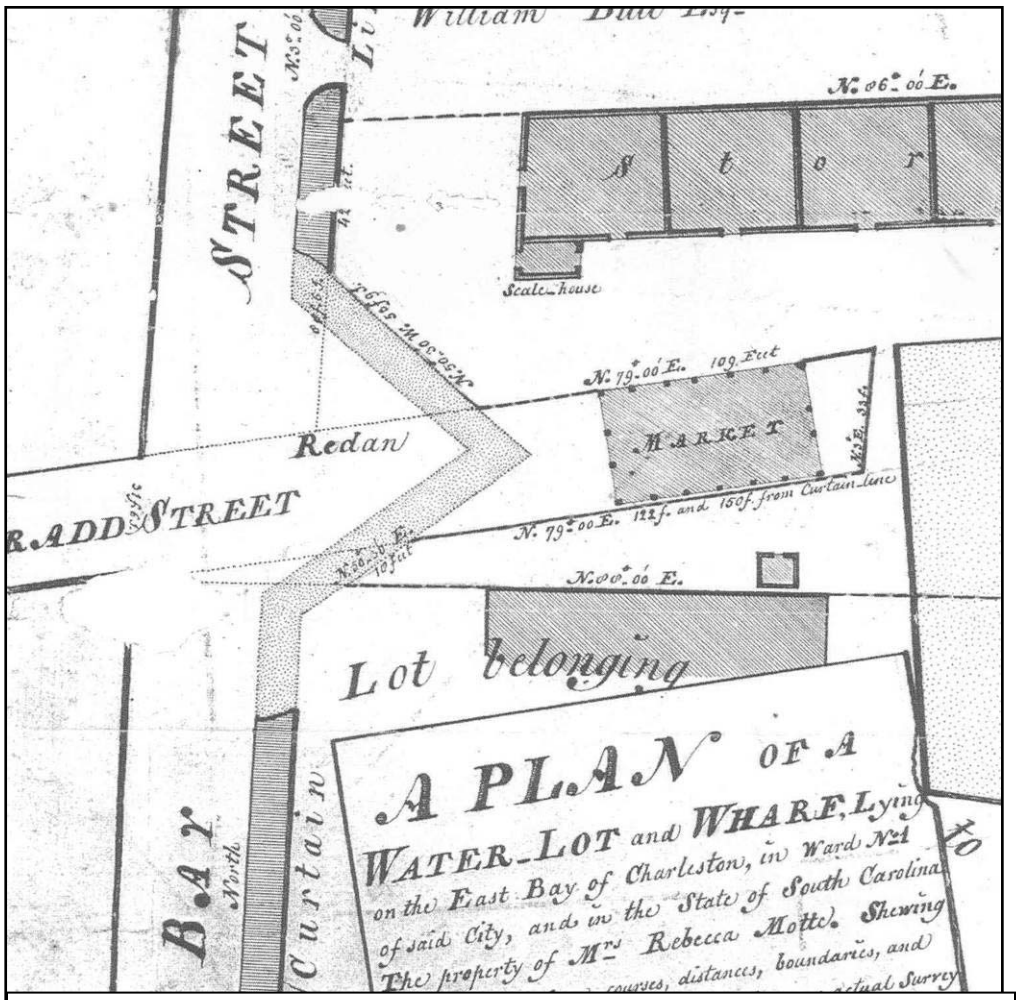


Figure 3: 1785 plat of property belonging to Mrs. Rebecca Motte, showing the redan (recently demolished), the curtain line, and the Lower Market. (Courtesy of the Southern Maritime Collection, State of South Carolina).

The Walled City Task Force then assembled a team of archaeologists from The Charleston Museum and Brockington and Associates, plus historians, preservationists,

docents, students, and crews from Charleston Water Systems to dig for two weeks in January 2008, using a backhoe as well as hand excavation, guided by the historic plat and current landmarks. The project was successful in exposing the north face of the redan, as well as a number of 18th, 19th, and 20th century features. The project did not, however, expose the point of the redan or excavate to the base of the wall.

Based on these promising findings, the Task Force petitioned the City for the opportunity to continue excavations the following year, following the footprint of the redan into a City-owned parking lot. The City again offered permission, funding, and logistical support, and a four week project was conducted in June 2009. The second project was completed by the same team, with the addition of students from the College of Charleston archaeological field school. This project was successful in exposing the point and the south wall of the redan, and in reaching the base of the wall and recording the foundation structure. In addition, the project exposed multiple layers of fill and archaeological deposits dating from the early 18th century to the early 20th century, including materials associated with the Lower Market and general waterfront activities.

The project also produced unprecedented opportunities for neighbors and the public to share in the process of discovery and interpretation. Heightened awareness of the wall, its general location, and its likely survival below ground, prompted calls from public agencies and private citizens to report brick exposed in maintenance excavations elsewhere. Three additional sections of the wall were identified and described after completion of the Tradd Street Project; they are also described in this report (see Chapter 5). This report is part of the ongoing process of discovery and interpretation.

Research Issues

The South Adger's Wharf site, located in one of the oldest sections of Charleston and occupied continuously through the mid-20th century, presents an opportunity to examine many issues and components of urban life. The primary purpose of the project was to record the location of a component of the early wall, assess the construction and demolition of the wall and further explore the role of defensive works in the 18th century. But the area available for study also contained data from a second important urban feature – the Lower Market. In fact, the project was proposed to the City as "two for the price of one," as study of provisioning and commodity exchange has been a central issue in Charleston archaeology. Finally, the site presents graphic stratigraphic data on land filling and the evolution of the Charleston waterfront, to accommodate trade and shipping. The rich material assemblage retrieved from the multi-layered site expands our knowledge of materials used in the city throughout the 18th century.

Architecture of Charleston's Wall: Excavation of the redan at Tradd Street is only the third opportunity since 1925 to view a portion of the massive brick seawall, and documentation of the first two projects was limited. Exposure and analysis of the brick redan will allow architects, archaeologists, and historians to assess the details of construction and size and degree of professionalism in the design and execution of the

wall and the various defensive features. Precise mapping of the redan will also further efforts to translate these to current maps and the modern landscape, allowing better protection from ground disturbing activities.

Consideration of Site Formation Processes: The first consideration on many sites, including all of those in Charleston, is the physical actions that result in the transformation of a living culture into an archaeological site (Schiffer 1977; 1983). An archaeological site, whether urban or rural, consists of a natural setting altered by the humans who occupied that site. Artifacts are introduced into the ground by a variety of methods, including discard, loss, destruction, and abandonment. Once in the ground, artifacts can be redistributed or they can be removed. Most significant to archaeologists are those activities that introduce materials into the ground and reorganize them after deposition.

Understanding the site formation processes is an essential first step in archaeological site interpretation. Occasionally these activities are recorded in the documentary record, and the two sources of data can be compared. Site formation issues are particularly significant at South Adger's Wharf, as the majority of the excavated area is fill - layers of earth and debris deliberately deposited on low-lying marsh to create land suitable for human activity. Waterfront fill is, in fact, an artifact of the urban landscape, and requires an appropriate level of analysis for proper interpretation (See Zierden and Reitz 2002:83).

The Urban Landscape: The ongoing study of Charleston as landscape is based in the principal of a cultural landscape, the modification of land according to a set of cultural plans, embodying often inseparable technological, social, and ideological dimensions. People created and used these landscapes in a planned and orderly manner for everything from food procurement to formal design to explicit statements about their position in the world (Jackson 1984; Stilgoe 1982; Upton 1990). Creation of a formal waterfront, including features for defense, for local commerce, and for transatlantic trade, and changes to this waterfront over the course of three centuries, reflects the needs and aspiration of urban residents. The current intersection of East Bay, Tradd, and South Adger's Wharf serves as an example of the evolving urban landscape.

Provisioning the Urban Market: Faunal remains recovered from archaeological sites are central to research concerning the production and consumption of foods in the colonial city. Baseline data on the meats sold in the market are critical to this study. A recent study of Charleston's earliest market at Broad and Meeting Streets, later named the Beef Market, provides critical new data on the meats sold at market; moreover this study documents changes in the products stocked and sold as the 18th century progressed (Zierden and Reitz 2005; Reitz 2007). The opportunity to examine a second market context will strengthen conclusions derived from that study.

Associated studies include the source and use of specific domestic animals such as cows and pigs. Recent studies by Elizabeth Reitz, for example, have demonstrated that cattle were maintained and slaughtered on townhouse sites, despite the presence of

the market (Reitz and Zierden 1991; Reitz and Ruff 1994). Data from the Beef Market suggest that live animals were not present at the market in the second half of the 18th century, perhaps because of the central location of the market and the possibility of nuisance complaints. The new Lower Market, constructed on the edge of the colonial city and along the waterfront, may have functioned in a different manner.

Zooarchaeological research has explored the role of wild animals, such as small mammals, birds, fishes, and reptiles in the lowcountry diet. Differences between urban and rural consumption of these foods is also considered. These issues are part of a study of what Chesapeake researchers term the "provisioning system." Included in their definition is "local production of food and fuel, importation of foods and fuels from other regions, transportation of these goods to market, food processing by intermediaries, distribution to consumers, and the social connections that facilitate economic exchange" (Walsh et al. 1997:5; see also Anderson 1971). Analysis of food remains from deposits associated with the Lower Market, coupled with data from the Beef Market and a host of residential sites, adds to the ongoing study of provisioning systems in colonial Charleston.

Consumerism and Commodity Exchange: Fill deposits from colonial cities often contain large amounts of cultural material, and South Adgers Wharf is no exception. Site formation processes will be examined to determine if the materials were generated from on-site activities or transported to the area from elsewhere. Two waterfront sites investigated previously, the Exchange Building (Herold 1981) and Atlantic Wharf (Zierden and Reitz 2002) contained materials not found elsewhere in the city, some of which were generated from on-site activities.

In either case, the artifacts inform on the material life of the city in general, and contribute to the study of commodity exchange and consumerism. These issues include trade and international relations, culture diversity, self- and group identity, and socioeconomic classification. The study of residential, commercial, and public sites has revealed a material assemblage that is similar to other English colonial sites of the 18th century. Unique to this site, the assemblage speaks to the flow of goods and people in this transatlantic port.

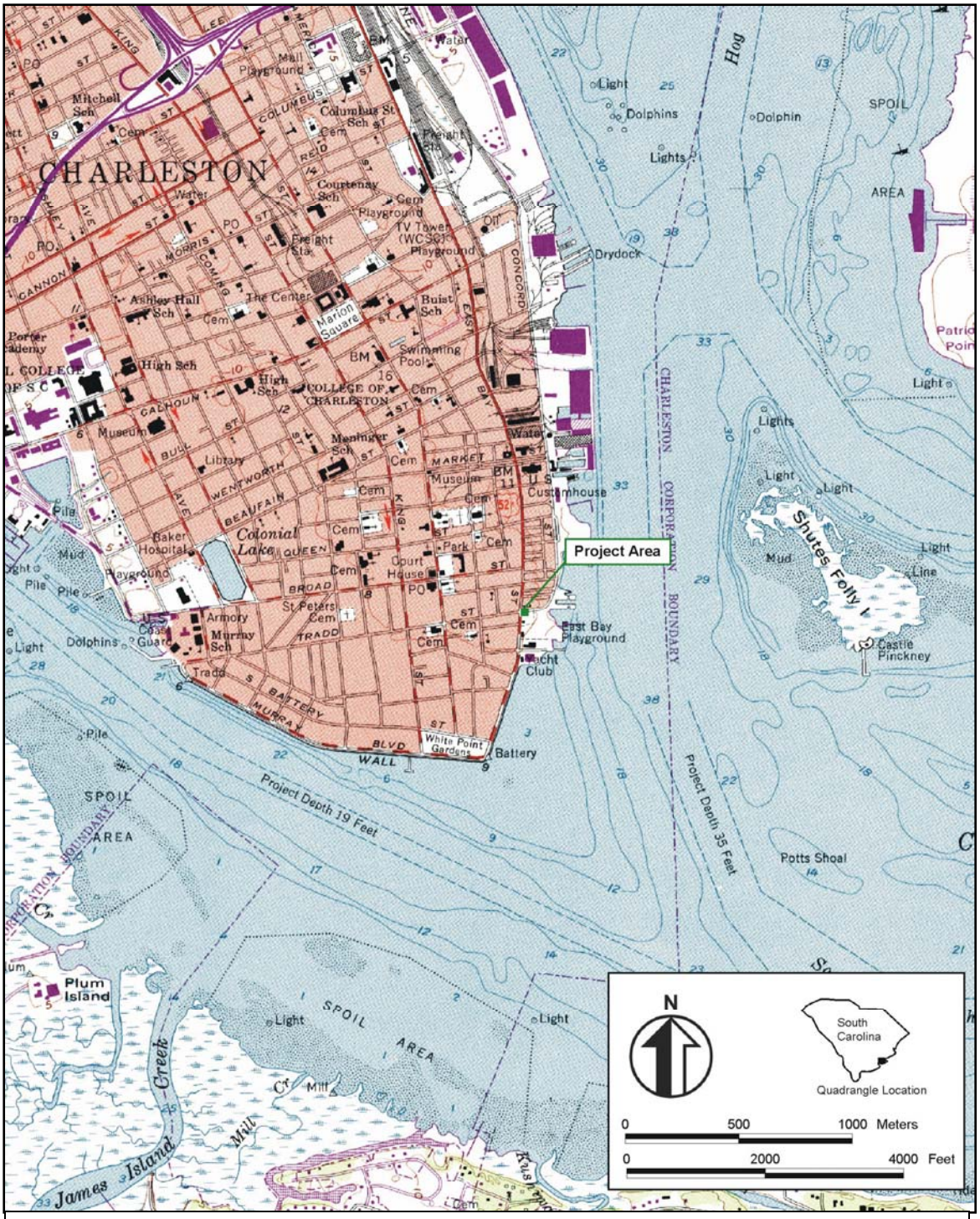


Figure 4: Location of the South Adger's Wharf site at the foot of Tradd Street, Charleston peninsula.

Chapter II
Historical Background

Early Charleston

Charleston, the first English settlement in the Carolina colony, is well-known as the social and intellectual center of a flourishing plantation economy, built on African slave labor. Charleston's economic domination of the south Atlantic seaboard was, however, unknown to the settlers a century earlier who feared their position "in the very chap of the Spaniard" (Joseph Dalton to Lord Ashley, September 9, 1670 in Crane 1981:3; Cheves 1897, v. 183).

Well aware of their tenuous hold on the new colony, the settlers first chose a readily-defensible location on the Ashley River. The colonists soon contemplated a move from Albemarle Point on the banks of the Ashley – a secluded and highly defensible position – to Oyster Point, the peninsula formed by the confluence of the Ashley and Cooper Rivers. The Lords Proprietors, under the guidance of the enthusiastic Anthony Ashley Cooper, Lord Shaftsbury, directed the Carolina settlers to "plant in towns" (Hart 2010:22). The new location featured a fine harbor on the Cooper River side and was "ideally cituated [sic] for trade" (Mathews 1954:153; Salley 1928:105).

Figure 5: The Crisp map of 1711 showing the Carolina Coast (Library of Congress).

The peninsula was also deemed more defensible. But historian Robert Weir notes that the location was not without its shortcomings (Weir 2002:66); indeed, the town's survival was questionable through the end of the century. The bar at the harbor entrance was shallow, making entry into the harbor difficult for larger vessels. The water table on the low-lying peninsula was high, so that underground cellars were impractical and wells were shallow, compromising the quality of drinking water. Mortality rates were high, and population growth was slow. Food supplies were relatively plentiful, however, and by the end of the first decade of settlement, the colony was supplying food to Barbados and other islands in the West Indies (Weir 2002:69). Foodstuffs and deerskins were the colony's first lucrative trade item.

Building on lessons learned in earlier colonizing efforts in Virginia and the Caribbean, and benefitting from an already diminished and highly mobile Native American population, the settlers immediately searched for profitable exports. The search for a profitable staple, however, proceeded slowly and was complicated by conditions set by the Lords Proprietors. Forty years, and a shift to Royal rule, would pass before the colony was well-situated financially (Clowse 1971; Weir 2002).

Prosperity, though, demanded security. The early colonists lived under constant fear of attack. Occupied Spanish territory was immediately south of Charleston: a chain of missions, each protected by a presidio, extended from St. Helena to St. Augustine and westward through northern Florida to the Apalachicola River. The Atlantic coast was the scene of persistent warfare until the missionaries abandoned the northern outposts in 1702 (Andrews 1938:203; Hann 1988; Wright 1971). The French, spreading along the Mississippi, were another threat to Britain's southernmost settlement. Pirates, the scourge of the Caribbean and Atlantic Oceans, were another hazard.

The threat of Spanish invasion plagued Carolina until the mid-18th century. The outbreak of Queen Anne's War in 1702 provided an opportunity for an English invasion force, under Governor James Moore, to set siege to St. Augustine by sea and by land (Waterbury 2002; Moore 2002). The Spanish were forewarned, however, and barricaded in the Castillo de San Marcos. Though Moore occupied the town, he was unable to capture the fort. Highly criticized for this endeavor, he restored his reputation two years later with a ruthless raid on the Apalachee in the north Florida mission settlements (Hann 1988; Hann and McEwen 1998).

The Spanish retaliated in 1706, invading Charleston harbor as the city languished under a yellow fever epidemic. The English were prepared this time, with new fortifications, and skirmishes at James Island and Shem Creek kept the Spanish at bay. The Spanish mounted another unsuccessful raid in 1719, and a pattern of minor skirmishes continued until the War of Jenkins Ear in 1739. Though this was the last major skirmish among the colonists, the feelings of mutual enmity continued until the stroke of a pen in Paris gave Florida to the British in 1763 (Weir 1983; Edgar 1998).

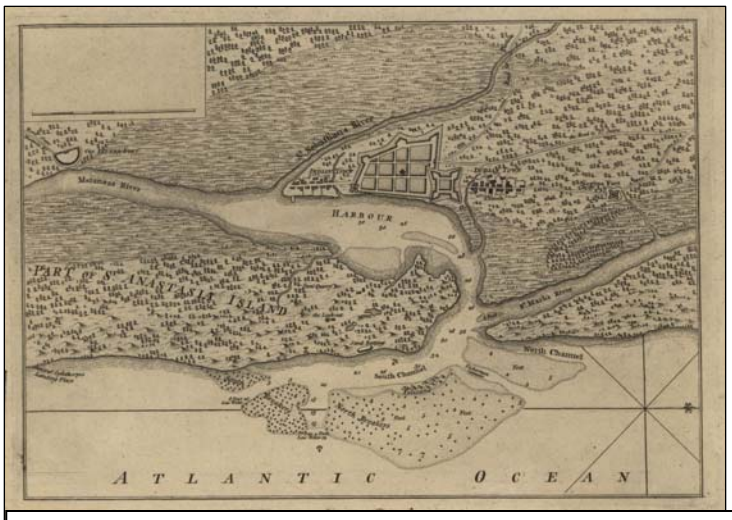


Figure 6: St. Augustine, Florida in 1763 by Jeffries (Library of Congress).

Intimately linked to rivalry with the Spanish was the manipulation of the Native American population, principally through trade relations. Control of the Indians was pursued relentlessly by the English, French, and Spanish as a result of the Europeans' desire for animal skins and Indian slaves. South Carolina was the most heavily involved

of any of the colonies in the Indian slave trade (Snell 1973; see also Bowne 2005; Gallay 2002). Although this trade was condemned by the Lords Proprietors, it was profitable for the colonists, and a large number of enslaved people were shipped to the Caribbean and the northern colonies.

The principal item of trade, though, was not slaves but animal skins. The main animal pursued by Native people, and desired by European merchants, was the white tailed deer. The Indians depended on these animals for a significant portion of their food, and they artificially increased deer herds in the wild by firing the woods (Cronon 1983; Lefler 1967; Silver 1990). Deerskins soon became the colonists' most profitable export. The earliest trade was a secondary small-scale pursuit of individual planters. Some of these entrepreneurs hired an Indian hunter to supply them with skins; others traded in a more haphazard fashion (Crane 1981:118). A 1707 act, championed by the politically powerful Goose Creek faction, concentrated the deerskin trade in the colonial capital, and cemented the role of urban merchants in that trade (Hart 2010:25). By the mid-18th century dressed deer skins accounted for 16% of the colony's exports, and tanning was the city's most important industry (Bridenbaugh 1955:76). The defeat of the Indian alliance in the Yamasee War of 1715 changed the mechanics of this trade as the defeated tribes moved inland (Ramsey 2008). Those involved in the fur trade now required storage facilities to support their long-distance enterprise (Barker 2001).

Soon the trade was transformed from one operated on a small scale by individuals to a capital-intensive industry controlled and dominated by Charleston's mercantile community. Local merchants established credit relations with British businessmen, enabling them to procure and finance the trading goods necessary for the exchange conducted with Indian suppliers. The wealth and standing acquired by these merchants led to diversification, into commodities such as naval stores, provisions, rice, and African slaves (Calhoun 1986; Calhoun et al. 1982; Earl and Hoffman 1977:37). By the 1690s rice emerged as a profitable staple; in 1704 naval stores became profitable after the War of Spanish Succession made Swedish products inaccessible (Clowse 1971:133). These exports, in turn, stimulated other economic activity and the city began to stabilize and grow (Weir 2002:70).

Native Americans were not the only groups attempting to play the Anglo-Spanish rivalry to their advantage. A large number of newly-arrived African slaves also saw an alliance with the Spanish as their salvation. For their part, the Spanish capitalized on this to further erode British control of their new colony. Lured by the promise that escaped slaves would be given religious sanctuary in Spanish Florida, Africans escaped and made their way south. The first recorded group of fugitives, including women and a nursing child, arrived in St. Augustine in 1687. By 1738 the number was large enough for the Spanish to establish a separate fort and community north of St. Augustine, Gracia Real de Santa Teresa de Mose (Deagan and McMahon 1995). Fort Mose quickly came to represent freedom to Carolina slaves, and helped incite the 1739 Stono Rebellion (Wood 1974). Opportunistic alliance between southeastern Indians and Africans would continue throughout the 18th century, despite attempts by white colonists to promote mutual distrust and dislike.

The growing colony never lacked settlers. Dissenters, Englishmen, Scots, New Englanders, Jews, and African and West Indian slaves formed the core of this diverse group. The West Indies remained a source for early settlers, and these planters, merchants, artisans, servants, and slaves influenced development of Carolina's social and political systems; most notably, a block of Barbadian planters known as the Goose Creek men influenced the political and economic development of the early colony (Dunn 1972; Clowse 1971:88-89). The Carolina policy of religious toleration also attracted French Huguenots, suffering persecution in their native land. The Huguenots assimilated into the prevailing English society relatively rapidly, particularly after the 1697 Naturalization Act (Van Ruymbeke 2001). A large number of settlers came unwillingly, transported from Africa as slaves to work plantations. The increasing cultivation of rice created a voracious demand for slave labor, and by 1708 the majority of lowcountry residents were black (Edgar 1998; Wood 1974).

The Proprietors believed that cities increased security, provided opportunities for trade, and promoted civilization (Weir 2002:67). The early plan of Charleston, devised in 1672, was known as the Grand Modell. Utilizing the central square commonly identified with Philadelphia, this plan divided the peninsula into the deep, narrow lots characteristic of 17th century British colonial towns (Reps 1965:177) and guided development of city lots until the second quarter of the 18th century (Poston 1997:48). Like Philadelphia, Charleston's plan featured broad streets and lots reserved for a church, town house, and other 'publick structures' (Thomas Ashe in Bridenbaugh 1938:10), including a public market.

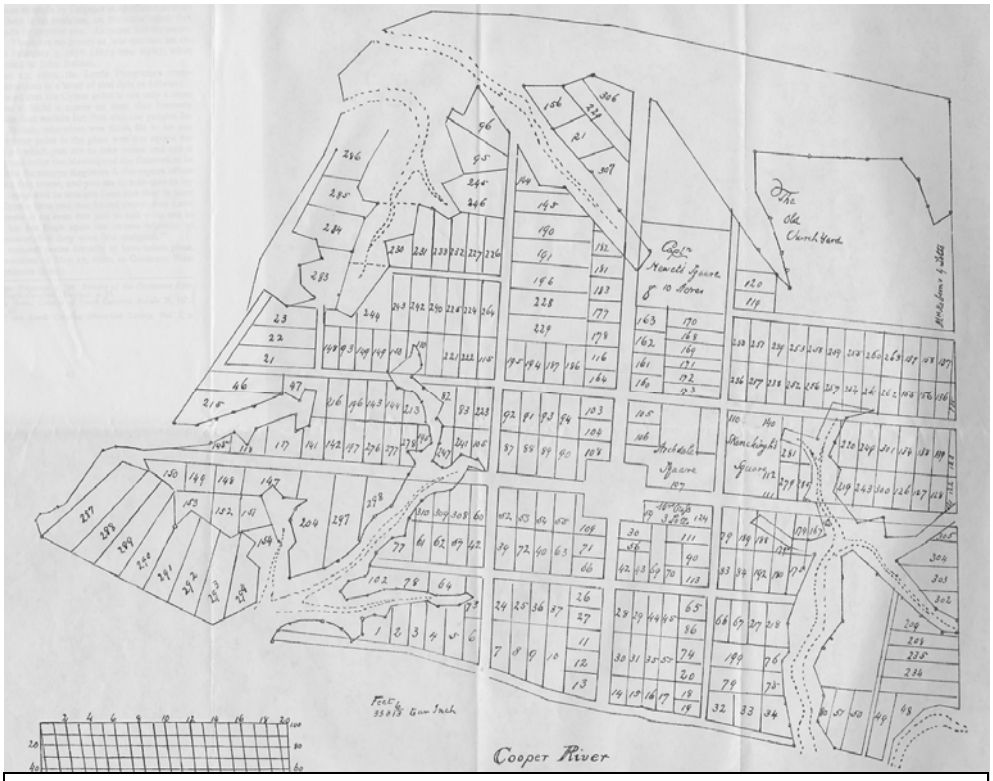


Figure 7: The Grand Modell of Charles Town (South Carolina Historical Society).

But the plan on paper had to be adapted to the realities of the terrain of the peninsula (Saunders 2002:200). The highest land, between Vanderhorst's and Daniel's creek, was chosen, as was the section of the Cooper River where the deepest water and narrowest marsh was found. This area was not only situated for commerce, but was the most defensible. The creeks that framed the new city provided natural barriers that were enhanced with fortifications. Those same creeks later restricted the flow of goods and people as the port town expanded.

Charleston's Colonial Defenses

The small triangular structure at Tradd Street, known as a redan, was part of the main line of colonial fortifications that faced Charleston Harbor. This line of brick fortifications was begun along the east side of the Bay Street in the 1690s. Based on European fortification design principles of the day, the angled walls of the redan allowed the five or six cannons mounted within to fire at a wider range of potential targets, and thus better protect the curtain wall and the city from naval assault. When it was built three hundred year ago, the Cooper River washed the redan's brick walls at high tide. Since that time, the mud flats on the east side of East Bay Street have been built up with silt, ballast stones, trash, and other materials. By 1784 or 1785, when the redan at the east end of Tradd Street was finally removed, an extensive dock stood between it and the channel of the Cooper River. Larger wharves were located on either side of the Market Dock. This extension of Tradd Street is now known as South Adger's Wharf.

Charleston's earliest defensive works were built along a low bluff facing the mudflats of the Cooper River. At its eastern edge, parallel to the river, early settlers laid out a "wharf," or landing, that became East Bay Street. Between 1680 and 1686 an earthen "tranchee" or entrenchment was built along the front of this landing, stretching approximately one thousand feet southward from Broad Street. This earthen barrier, which formed a curtain line between two small wooden forts, was probably designed to both protect the landing from tidal surges and to screen defenders during an attack (Leland and Resinger 2006, 2008; Salley 1908:34; Butler 2008).

Figure 8: The Boyd map of 1686, showing the Cooper riverfront guarded by two forts, likely the later locations of Granville Bastion and the Half Moon Battery . (University of Aberdeen; Leland and Resinger 2006).

After several years of watching the town's waterfront erode, in 1694 the South Carolina General Assembly ratified the first of many statutes authorizing the construction of a brick "wharf wall" or "curtain line." Construction commenced in 1696, and continued for more than a decade, requiring several million bricks. That same year the legislature commissioned a brick "fortress" to replace the old timber one at the southeast corner of the town, later christened Granville's Bastion. In 1699 a brick "half-moon" was also begun at the eastern end of Broad Street to replace an earlier fort on that site (Acts of the Assembly, SCDAH:147; McCord, Statutes 1840:28-33). Furthermore, a law passed in 1700 required persons holding lots "on the Bay of Charles Town" to build a brick wall before their land and to keep it in repair at their own cost (Joseph et al. 2000:4; Lipscomb and Olsberg 1977:53).

At the beginning of Queen Anne's War in 1703, the South Carolina legislature ratified an act to enclose the entire town with a system of entrenchments, flankers, parapets, sally ports, a gate, drawbridges, and blinds. In addition to the existing "fortress" and "half-moon," the new works included four additional bastions, a ravelin with two drawbridges guarding the town gate, and eight redans, or salient angles (Act 219 in McCord, vol. 7, 1840:28-33). A broad earthen wall with wooden platforms for cannon connected all of these features and the entire "enceinte" (enclosed settlement) was surrounded by a moat and palisade fence. The illustration published in London by Edward Crisp in 1711 depicts early Charles Town as a miniature "walled city."

Between 1696 and about 1708, English masons and African slaves laid approximately seven million bricks along the east side of East Bay Street (approximately 1,500 bricks per linear foot), creating a solid defensive line from Granville's Bastion to Craven's Bastion. This wall was repaired and strengthened several times in the following decades, and probably attained a height of six feet above the street level, or the level of the Cooper River at high tide (Butler 2008; Gentleman's Magazine 1745:30).

Figure 9: *An Exact Prospect of Charles-Town, the Metropolis of the Province of South Carolina,"* 1739, engraved by H. Toms, after the painting by B. Roberts (Carolina Art Association).

Included in the design for the wall were three redans, or salient angles projecting from the curtain line into the Cooper River. Located at the ends of Lodge Alley, Unity Alley, and Tradd Street, the redans included embrasures, or splayed cannon openings, in

the upper part of the wall, and were designed to provide additional "lines of fire" in case of an attack from the water. Based on the 1739 illustrations, each redan was armed with five to seven cannons.

When the curtain line was first constructed, the waters of the Cooper River reached the east side of East Bay Street at high tide, leaving an exposed mudflat 200 feet wide at low tide. To protect the brickwork from floods, storms, and errant boats, the legislature ordered the installation of a double row of wooden pilings along the entire length of the curtain line. This palisade was approximately five feet from the wall, and the space between the bricks and pilings was filled with pine brush, oyster shells, and stones (Salley 1932: 61). As maritime activities along the Bay increased in the first half of the 18th century, the mudflat was pushed eastward. By mid-century, silting from construction of wharves prevented the water from reaching the redans, even at high tide. In 1745, the legislature ordered a twelve-foot-wide moat cut on the east side of the curtain line. This moat was not filled until late 1764, at the conclusion of the Seven Years or French and Indian War. (Cooper 1838:653-656; 697-705).

The fortifications were severely damaged by strong hurricanes in 1713 and 1714, and the Yamasee War of 1715-1717 consumed all the funds and resources for repair (Fraser 2006:11). Differences between the Carolina colonists and the Lords Proprietors led to a legislative coup in December 1719, at which time Carolina declared itself to be under direct royal control, though the arrangement was not formalized until 1729 (Clowse 1971:194-195). In the early 1720s, Governor Francis Nicholson urged the repair and expansion of Charles Town's fortifications, but a legislative impasse effectively consigned the old works, save the sea wall, to a state of virtual abandonment. The 1739 *Ichnography* shows the town expanded well beyond these landward boundaries, and the walls symbolically reduced in significance.

By the mid-1730s, a variety of new defensive works were planned, but none of those constructed in the ensuing decades completely surrounded the town. The Assembly commissioned earthwork ramparts to surround the southern half of the peninsula, fronted by a double row of cedar pilings. They built a brick battery, capable of mounting up to 40 cannons, at the southern tip of the peninsula (now White Point Garden). Christened Broughton's Battery in December 1737, this structure was designed by Gabriel Bernard (Saunders 2002:211; Ravenel 1964:20).

The outbreak of the War of Austrian Succession led to a renewed burst of fortification building in the early 1740s. While work continued on banking and piling the southern portion of the town, the legislature made plans to enclose the town's northern boundary with a new line of earthwork entrenchments and bastions. By 1745 Charles Town had a new town gate in King Street, a few blocks north of the old one, which led over a new moat stretching from a creek leading into the Cooper River on the east to another creek leading to the Ashley River on the west.

As the town continued to grow in the 1750s, this new fortified line proved restrictive and inadequate. In 1755, at the beginning of the Seven Years' War, Governor James Glen hired German-born engineer William De Brahm to design and superintend a

new plan of urban fortifications. De Brahm proposed a large-scale project to encircle the entire town by enhancing the existing works to the east, south, and west, and creating a new northern line of fortifications between the Ashley and Cooper Rivers a few blocks north of the 1745 line. The expenses for De Brahm's project soon overwhelmed expectations, however, and after a few years the work was abandoned, having completed only the improvements to the southern half of the peninsular walls (De Vorsey 1971:11; Ravenel 1964:23; Saunders 2002:212).

A massive tabby horn work bastion, serving as the new town gate and the centerpiece of the northern defense line, was commenced in 1758 and left unfinished in 1760. Following the end of the war, the moat in front of the curtain line was filled in 1764, the northern defensive line erected in 1745 was leveled in 1765, and the remaining fortifications were allowed to decay. In 1768, however, the ramparts of earth and palmetto logs along the town's southern perimeter were replaced by a substantial brick wall.

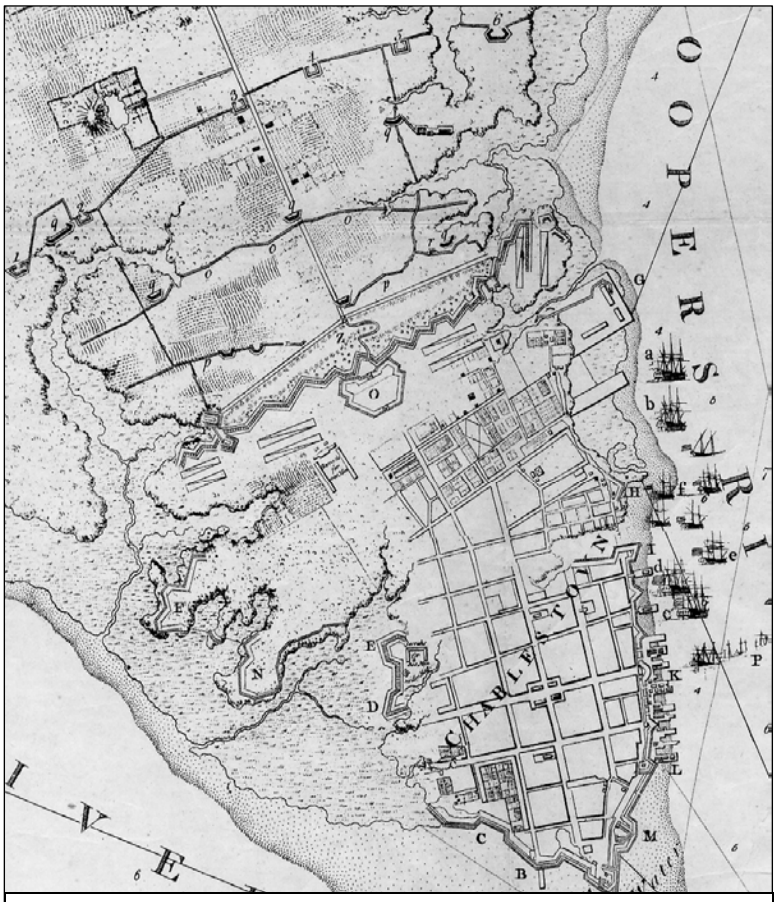


Figure 10: Clinton map of the siege of Charleston, 1780 (William L. Clements Library, University of Michigan).

Fort Moultrie on Sullivan's Island was built in the spring of 1776, at the beginning of the American Revolution, to defend the city against a British naval attack; a similar wall made of palmetto logs and sand was also built around the peninsula of Charlestown in 1776 and 1777. Following an aborted British attack on Charlestown's northern boundary in 1779, local officials ordered the completion of a northern line of entrenchments and bastions between the Ashley and Cooper Rivers similar to those De Brahm had planned in the late 1750s. When the British army and navy commenced their siege of Charlestown in the spring of 1780, they faced a heavily fortified city, surrounded on all sides by high walls and low swamps. Despite a valiant defense, the city capitulated on 12 May 1780 (Borick 2003).

The brick fortifications along the waterfront were repaired periodically and remained intact through the Revolution. The South Carolina legislature waited until March 1784 to authorize the demolition of the city's urban fortifications. In the months

and years following, the brickwork was demolished to ground level, the land subdivided, sold, and built over (Cooper, Statutes, v.14, 1838:648-649).

Eighteenth Century Charleston

The new town was gradually constructed as a walled city. Though the English and their Indian allies chipped away at the Spanish mission chain along the Atlantic coast (Milanich 1998:171-173), the threat of Spanish invasion plagued the Carolina colonists until the mid-18th century. By the second decade of that century, the town boasted a massive brick seawall with corner bastions, providing a formal, and formidable, waterside entrance to the town (Saunders 2002:205). The three landward walls, evidently viewed as less critical, were likely earthen embankments, fronted by ditches that served as moats.

Carolina Governor James Moore's raids on St. Augustine in 1702 and the San Luis mission in 1704 were brutal, and largely a military failure, but they marked a turning point in the outlook and development of both St. Augustine and Charleston (Zierden and Reitz 2002). The colony's already successful economy was bolstered by the conflict. The landward walls of Charleston were gradually demolished, as the city grew during the late colonial period. Deerskins, lumber, naval stores, and an inter-coastal trade in provisions continued to fuel the city's expansion (Edgar 1998:136). An illegal trade with St. Augustine developed after 1710, and flourished in the 1730s (Harmon 1969:83). This trade was eventually legalized in 1750 (Deagan 2007).

Beginning in the 1690s the production of rice and naval stores brought economic stability to Carolina and, with it, increases in the population of the city. With the development of rice as a profitable export came the importation of Africans as enslaved laborers, many of whom contributed knowledge and skills to growing and harvesting the grain (Weir 2002:70; Carney 2001; Wood 1974). These productive economic ventures led to the establishment of additional plantations in the country and additional support services in the town. Artisans, craftsmen, merchants and professionals added to the swelling ranks of urban dwellers. The development of outlying communities along a fluid and permeable frontier brought an influx of products from the interior.

The earliest towns were the product of a plan by the Lords Proprietors to lessen the threat of Native American and Spanish attacks from the interior. These efforts were formalized by Governor Robert Johnson in 1730, with his "Scheem …for Settling Townships." His proposal to the Board of Trade in 1730 (known as the Township Plan) proposed eleven townships located sixty miles inland on the colony's principal rivers (Edgar 1998:53). Nine were established by 1759 and another three were settled by the end of the colonial period. Many of these were ethnic enclaves, and the result was a distinctly heterogeneous population by the middle of the 18th century; French, German, Swiss, Dutch, English, and Caribbean settlers, remnant Native Americans, and enslaved Africans all lived in Carolina (Joseph and Zierden 2002). Religious groups such as Sephardic Jews, Quakers, and dissenters added additional diversity.

As the colony began to prosper, merchants emerged as a distinct social and economic group. They began to invest their earnings in the local economy, instead of returning to England after making their fortunes (Rogers 1980; Stumpf 1971). They, and the planters of the lowcountry, emerged as the leaders of society. Indeed, the two groups often overlapped, for planters engaged in mercantile endeavors, and merchants invested their earnings in land, becoming planters themselves. A strong tie to the country is part of Charleston's historical identity (Goldfield 1982).

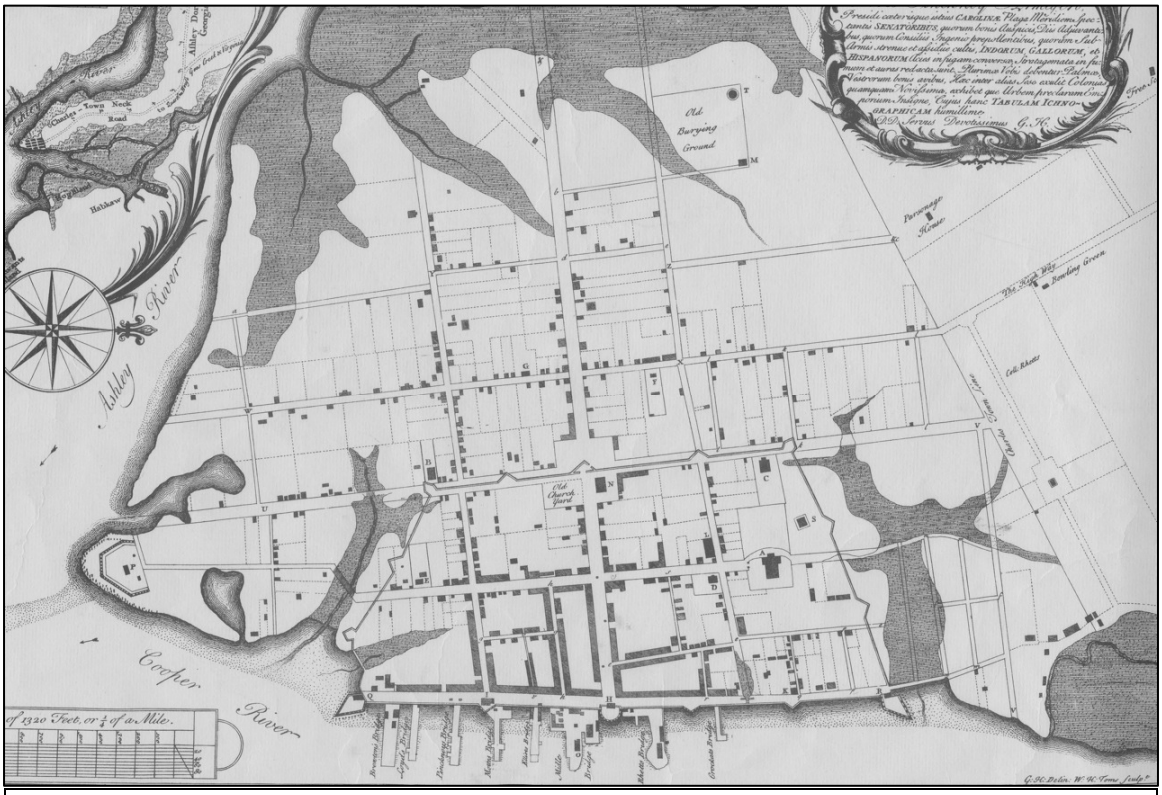


Figure 11: *Ichnography of Charles-Town at High Water,*1739, by Bishop Roberts and W.H. Toms (Collections of The Charleston Museum).

Charleston's economic expansion in the 1730s was matched by physical expansion. The city had grown well beyond the city walls and development was primarily to the west (Roberts and Toms 1739). The city spread west to the banks of the Ashley River and south to the tip of the peninsula, though much of the peripheral area was only sparsely occupied (Calhoun et al. 1985). Merchants clustered on Bay Street and on three principal east-west thoroughfares leading from the waterfront; Broad, Elliott and Tradd streets. In the 1730s, 20% of the advertising merchants were located on Broad Street; the thoroughfare retained this prominence throughout the colonial period. Nearly 26% of the merchants advertising in the South Carolina Gazette operated shops on East Bay, and another 14% eventually maintained shops directly on wharves (Calhoun et al. 1985). The 1739 map of the town and engraving of the waterfront painted the same year by Bishop Roberts and engraved by W.H. Toms shows a city filled with Jacobean and post-medieval style multi-story buildings, and densely packed with storehouses, dwellings, and shops (Lounsbury 2001:11). Following the fire of 1740, the southern portion of the city was rebuilt in a diverse architectural style, one typical of English port

and market towns (Herman 1997:38). Both row houses and Georgian townhouses combined commerce and residence in a single dwelling. Herman notes that the most common form included street-level shop in front, with general living spaces behind and 'best' rooms above (Herman 1997; Poston 1997).

The city shown in this view did not last. The fire of 1740 leveled 40% of the city. Robert Pringle wrote to his business associate, Michael Lovell, in Antigua:

> "You may have perhaps heard before this comes to your hands of the fatal Calamity that Befell this Town by Fire the 18th November Last which in four hours Time Lay'd about three Hundred Dwelling Houses in Ashes, besides a great number of Store Houses and Some of the Wharfs, in which was Consum'd an Immense quantity of Merchandize of all Sorts, the Value thereof Computed at 200,000 pounds Sterling besides the Houses and if it had not happened then to be High Water, most of the Shipping in the Harbour had likewise been Destroy'd. In the number I was Burnt out of my House and thereby Lost some of my Goods and Household Furniture. It broke out about two a clock afternoon the Wind blowing hard at North West, and by Six a Clock all the Damage was done"

Pringle went on to say that rum, muscovado sugar, and Madeira wine were very scarce, as "most in town was burned in fire" (Edgar 1972: 283-284).

The hurricane of 1752 nearly equaled the fire in damage. The massive storm, simply the largest among many of the 18th century, completely destroyed the waterfront, as well as buildings, stores, and their contents. The brick seawall itself evidently suffered considerable damage, and required extensive rebuilding (Calhoun 1983; Herold 1981; Butler 2008; Fraser 2006).

> "Granvill's bastion, situated at the southeast corner of East Bay Street…was much shaken, the upper part of the wall beat in, the platform with the guns upon it floated partly over the wall. The upper part of the curtain line, a solid wall at least four feet thick, was beat in upon the bay" (South Carolina Gazette, September 19, 1752, quoted in Calhoun 1983)

Calhoun reports that the storm surge overwhelmed all of the southwest part of town between Tradd and King Streets. Meeting Street was covered by two feet of water, and Church Street was flooded to Tradd Street. The waterfront was devastated, and all but one of the ships in the harbor was driven ashore. The resulting wall of debris caused extensive damage to the houses and wharves along East Bay Street (Calhoun 1983; for archaeological evidence of this event see Herold 1981). The South Carolina Gazette reported,

> "the sea having rose upwards of Ten feet above the high-water mark at spring tides, and nothing was now to be seen but ruins of houses, canows, wreck of pittaguas and boats, masts, yards, incredible quantities of all sorts of timber, barrels, staves, shingles, household and other goods, floating and drive, with great

violence, thro the streets, and round about the town" (SCG, September 13, 1752, discussed in Shields 2003).

By 1750, Charleston's plantation-based economy was thriving. As the 18th century advanced, the city's economic importance continued to expand and, with it, the relative affluence of its citizens. White per capita income was among the highest in the colonies (Weir 1983). Personal wealth poured into the colony from Europe in the form of furniture, silver, tableware, textiles and paintings; imports were matched by a rise in local craftspeople and their slaves who produced this finery. The city supported, in particular, a number of cabinetmakers and silversmiths (Savage and Leath 1999).

Personal wealth was matched by a rise in imposing public and domestic architecture, coincident with the opportunity for rebuilding provided by the fire of 1740 and the hurricane of 1752. Unlike other plantation-based American colonies, the planter elite of the lowcountry chose to live in the city at least part of the year, and to display style and taste in their imposing town homes. Lounsbury notes that this involved a shift from vernacular to classical design, with a new approach to the layout of the urban lot (Lounsbury 2001:14; see also Joseph 2002). This concern with style, taste, and visual form carried through to public buildings, as well. City planners used this opportunity to return to the town center set aside at the intersection of Meeting and Broad a half-century earlier. Re-shaping of this area began with the 1730s construction of the single-story brick market house, and continued with the construction of St. Michael's Church in 1751 and the State House in 1752. The fourth corner was improved a decade later with the construction of the two-story treasury and guardhouse on the southwest corner.

Lounsbury suggests the removal of public buildings from the waterfront to a centralized location follows a pattern noted in other early American cities such as New York and Philadelphia. The visibility of the Statehouse and St. Michael's, in particular, symbolized the prosperity and prestige of the entire community (Lounsbury 2001:16). The Exchange building at the foot of Broad Street, over the foundation of the Half Moon Battery, further cemented the visual image of Charleston as a preeminent economic force. Its construction over the foundation of the Half Moon Battery reminded residents that commerce had replaced defense as the primary function of the waterfront. By this time Charleston was a fortified city, but no longer a walled city (Weir 2002; Saunders 2002:213).

Figure 12: Portion of *A View of Charles-Town*, 1774,by Thomas Leitch. The Exchange building dominates the skyline (Museum of Early Southern Decorative Arts).

If the intersection of Broad and Meeting streets emerged as the administrative center of the city, the waterfront remained the economic center. It was here that the agricultural products of the surrounding plantations accumulated and were shipped to market; here was the destination of finished goods whose journey had begun in far-away, often exotic ports. For factors, commission merchants, retailers – all of those who dealt in exports and/or imports, East Bay and the wharves were ideal locations for their businesses. As the 18th century progressed, more and more wharves were built – eight are shown on the 1739 map. Government officials who felt increased openings in the curtain line left the city vulnerable to attack were overruled by those who felt closing the openings would impede trade. Joseph et al. (2000:6) notes there were seventeen wharves by 1770. Commerce was interrupted by the American Revolution, but business was reviving by 1780. In 1786 the City made plans to widen East Bay Street to 66 feet, and wharf owners were permitted to build "convenient Brick Houses, to be covered with Tile" in return for providing the land "east of the curtain line" for the road (Stevens 1988:502 in Joseph et al. 2000). The 1788 Petrie map shows twenty two wharves covering most of the open space along the Cooper River.

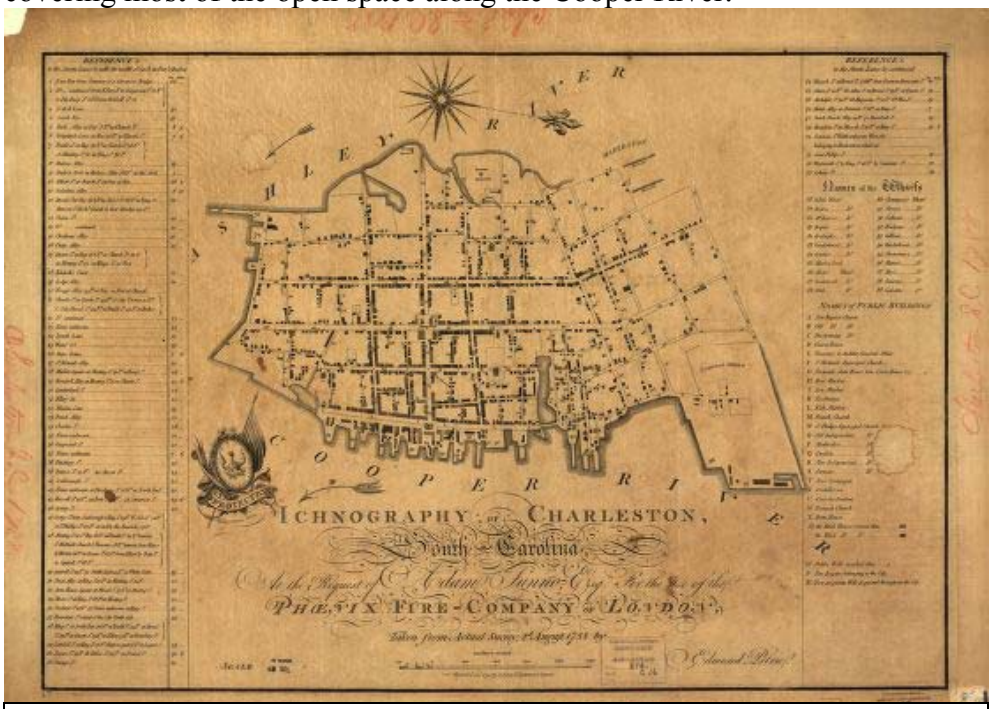


Figure 13: *Ichnography of Charleston*, 1788, by Edward Petrie (Library of Congress).

On July 4, 1776 the American colonists proclaimed their independence from the British Empire. Tensions between the mother country and her North American colonies had been building over the years, centered around payment of the national debt. The first attempt to conquer the province of Carolina came in 1776 when the Royal Navy attacked Fort Sullivan, later Fort Moultrie. They struck again in 1780 and were successful. The British occupation of Charles Town was to last two years. The loss of Charleston was considered by many Americans to be their greatest defeat in the Revolution (Borick 2003).

During the occupation, many Carolinians suffered sequestration of their property, the quartering of troops in their homes, imprisonment in the "dungeon" of the Exchange or on warships in the harbor, and exile. They were also plundered of "enormous wealth." Systematic and official looting is estimated to have resulted in a loss of goods and slaves totaling 300,000 pounds sterling (Wallace 1961).

The British occupation evidently brought many changes to the city. There was a great deal of movement and change among the city's merchant class, and a variety of new products, particularly foodstuffs, were imported (Royal Gazette 1780-1782). The occupation forces also worked to clean up the city. In July 1780, they proclaimed,

> "As there will be an absolute Necessity for keeping the Town and suburbs as clean as possible, a Regulation will take Place for Waggons to go round the respective Districts, every second Day, in order to carry off all Filth and Soil; and it is earnestly recommended to the Inhabitants upon no Account to throw any of it in the Streets, but to collect it within Doors till the Carts come to receive it from the several Houses. –No Dirt or Filth is to be thrown into any of the vacant lots. As the Health of the Inhabitants, as well as that of the Garrison, will depend very much upon the Order and Cleanliness of the Town, it is hoped it will be unnecessary to issue any further Proclamations upon the Subject" (Royal Gazette, July 6, 1780).

The American Revolution and its attendant chaos disrupted the commercial life of Charleston but did not halt the growth of the city. In 1783 the town was incorporated, Charles Town was renamed Charleston, and divided into wards for better control. Peace and security stimulated a people tired of war. After a period of economic readjustment, Charleston returned to a period of unbridled prosperity (Edgar 1998:266; Fraser 1989:178). The invention of the cotton gin in 1796 paved the way for the ascent of cotton as another immensely profitable staple (Porcher and Fick 2005; Fraser 1989).

By this time, the development and increased prosperity of Charleston resulted in a rise in the cost of renting and buying real estate within the commercial core of town. Significant portions of the artisan community dispersed throughout Charleston as all but the most affluent craftspeople were driven from the highly desirable locations. Many small businessmen attempted to combat rising real estate prices by sharing buildings. Craftspeople who derived their livelihood from such trades as the slaughtering of livestock, soap making, and tallow chandlery needed space, while the unsanitary conditions and danger of fire made these activities the subject of nuisance persecution (Calhoun et al. 1982). But the wealthy and influential merchants typically lived on East Bay Street adjacent to the wharves and the economic heart of the community.

The waterfront remained the economic center of town into the next century. The 19th century Charleston wharf was not merely a docking facility. Rather, it consisted of a dock and usually several buildings where merchandise could be stored, counted, and shipped or purchased. Dealers in merchandise not only profited from the convenience of

being in the commercial center of town, Broad and East Bay streets, but also by avoiding exorbitant cartage costs. Goods were often advertised at discount prices if the buyer would pick up his purchases on the wharf. Transportation was not merely an expense but, at times, a major difficulty (Joseph et al. 2000; Calhoun et al. 1982). Although the individual would find it relatively comfortable to traverse the city, the movement of goods from one location to another was not as simple. Flooding and bad roads were facts of life in Charleston. David Shields notes that the streets of Charleston remained unpaved throughout the 18th century, long after other North American cities. Charleston's streets were sand, though, which meant they drained quickly and were relatively easy to clean (Shields 2003:4).

Charleston's Colonial Markets

The Grand Modell, devised in 1672, divided the city into deep narrow lots set on broad streets. The plan featured a central square and reserved lots for a church, town house, and other 'publick structures', including public markets (Thomas Ashe in Bridenbaugh 1938:10). In 1690 a temporary market was established at the corner of Broad and Meeting streets, and this was reconfirmed in 1710 and 1736 (Childs 1981:24; McCord 1840: 2/73, 2/351, 3/458, 3/516). The early market probably began as a gathering of wagons manned by farmers and slaves bringing produce from the surrounding countryside. As the town stabilized, crude stalls may have been built and occupied by vendors. The first permanent market was constructed here in 1739, and the corner remained the city's central market location through the 18th century. However, other markets were constructed in the city during the colonial period.

In 1723 Andrew Allen leased the land just west of the Tradd Street redan from the legislature and erected a two-story building that was called the "New Market House". This distinctive angled building carried that name for the next thirteen years. In 1736 the legislature appropriated this building and re-designed the lower portion as the Exchange. In 1738 the upper portion became the "Court Room," South Carolina's first venues for trials outside of a tavern (Butler 2008). The entire building, depicted on the 1739 Prospect and map, was consumed in the 1740 fire and never rebuilt.

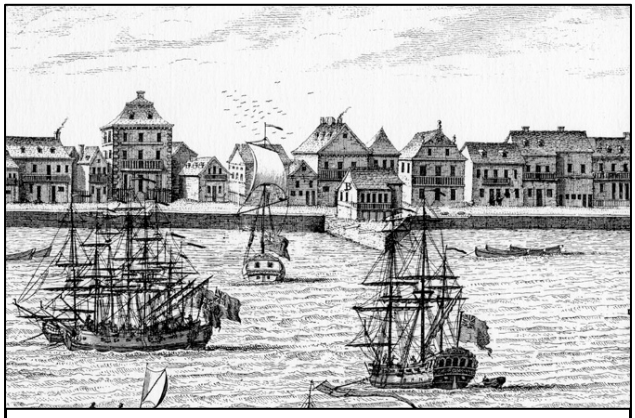


Figure 14: Close-up of the 1739 "Prospect" showing the redan at Tradd St. and Andrew Allen's building.

The fire of 1740, which burned nearly half of Charleston, destroyed the Exchange and "Court Room," Andrew Allen's former market, that had recently been built at the east end of Tradd Street. The site sat vacant for several years, except for the presence of the brick redan at the foot of Tradd Street. The market established at the corner of

Meeting and Broad Street remained the city's market through the first half of the 18th century. By then, Charleston was evidently large enough, and wealthy enough, to support additional markets. In 1750 the Assembly approved the building of a new market on a growing wharf on the east side of the brick redan. Although it was in front of the defenses, its simple wooden construction ensured that it could be quickly dismantled in case of invasion, and would not obstruct the fire of the cannons mounted in the redan (Acts of the Assembly 1775).

Other markets quickly followed. In 1760, a new market building was constructed at Broad and Meeting streets and renamed the Beef Market. A Fish Market was constructed on Vendue Range (Queen Street), east of Bay Street in 1770. This location was ideally suited to receive the catch by water, and to clean and prepare for sale with ready access to the waterfront for the disposal of the waste. This, too, seems to be the case for the Lower Market, constructed at the foot of Tradd Street.

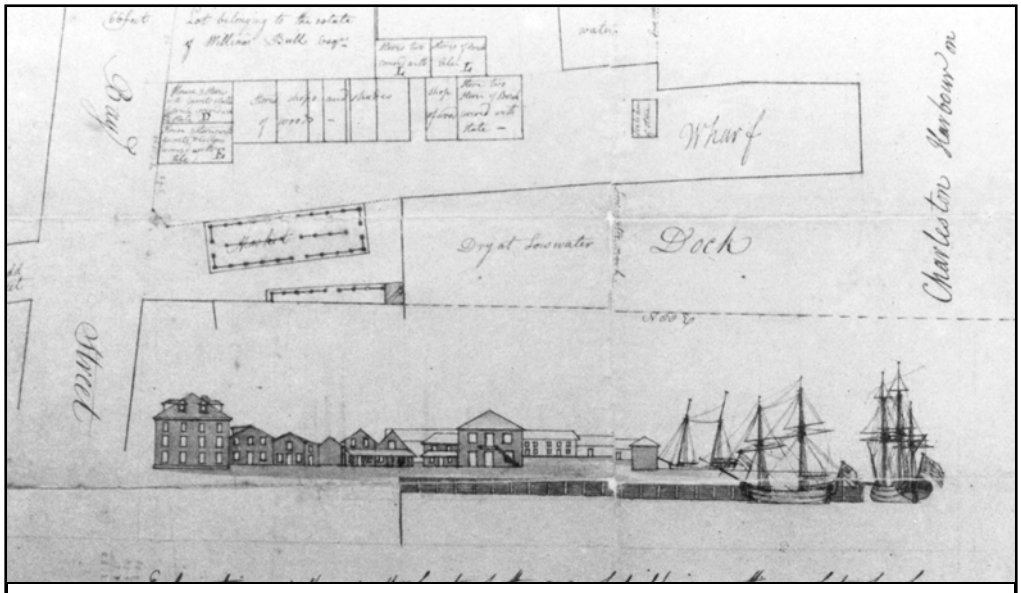


Figure 15: 1793 plat of Mrs. Motte's Wharf (McCrady Plats #541, Charleston County Register Mesne Conveyance Office).

The new Lower Market was evidently a bustling establishment, as indicated by several references to the locale in the newspaper. A 1774 summary in the South Carolina Gazette lists the "Creatures killed and sold in the Lower Market for the previous year: 547 beeves, 2907 Calves, 1994 Sheep, 1503 lambs, 230 Deer, 797 Hogs, 4053 Shoats" (SC Gazette, October 10, 1774; also Southern Agriculturalist vol. 9, 1836:165). The waterfront location of the Lower Market likely meant that the remains of these butchered animals were deposited in the harbor. The central location of the Beef Market, in contrast, likely hampered the ability of butchers there to slaughter on-site or nearby. In evident response to a recurring problem, a 1783 issue of the South Carolina Weekly Gazette reminded readers that the butchering of cattle "within the city limits" was prohibited (SC Weekly Gazette, October 4, 1783

Local plantations, and particularly the slaves who lived on them, were the primary producers for the Charleston markets. The connection of Charleston markets to plantations is underscored by an ordinance of 1786: six stalls at the Lower Market on Tradd Street were reserved for "the use of the planters that bring or send their own stock to market" (Edwards 1802:39). Such arrangements were stipulated again in legislation for the new, centrally-located market in 1807, providing "for the use of planters bringing or sending meat of their own stock or raising to market, there shall be reserved six stalls in the Centre Market" (Eckhard 1844:137). Many of the planters on James Island grew vegetables such as watermelons, musk melons, tomatoes, okra, peanuts, Irish potatoes, green peas, beans, squash, cabbages, turnips, and sweet potatoes for the Charleston market. After the closure of the Lower Market in 1799, the wharf at the foot of Tradd Street continued to serve as the arrival point for James Island hucksters and their wares, well into the twentieth century (Bresee 1986; see Frazier 2006).

Slaves, from both the city and the countryside, made up a large portion of the city market vendors. These vendors huckstered a variety of items, both for their own benefit and that of their masters. Maurie McInnis notes that most planters encouraged the practice of slaves provisioning themselves and the urban market. She notes that slaves brought their wares to the market on Saturday nights (McInnis 2005:184).

Historian Philip Morgan suggests that nearby James Island slaves, in particular, were an important, and distinct, link in the lowcountry marketing system. He cites several references to James Island slaves who worked in the Charleston markets, surmising "an identifiable group of island peddlers had emerged by the late colonial period" (Morgan 1998:251). This tradition continued through the mid-twentieth century (Frazier 2006; Bresee 1986).

The earliest known plat of the Lower Market is dated 1767, and shows the market as a hip-roofed structure. Little else is depicted on the plat, except for "The Wall", at an angle running southwest/northeast, west of the market shed. The lands bounding the market and the continuation of Tradd Street belonged to Samuel Hartley. The property is described as "The Market or extension of Tradd Street, Granted to Andrew Allen" (SCHS 33-43-29). This angled property boundary remained a fixture on maps and plats of the property into the early 19th century.

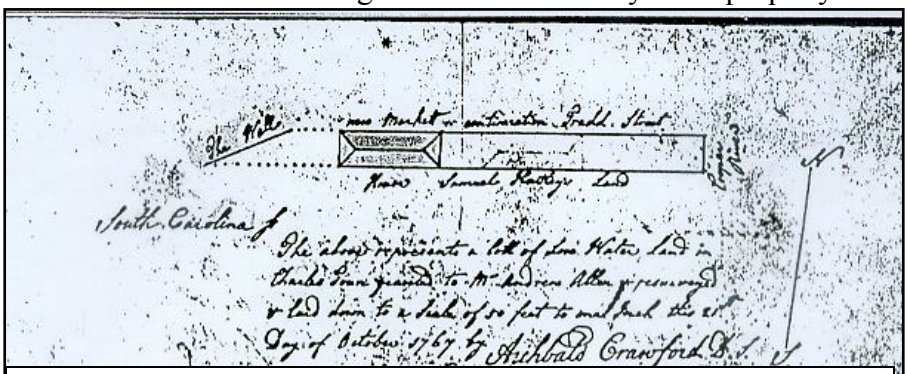


Figure 16:1767 plat of the Lower Market and "The Wall" (SCHS 10-21-1767).

By the final quarter of the 18th century, the Lower Market was a bustling center of activity for the city. Access to the market for vendors and customers, however, was complicated by the barrier of the curtain line and redan. Even after the redan was

demolished in 1785 (based on the Purcell plat), the curtain line remained an impediment for several years. According to a resolution of the Charleston City Council in late 1785, after the old brick redan was finally removed, the Lower Market was enlarged, onto the wedge of land abutting Tradd Street to the south, purchased from Jacob Motte in 1768 (plat #578, 8-1804). A new shed was built on the south side of the market property. These sheds were reserved for "those persons who come first to market with butter, poultry, wild fowl, or vegetables." They were given "preference of sitting under the shed" and each person shall "have as much room as is necessary" (Columbian Herald, 11 May 1786).

At the same meeting of May, 1786, the Commissioners of the Markets addressed other issues plaguing the market. In 1784, the Grand Jury heard complaints about the cleanliness of the market, and recommended that the area called the Lower Market, "be immediately paved, as in its present situation it is extremely offensive and disagreeable to the inhabitants." Additionally, the same Grand Jury noted that "the very great number of dogs which are suffered to go at large through the streets, particularly those which crowd each market-place" and that the said dogs "worried the cows, horses, etc" and tended to "go mad."

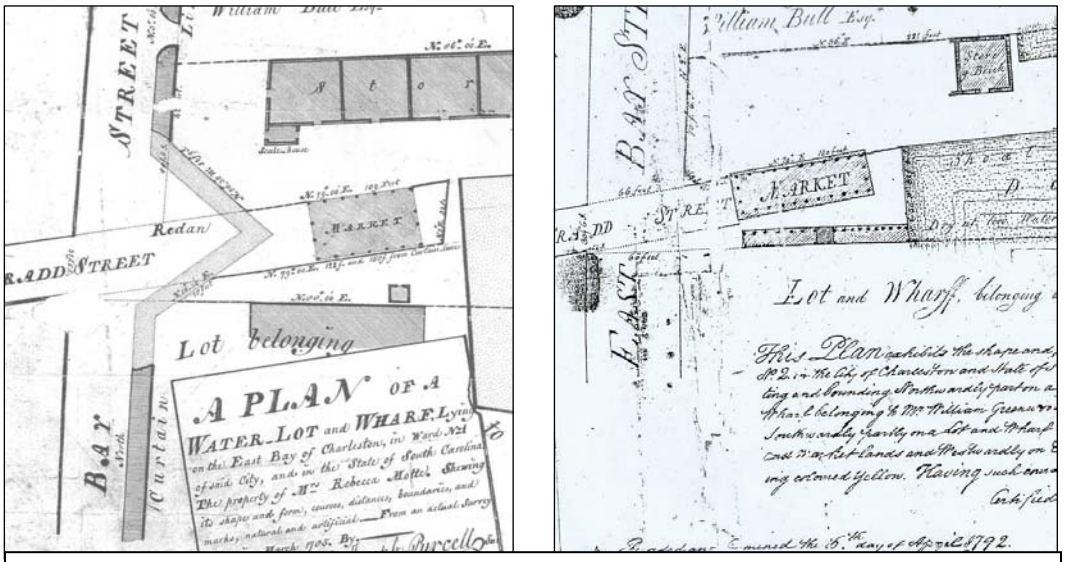


Figure 17: The Lower Market before and after extension (1785 and 1792). The market has been expanded 29 feet to the west, and a second set of stalls has been added.

Evidently dogs were not the only disorderly market attendants. The Commissioners of the Markets resolved that "all persons who bring poultry or vegetables to the Lower Market, be placed in two lines running west from the market to the street… and the lines to be at least 10 feet apart." Those first would be ushered into the sheds on the south side, described above. First, the clerk of the markets would "employ a person to keep each of the markets clean, that they be obliged to sweep the markets twice each day, wash the stalls once every day, and the pavement in and round the markets three times each week," to "keep the markets as clean and sweet as possible" (The Columbia Herald, May 18, 1786).

The waterfront market, however, was still too small to accommodate Charleston's growing market needs, and the site was becoming too congested by the post-Revolutionary expansion of the wharves. In an effort to consolidate the city's market activities in the new Market Street, this market, as well as the Beef Market on Broad Street and the Fish Market on Vendue Range, was closed in 1799, and the city sold the property in early 1800.

Charleston's Commercial Waterfront

Charleston was established as a port city, along the Cooper River. The Cooper was wide and deep, and relatively free of shoals. Development of the waterfront began with the earliest settlement, and remained the core area for commercial activity throughout the colonial period. During the first decade of Charleston's existence, most captains of ocean-going vessels used lighters to carry their goods to the town docks. In the 1690s, however, those areas along the shoreline deep enough for large ships were converted to wharves. By the time of Crisp's map of the city in 1711, two wharves, or bridges, were shown projecting into the Cooper River from the brick curtain line.

The port was constantly expanding as new docks and wharves were built. Bishop Roberts' 1739 *Prospect* shows a city crowded behind an imposing brick seawall, surmounted by a curtain line provisioned with cannons. A contemporary map by the same illustrator, the *Ichnography of Charles-Town at High Water*, though, shows several wharves extending beyond the wall. Each new wharf required a breach in the curtain line. The shift in attitude, from defensive to expansive, was reflected in the ongoing struggle between maintenance of the waterfront curtain line and opportunities to facilitate transportation.

There was also a growing debate over buildings constructed in front of the curtain line, and the growing impediment to line of fire in the event of an attack from the water. As early as 1700, persons holding lots on the "Bay of Charles Town" were given permission to build wharves to the low water mark, but were not allowed to erect any houses or buildings. Renewed in 1718, this law was modified in 1725 when a provision was made for those "persons having right to any of the lots to the Eastward of the Front Wall to build and erect on the Flats or Bridges built or to be built, Cranes, Crane Houses, and Ware Houses not exceeding ten feet in height." A revision to the law in 1736 raised the height of the structures to sixteen feet. It also allowed the parapet to be opened on Bay Street "for all Bridges that extended twenty feet beyond Low Water Mark…" The openings could be fifteen feet in width, "convenient for…communication of said Bridges with said Bay Street" (Lipscomb and Olsberg 1977:53 in Joseph et al. 2000:5).

With commercial activity focused on the Cooper River in the colonial period, the principal commercial streets were east/west thoroughfares that terminated on the waterfront. Over a quarter of the merchants advertising in the South Carolina Gazette operated on East Bay Street; another 14% kept shop directly on the wharves. By 1740, eight wharves were already constructed in front of the brick wall.

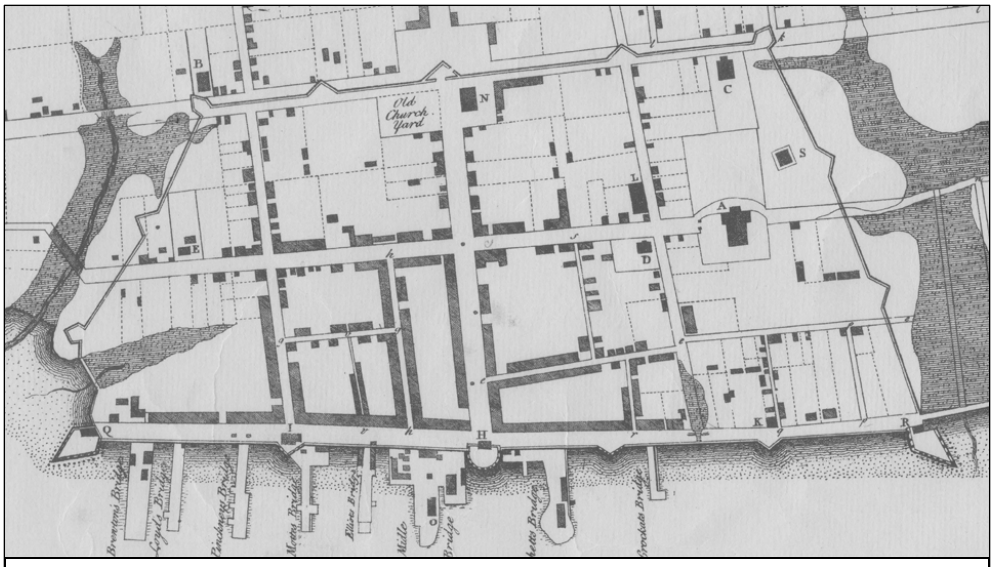


Figure 18: Detail of the 1739 *Ichnography*, showing Motte's wharf in front of the redan.

A major impetus for growth and change in the city was the fire of 1740. It destroyed blocks of colonial buildings, including those in the south half of the Roberts' view of 1739, and cleared the area for rebuilding in newer styles. Additional wharves were built, prompting Governor James Glen in 1752 to express concern that the city's defenses were compromised. He suggested that the sheds and crane houses could be turned into block houses, or detached forts. He also requested that owners of the bridges might be required to have "a certain Number of Gabions [sand-filled baskets or cages to protect artillery from enemy fire] always ready…" The legislature, however, disagreed and supported the opening of "Communication with the said Wharfs" (Lipscomb and Olsberg 1977:279).

The hurricane of 1752 did additional damage to the city, its buildings, and the seawall and wharves. The majority of the wharves were rebuilt. Commercial development continued to the end of the eighteenth century. In 1770 there were seventeen bridges, and twenty-two by 1788 (Petrie 1788). In 1786, East Bay Street was widened to sixty-six feet, the expansion occurring on the east side. The upper portions of the curtain line were demolished, and the foundations paved over. In return for this loss of land, wharf owners were permitted to "build convenient brick houses, to be covered with tile" (Stevens 1988:502; Joseph et al. 2000:6). Another law, passed a year later, provided wharf owners an opportunity to purchase more grants for "Land Covered by water in front of their present Wharves" (Stevens 1988:286); this may have encouraged filling of areas previously underwater. Joseph suggests that the 1788 map, with twenty-two wharves, indicates that several of these began further off of East Bay Street, suggesting that infill of the waterfront was already underway (Joseph et al. 2000:8)

Adger's Wharf began as a "low water lot," or land exposed only at high tide, belonging to Robert Tradd across Bay Street. Robert Tradd, possibly the first English child born in South Carolina, died in 1731, and bequeathed his "Water Lott" to Jacob Motte and his children.

Jacob Motte was public treasurer of South Carolina and a prominent merchant. He was also a business partner of James Laurens, brother of Henry Laurens. He built on Tradd's "low water lot," a large wharf known as "Motte's Wharf" or "Motte's Bridge." Buildings on Motte's Wharf included a "scale house," where items were weighed, and

that was large enough for Motte to re-locate his office and store there after the fire of 1740.

Motte's Wharf was in front of the Tradd Street redan by 1739. Motte's Bridge featured only a single structure, adjacent to the curtain line. Initially, a mud flat 200 feet wide existed in front of the redan at low tide. The Lower Market was constructed at the Tradd Street redan, adjoining Motte's Wharf. By the time the fortifications were dismantled in 1784, Mrs. Motte's wharf was crowded with a line of stores and a scale house. A year later, City Council authorized expansion of the market, with a second set of stalls. The market bustled with activity until the end of the 18th century, when it was shuttered and replaced with the Centre Market farther north. Market Dock of the 18th century, remained, hemmed in by two longer docks and commercial waterfront complexes.

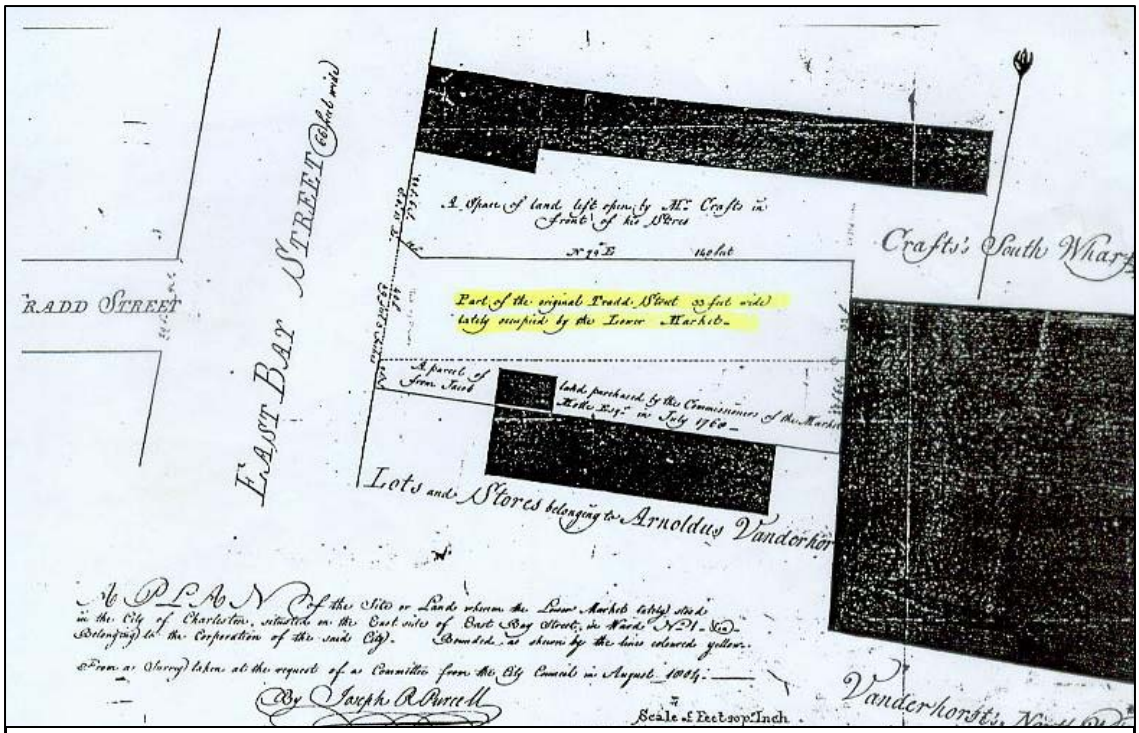


Figure 19: Craft's South Wharf and Vanderhorst's Wharf in 1804, with "Part of Tradd Street lately occupied by the Lower Market" (SCHS 33-46-3)

By the end of the 18th century, both Motte's and Greenwood's wharves had been acquired by William Crafts and were known as Crafts' North and South Wharves. William Craft acquired the land, and the wharf to the north in 1804 and the area "lately occupied by the Lower Market" (SCHS 33-46-3) was "left open by Mr. Craft in front of his stores." They were purchased in 1822 by Arthur Middleton, as administrator of Nathaniel Russell's estate; later Middleton acquired them for himself. In 1835 he sold part to James Hamilton & Co. James Hamilton organized the Savannah and Charleston Steam Packet Company, that offered steamship service to Savannah. He maintained his office in the 1790s building at 90 East Bay (Poston 1997:53).

In 1842 this collection of wharves was purchased by James Adger & Co., and became the southern terminus of the first steamship line between Charleston and New York. Allegedly, the lucrative line helped James Adger to become the richest man in South Carolina. One of Adger & Company's best ships, the *SS James Adger*, was in New York harbor when the Civil War began. The ship was confiscated by Union authorities and used throughout the war by the United States Navy (Stockton in Saunders 2011).

Over the years, substantial brick buildings were constructed along Adger's North and South Wharves. The Sanborn insurance map of 1884 indicates that Adger & Company's office was at 90 East Bay Street, while the buildings between the wharves were cotton warehouses. The brick range on the north side of North Adger's Wharf also housed cotton on the first level with brokers' offices above.

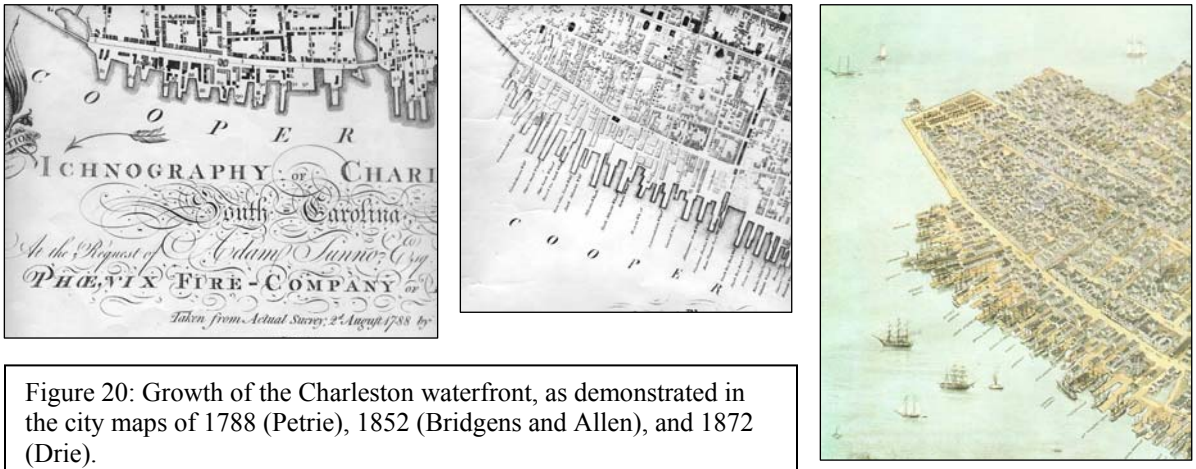


Figure 20: Growth of the Charleston waterfront, as demonstrated in the city maps of 1788 (Petrie), 1852 (Bridgens and Allen), and 1872 (Drie).

As port activities moved up the peninsula, the wharves were abandoned and the buildings converted to residential and office use. The granite base of Adger's South Wharf, where the Adger ships formerly docked, still projects into the Cooper River. The site has now been incorporated into Waterfront Park (Stockton in Saunders 2011).

Land at the foot of Tradd Street was set aside for public use. This public land was occupied by the exchange and Courtroom, and later the Lower Market. A small wedge of land, abutting the Tradd Street extension, was purchased in 1768 by the Commissioners of the Market to expand the facility. By 1791 a smaller range of stalls was constructed on this tract. A narrow strip on the south boundary "intended to be sold to the City for the Market" (SCHS 32-7-7; 1808?) was under dispute. Later, this line between Motte's and Greenwood's wharves was settled by the Court of Common Pleas (1789 plat).

By the time the redan was demolished in 1785, the wharf to the south was owned by Ann Graeme, though the date of construction and chain of title is currently unknown. The market was closed in 1799, and the site became part of the right of way of South Adger's Wharf. In 1804, after the market structures were gone, the City of Charleston sold part of the land to Arnoldus Vanderhorst, who had acquired Graeme's wharf. At the

time of the sale, the wharf property south of the Tradd Street right-of-way featured a small structure on the wedge of market land, and a long series of stores along the property line (SCHS 33-46-3, 1804). Soon afterward, Vanderhorst erected two large, three-story tenements of brick. The northernmost, known as Vanderhorst's North Row, was destroyed by the earthquake of 1886, while the southern structure remains. Both rows originally included a complex series of service structures behind each unit, as well as various storehouses and wharves. Governor Arnoldus Vanderhorst served as intendant (mayor), South Carolina governor, and as a general in the War of 1812. He resided in a house across East Bay Street that no longer stands. The Vanderhorst plantation comprised most of Kiawah Island, and his home there has been restored (Poston 1997: 98; Trinkley 1993).

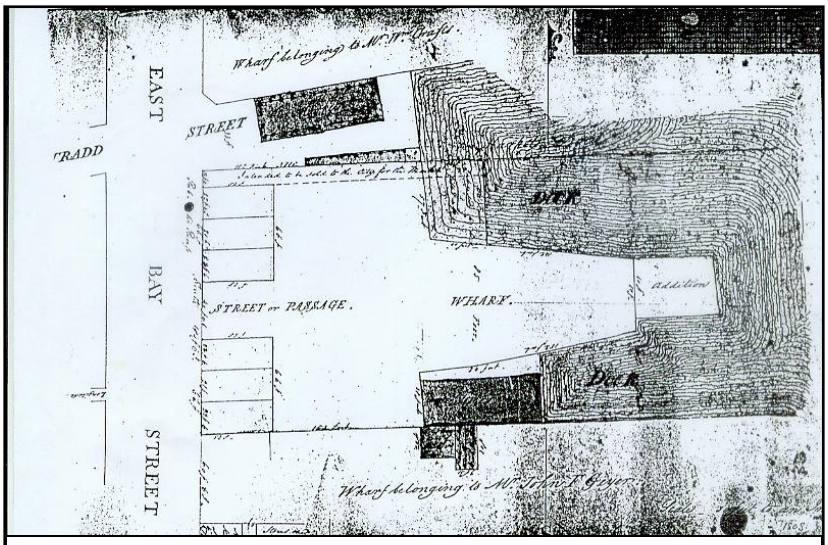


Figure 21: Plat of Vanderhorst's Wharf, 1808 (SCHS).

The earthquake of 1886 destroyed the Vanderhorst North Row, which was soon replaced by a large one-story warehouse. In 1922 the City of Charleston purchased both the Vanderhorst and Adger properties and replaced the warehouse with a commercial railroad spur leading from Adger's South Wharf. The railroad spur was removed by the middle of the 20th century, and for the past several decades the site at the east end of Tradd Street has been used as a city-owned, asphalt-paved parking lot. Filled lands to the east are part of Hazel Parker Playground, a City park.

In the early-19th century, the wharves and waterfront remained a focal point of the city, and merchants continued to congregate near the harbor. By the middle of the century, however, King Street had become the retail center of Charleston, and the city was somewhat realigned along a north/south axis centered on this overland thoroughfare. The new railroad terminal was built between King and Meeting Streets in 1852 (Rosengarten et al. 1987; Calhoun and Zierden 1984). During this time, wharf ownership became consolidated into firms owning larger pieces of real estate. Although infill and construction of piers continued, by the turn of the 20th century, many of the wharves were abandoned and became "rotting piles of decaying timbers" (Fraser 1989:343).

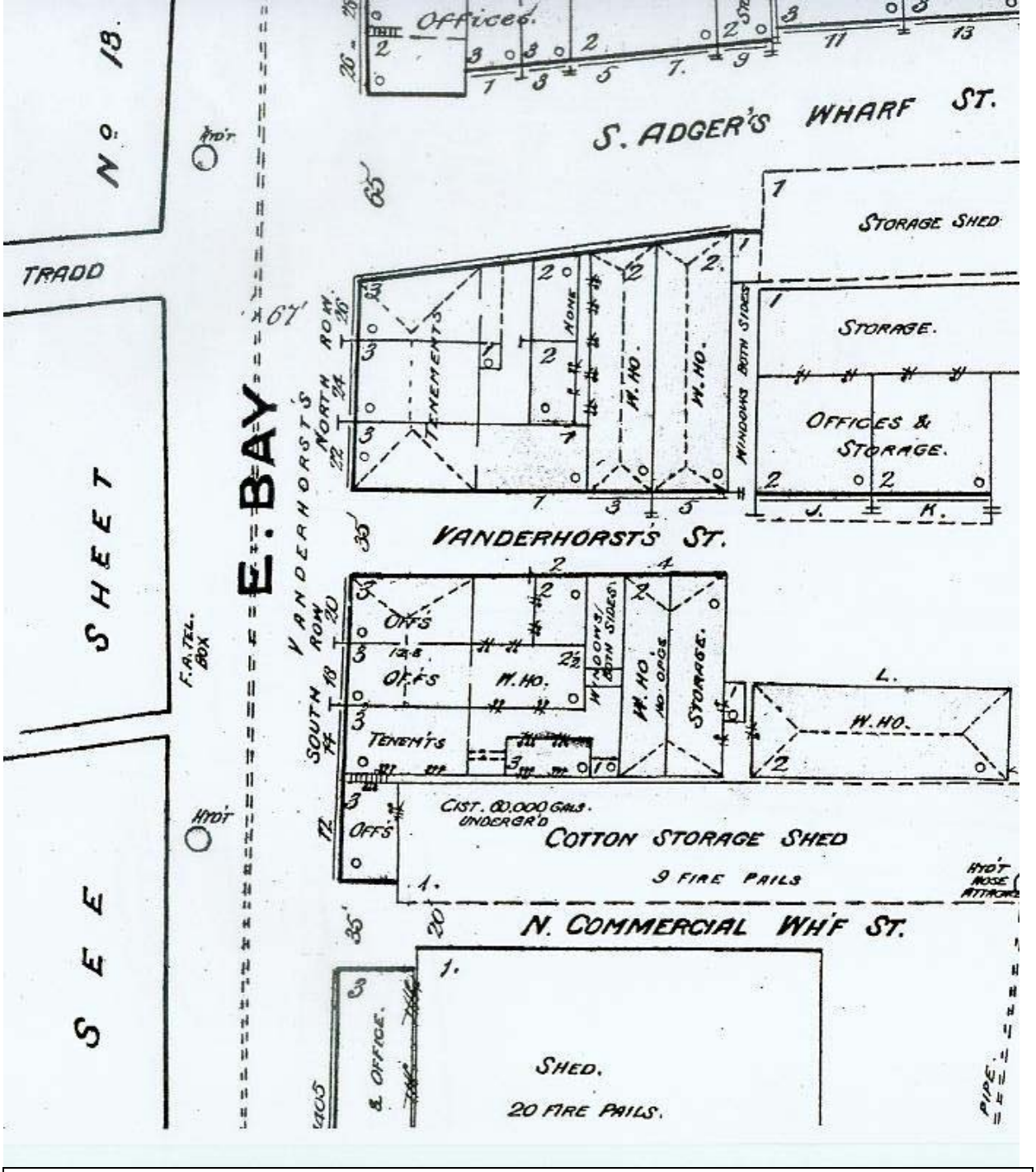


Figure 22: 1884 Sanborn Fire Insurance map of Vanderhorst's Wharf, showing a range of storage, offices, and warehouses behind the north and south brick tenements.

Throughout the 1920s, the Cooper River wharves were controlled by the Terminal Company, a railroad company. They neglected the waterfront, and Mayor Grace campaigned to bring the property under City control. He created the Ports Utility Commission Authority in 1921 - the local precursor to the South Carolina Ports Authority, established in 1942 to support World War II initiatives (Coker 2011). The Authority has greatly enlarged and modernized the port of Charleston, and it remains the nation's fourth busiest container port (Rosen 1992:141; Joseph et al. 2008:8). The locus of the commercial waterfront activity has shifted north, however, and is now centered on the Cooper River above Calhoun Street.

Mayor Joseph Riley has led the city's effort to revitalize the waterfront south of Calhoun, and to make it accessible to Charleston's residents and visitors. The areas between Market and Tradd Streets still controlled by the city have been revitalized, and new public buildings have been constructed. The Waterfront Park, between Vendue Range and South Adger's Wharf, incorporates a portion of the granite base of Adger's South Wharf.

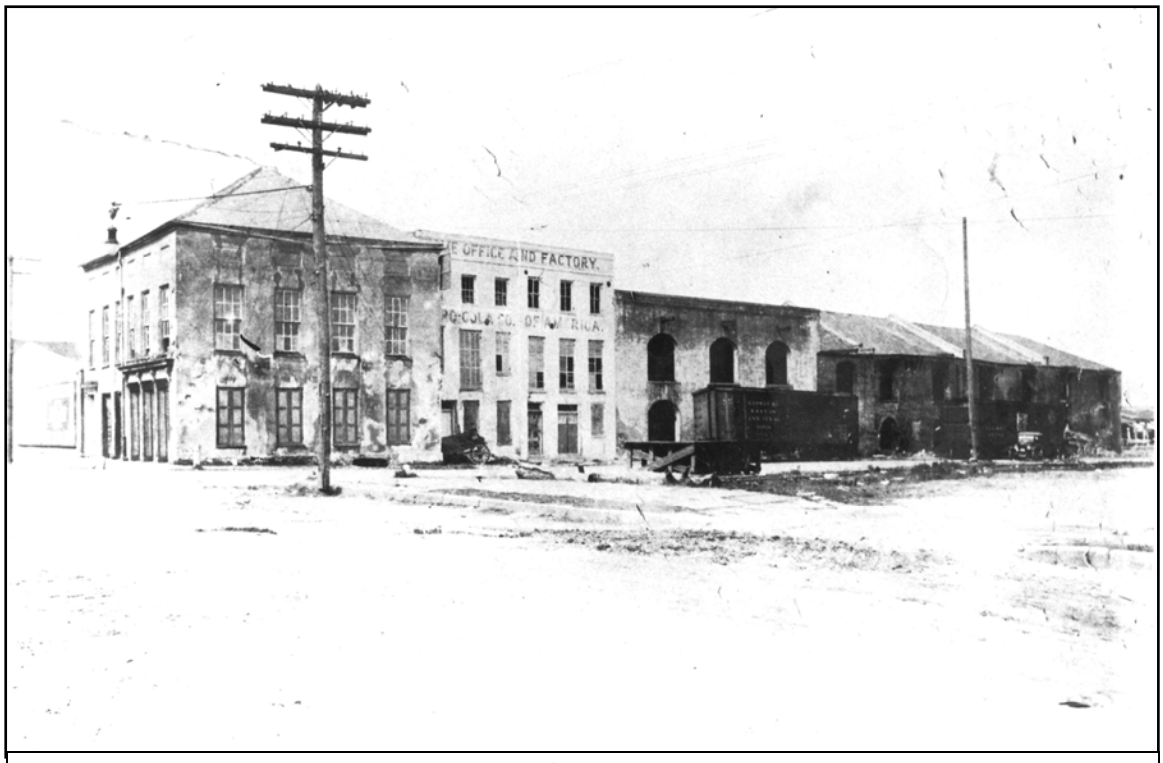


Figure 23: South Adgers's Wharf in the early-20th century. The rail line is visible in front of the range of buildings shown on the 1793 plat, including 90 East Bay Street (courtesy Historic Charleston Foundation).

Chapter III
Fieldwork

Site Description

An urban setting often brings unique logistical considerations to archaeological field projects, and the redan project was no exception. Several site features impacted field decisions and location of excavations. East Bay Street, expanded to 66 feet in 1786, is the western boundary of the site; it is paved in asphalt and features parallel parking spaces along the east and west shoulders. The small street known as South Adger's Wharf, 55 feet wide, is an extension of Tradd Street running east from East Bay Street, and is paved in large ballast cobbles. This historic paving material is present on other small streets running east from East Bay, as well as on Chalmers Street. The removal of a section of the cobblestones on South Adger's Wharf provided the opportunity for the excavation.

A line of historic buildings fronts the north side of South Adger's Wharf. These occupy street frontage along the northern edge of the street, with no space between the buildings. Currently townhomes, these are the same commercial structures shown on the 1793 plat of the market dock and Motte's Wharf. The location of these structures, particularly 90 East Bay Street, paired with the historic plats guided the backhoe explorations in 2008.

The property on the south side of South Adger's Wharf is an open parking lot, paved in asphalt. The parking lot is accessed by two driveways from South Adger's Wharf, and is laid out in a series of angled parking spaces, including a line of spaces along the western edge of the lot. The western edge of the lot is separated from the East Bay sidewalk by a substantial brick wall, 8' high. The parking lot is accessed from East Bay Street by a small concrete stairway, located at the northern terminus of the brick wall. Centered among the parking lot, the sidewalk, the cobblestone street, and the western entrance to the lot, was a square of grass-covered soil. This small area contains four large metal utility boxes, all in active use. These visually obtrusive features are critical to neighborhood functionality. Nonetheless, they were an obstruction to excavation in 2009 and to exhibition in 2012.

Figure 24: Views of the SAW site in 2008; facing west toward Tradd Street, facing east toward the Cooper River.

Buried pipes and service lines are another challenge to urban archaeology. The excavation area was surveyed for gas, electrical, and communication lines prior to excavation, and those identified clustered along the edges of the 2008 excavation area. Despite these efforts, an iron water pipe and an electrical conduit were discovered running east-west, and southwest-northeast, respectively, during backhoe excavations. Both of these features impeded excavations as the project proceeded, and units were placed to avoid them. In addition, a water pipe installed in the last ten years was present on top of the redan features along the southern boundary of the street. A pvc conduit for cable television was located in the parking lot during the 2009 excavations, but was somewhat easier to work around than the service lines in the roadway.

Excavations in 2008

The area of South Adger's Wharf available for excavation measured approximately 45' east-west by 35' north-south. The area was bounded to the north and the south by granite curbing, and on the east and west by intact cobblestone street. The curbs and sidewalks were not parallel, and the site area was wider on the west side than on the east.

Figure 25: Fieldwork in 2008; backhoe excavations, screening, hand excavations.

Excavations at South Adger's Wharf were a combination of backhoe trenching and hand excavating. Horizontal control was maintained with a combination of gridding with manual transit and post-excavation mapping with a total station. Three backhoe trenches were excavated; within these, four controlled excavation units were established. The backhoe excavation was conducted by Charleston Water Systems, under the supervision of Eric Poplin. Backhoe excavation was followed by hand excavation with

round and flat shovels. Measurements were taken in feet and tenths, and a manual transit was used for daily elevation recording. A total station was used to map the entire site, including all excavation areas and all cultural features.

A general level of horizontal control was established relative to site landmarks and visual access, or lack of it. A site grid was established relative to the northwestern corner of the site area and a grid line was established along the northern curb at 5 foot intervals. Grid points were measured relative to the northwest corner, and so grid coordinates across the site were measured South and East at 5 foot intervals. Because the site boundaries were not parallel, grid points along the southern edge of the site were not parallel to the southern curb. Grid locations were measured for the controlled excavation units and for the measured profiles, but not for the backhoe trenches in general.

Soils were screened through ¼ inch hardware cloth. This included the individual soil layers and proveniences from the controlled excavation units, as well as samples of the soils excavated by backhoe. In addition to these two sources of materials, artifacts were hand-collected from the large amount of backhoe soil. Artifact bags were assigned a field specimen number and provenienced accordingly. Field notes, drawings, and photographs were made on a daily basis.

Trench 1 trended north/south, bisecting the site area. Location of the trench was based on comparison of the 1785 plat with the location of 90 East Bay Street, and was expected to encounter both the north and south faces of the redan. Excavation initiated about 5 feet south of the northern curb, and continued in a southerly direction for 20 feet. Further excavation to the north and the south was constrained by service trenches in these locations (cable conduit along the northern profile and electric and gas lines along the southern limits). The trench was approximately 8 feet wide, and the eastern edge was located at East 35'. The eastern profile was angled toward the west, away from grid orientation, and so Unit 1 was positioned to excavate the remaining profile, along the E35 line. Unit 1 was a five-foot square, with the east side located along the E35 grid line. The unit was positioned at S18 E35 to S23 E35. Approximately 80% of the unit was available for excavation, with the east wall positioned against the Trench 1 profile.

Trench 1 was located in an attempt to bisect both the north and south sides of the redan, based on available cartographic information and measurements relative to surviving landmarks. Exposure of 20 feet failed to produce any evidence of the wall. The trench did reveal a completely intact soil profile that promised datable stratigraphy and closed contexts. Two key deposits encountered in Trench 1, designated Feature 1 and Zone 7. Feature 1 was a layer of small brick pavers. This paving event appeared to be associated with the Lower Market. Zone 7, a narrow band of bright red brick rubble a foot below Feature 1, appeared to be the type associated with the early wall. But no intact foundations were encountered.

Figure 26: Mapping the profile of backhoe Trench 1.

The second trench was oriented east-west. Trench 2 was located parallel to the southern edge of the site. Initially, the trench was 5' wide, located between S26' and S31'. The trench initiated at E42' and was excavated toward the west. Initial excavation continued 23 feet to the west; this exposed a large brick drain (designated Feature 2), that spanned most of the width of the trench. To increase visibility around the drain, the

Figure 27: Exposing portion of the redan parapet in Trench 2.

trench was expanded to the south, increasing the width of the trench to 10'. The southerly expansion continued to the curb marking the limits of the site, and west to the E25' point. This exposed the first evidence of the redan, what turned out to be displaced portions of the parapet that once sat atop the wall. Further excavation of Trench 2 to the west revealed the intact foundation of the northern wall of the redan (in the location where the southern wall was expected). Based on this discovery, excavation of Trench 2

continued an additional 15 feet farther west, fully exposing the surface of the redan, designated Feature 4.

The extension of Trench 2 was excavated by backhoe down to the top of the brick pavers for the market (Feature 1). The remaining deposits on top of Feature 4 were excavated by hand. A 10 foot by 3 foot section was gridded and designated Unit 2. This unit was bounded by the southern curb to the south and the mid-19th century brick drain (Feature 2) to the north, and was located between grid points E20' and E30'. Soils were designated by zone and excavated to the top of Feature 4. In Trench 2, the interface of intact wall, demolished superstructure, and intruding mid-19th century drain was complex, and exposure of these features was facilitated by use of the City's vacuum truck, which simultaneously washed fill soils from the features and removed the water by vacuum system.

Figure 28: Trench 2; clockwise from upper left: profile of Unit 2, showing Feature 1; vacuum truck exposing parapet; the redan, drain and parapet exposed; north wall of redan in Trench 3

Once Feature 4 was exposed and its orientation ascertained, a third trench was excavated parallel to the wall to more fully expose it. Trench 3 continued at a 50 degree

angle to the southern limits of the site, and was wide enough to expose the wall and work areas on the east and west sides. At its greatest extent, Trench 3 was 13.5 feet wide and was 17 feet long, from the northern limits of Trench 2. Excavation of Trench 3 ceased when the active gas line encountered in Trench 1 was exposed. Excavation by backhoe continued from the top of the ground to the top of Feature 4. At this point, hand excavation was conducted on either side of the wall, designated "Trench 3 inside" and "Trench 3 outside." The soils inside were excavated by layer, and the interior was considered an excavation unit. Unit 3 was bounded to the south by Feature 2 and to the west by Feature 4, and was approximately 4 feet by 7 feet. In summary, the excavations and principal features are as follows:

Table 1: Excavation Units and Features, 2008 project

Trench 1: north/south, approximately 8' x 16'
Trench 2: east/west, approximately 10' x 22'
Trench 3: northwest/southeast, approximately 12' x 16'

Unit 1: southwest corner @ S23 E30, 5'x5'
Unit 2: southwest corner @ S35 E20, 3'x10'
Unit 3: inside Feature 4 & Feature 2; approx. 4' x 7'
Unit 4: southwest corner @ S32 E 41' approx. 5' x 4'

Feature 1: brick paving for c.1789 market improvements; across the site
Feature 2: brick drain vault, mid-19th century, Trench 2
Feature 3: builder's trench for Feature 2
Feature 4: the redan/city wall

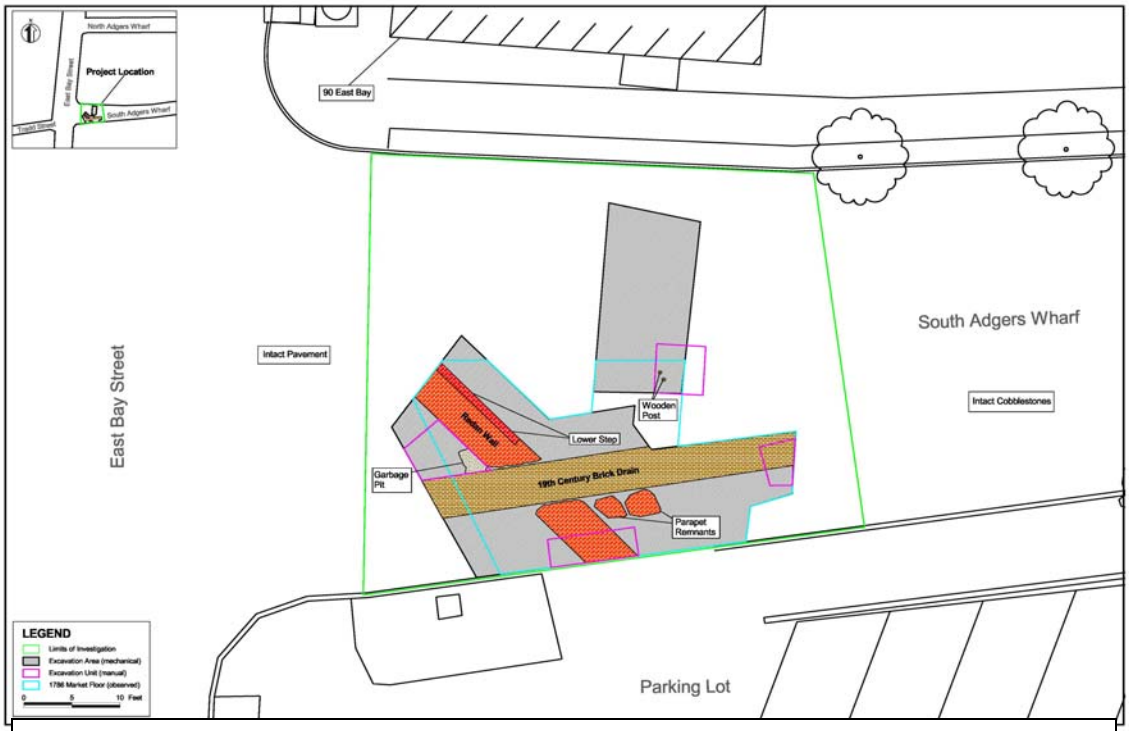


Figure 29: Planview of the 2008 excavations (prepared by Brockington and Associates).

Stratigraphy: Trench 1 and Unit 1

The profile of Trench 1 revealed intact stratigraphy, with multiple superimposed layers from the ground surface to the base of initial excavation, 6.5 feet below ground surface. The east profile was cleaned, photographed, and mapped. This produced a continuous profile 15 feet in length, initiating 5 feet south of the northern limits of the site. Subsequent excavation of Unit 1, between S18E35 and S23E35, produced an additional 3 feet of exposed profile. This profile informed interpretation and subsequent excavations at the site. At the same time, the eastern end of Trench 2 was cleaned, photographed, and mapped. This unit was located along the southern boundary of the site, and the profile is located at S127E140 to S133E140; together, the two profiles span the width of the site. This 6 foot section revealed the deep construction trench for the brick vault (Feature 2), as well as portions of the layers revealed in Trench 1, with some variation. Because of its length, and corresponding large view, the stratigraphy of Trench 1 is described first.

The top 3 feet (2.8' to 2.9') exhibited multiple fill episodes related to the paving of South Adger's Wharf as a through street. Together these received the designation Zone 1; the individual layers were designated by letters A through F. Zone 1a was a thick layer of crushed limestone (crush and run), 0.8 feet thick. This was deposited at the time that the cobblestones were removed for the present drainage construction project. A lens of yellow fill sand was designated Zone 1b; this was present intermittently through the trench. Zone 1b appears to be associated with an underlying deposit of highly mottled dark brown sand and yellow sand, designated Zone 1c. This may serve as the foundation for the 20th century cobblestone paving.

The next temporally and functionally distinct layer was mostly dark (10yr4/2), compacted soil, with some mottled sand, containing small fragments of brick, mortar, and coal which served as a bed for a series of rail timbers. These measured 6 feet in length and were approximately 3 inches by 4 inches. They were roughly rectangular, but the edges were rounded, and often only one of the three faces was completely flat. These appear to have served as ties for a rail line, possibly depicted in Figure 23.

The underlying deposit, designated Zone 1e, was 0.6 feet deep, and was a dark gray-brown sand. The sand contained large fragments of brick and mortar, and several varieties of rock. The mortar tended to be light gray (10yr7/1) and the bricks ranged from orange-red to purple-red (2.5yr4/8 and 10r5/1). The fill of Zone 1e was similar to the fill of Feature 3 (construction trench for the brick drain), though the two deposits appear to initiate at different levels. Zone 1e was truncated by construction of the rail ties in the area between S16.5' and the southern limits of the profile.

Zone 1f was the most distinctive deposit, and appears to be the original road surface for South Adger's Wharf. This zone consisted of small flint cobbles in compacted dark sand (10yr3/1). The cobbles ranged in size, but averaged 3 inches in length. The soil matrix was lensed, and within the profile there were areas in which the

cobbles were contained in a lighter gray sand fill (10yr6/3); this was designated Zone 1g, but was excavated with Zone 1f as a single provenience. An underlying lens of dark soil with very few cobbles was also designated Zone 1g. Again, it was difficult to separate from the above cobble concretion in excavation, and was screened with Zone 1f. The cobble zones appear to be the original paving of the roadbed.

The zones beneath appear to be associated with the Lower Market, present on the site from c. 1750 to 1800. Zone 2 was a narrow lens of coarse sand, described as 'pink' in natural sunlight (10yr3/4), and contained brick dust. It was moderately compacted and contained small artifacts. Zone 2 was not present throughout the profile, but instead initiated at S12'. It exhibited a maximum depth of 0.5 feet, before narrowing to 0.25 feet on top of the brick floor in the southern portion of the profile. Zone 2 may be associated with an underling feature (Feature 1), present over most of the site. In place of Zone 2 and Feature 1 in the northern portion of the profile was a dense deposit of brick and mortar rubble. This was designated Feature 5.

One of the most consistent, and significant, deposits on the site was a paving of single bricks set in mortar. This was designated Feature 1. The bricks were consistent in size and proportion, and were generally smaller and thinner than standard "Charleston bricks." Feature 1 was present to the southern limits of the site, as revealed in Trench 2 and the western limits of the excavation, as revealed in Trench 3 (to at least E10'). The eastern profile of Trench 1 suggests that the northern limit of Feature 1 was at S19' along the grid line.

The brick pavers designated Feature 1 were followed by three distinct, and associated, zone deposits. Directly beneath the pavers was a deposit of brown-gray sand, averaging 0.5 to 0.7 feet in depth (10yr4/3). This was designated Zone 3a. There was some distinction between the upper portion of this zone, which was mottled with yellow sand (10yr5/8 and 10yr5/3), and the lower level, which was more homogenous. There were some amorphous zones of white water-washed sand in some areas of the deposit (10yr6/3 to 6/4). Zone 3a was therefore excavated in two levels. Beneath this was another thin lens of granular 'pink' sand. This was designated Zone 3b, to maintain consistency with the previously-defined proveniences in Trench 2. Beneath it was a distinctive zone of hard-packed orange clay-sand 10yr5/8), clearly a prepared surface. Like Feature 1, this zone was consistently present across the site, and appears to be a construction or filling surface, associated with Feature 1.

The underlying Zone 6 was a thin (0.1 foot) lens of granular sand with brick dust, resulting in the 'pink' appearance described for Zone 2 and Zone 3b (5yr4/3). This was followed by Zone 7, a thin lens of crushed brick and mortar. Each component was distinctive in color; the brick was soft, and light red to orange color, while the mortar was bright white (2.5yr4/8, 10yr6/6). Both colors are associated with early 18th century brick construction in the city. Zone 7 was not present in the northern 10 feet of the unit, but increased in depth from initiation at the S10' point to 0.3 feet in depth at the S20' point. Zone 7 appears to be associated with the demolition of the redan.

Below Zone 7 the stratigraphy again changed dramatically. Zone 9 was a deep deposit of loose granular sand with some brick rubble (10yr4/3 to 10yr4/2). Zone 9 was also distinguished by a concentration of artifacts and bone, most relatively large in size, suggesting little post-depositional degradation. Zone 9 was 0.5 feet in depth, and gradually resolved into a darker (and wetter) sand with lenses of white sand (10yr4/2 to 10yr3/2, with lenses of 10yr7/2). This deep deposit was later designated Zone 10 and excavated in four levels. Levels 2 and 3 were characterized by the inclusion of large boulders of limestone and coral.

The total depth of the Trench 1 profile was 6.2 feet from the ground surface to the base of excavation. Cultural deposits, including levels of Zone 10, continued beyond this point. Due to the stability of the soil, and the suspected high organic content of this soil, excavations were halted at this point.

Unit 1 was located in the eastern profile of Trench 1, and was positioned to obtain a controlled sample of each of the strata revealed in the trench. The eastern edge of Unit 1 was located at S18 E35 to S23 E35. The unit included the portions of the profile that protruded west beyond this point. Truncation of the unit from the excavation of Trench 1 and intrusive electrical lines resulted in an excavation area of approximately 75% of the 5x5 foot unit, in an irregular shape.

Zone 1a and Zone 1b were removed from Unit 1 and discarded, as these were recent, sterile deposits. Samples of Zones 1c through 1e were screened, to obtain datable artifacts. A timber in Zone 1d was present in the unit; this was removed and retained as part of the collections. Screening of the entire provenience initiated with Zone 1f, the cobblestone layer. This deposit was extremely compacted, and the small flint cobbles were cemented together in a matrix of dark dirt. A large pick mattock was necessary to remove the deposit. In this portion of the profile, two lenses of cobbles and dark dirt were present, separated by a thin lens of mortar. The cobbles above the mortar lens were excavated separately.

Zone 2 was excavated next, revealing Feature 1 across the unit. After photography, these were removed and a sample retained. Excavation continued with Zone 3a, characterized by brown sand mottled with gold and yellow sand. Zone 3a was excavated in two levels, which were distinct. Level 2 was more homogenous, more compact, and contained a greater concentration of cultural material. Excavation of Zone 3a Level 2 revealed a concentration of whole, but disarticulated, brick, concentrated in the eastern half of the unit. This was designated Feature 6, and was photographed and mapped. Bricks in Feature 6 exhibited mortar on some surfaces, indicating they were part of a demolished structure. Colors ranged from orange to purple (the traditional Charleston gray). These were removed after photography, and a sample retained.

Excavation continued with Zone 3b, a granular sand containing brick dust, producing a reddish, or pink, appearance. This was excavated in a single level, and was 0.2 feet thick. Excavation revealed the prepared surface of orange sandy clay, designated

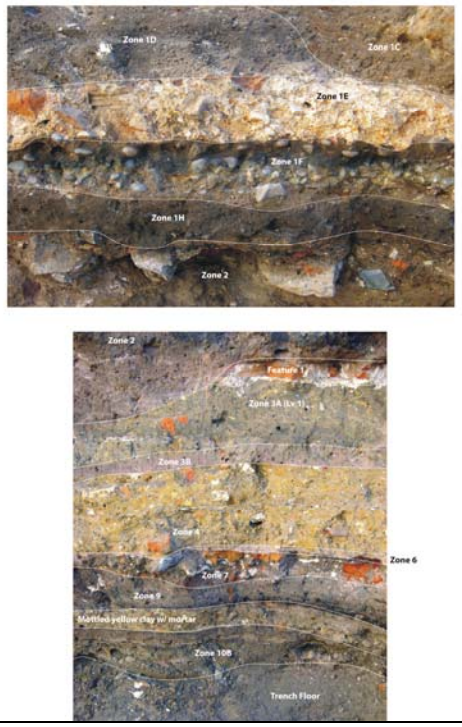


Figure 30: Profile and defined stratigraphy of Trench 1.

Zone 4. In Unit 1, this deposit was 0.6' thick, and was screened as a single provenience, as there was no visual evidence of layering.

The clay floor was followed by another narrow lens of reddish coarse sand, excavated as Zone 6. This was followed by a band of crushed brick and mortar, 0.4' deep. The bright white to light gray mortar and soft orange brick suggests that this is associated with demolition of the wall superstructure. Each was excavated in a single layer.

Underlying Zone 7 was an amorphous deposit excavated as Zone 9. This was 0.3 feet thick, and consisted of mottled yellow sandy clay and brown sand. Two voids, or air pockets, were noted in the southwest corner of the unit. Interface of Zone 9 with the following zone was marked by a thin lens of white sand, and this was excavated as Zone 9 Level 2. The lens of white sand was present in the northeastern half of the unit, with a line roughly parallel to the orientation of the redan.

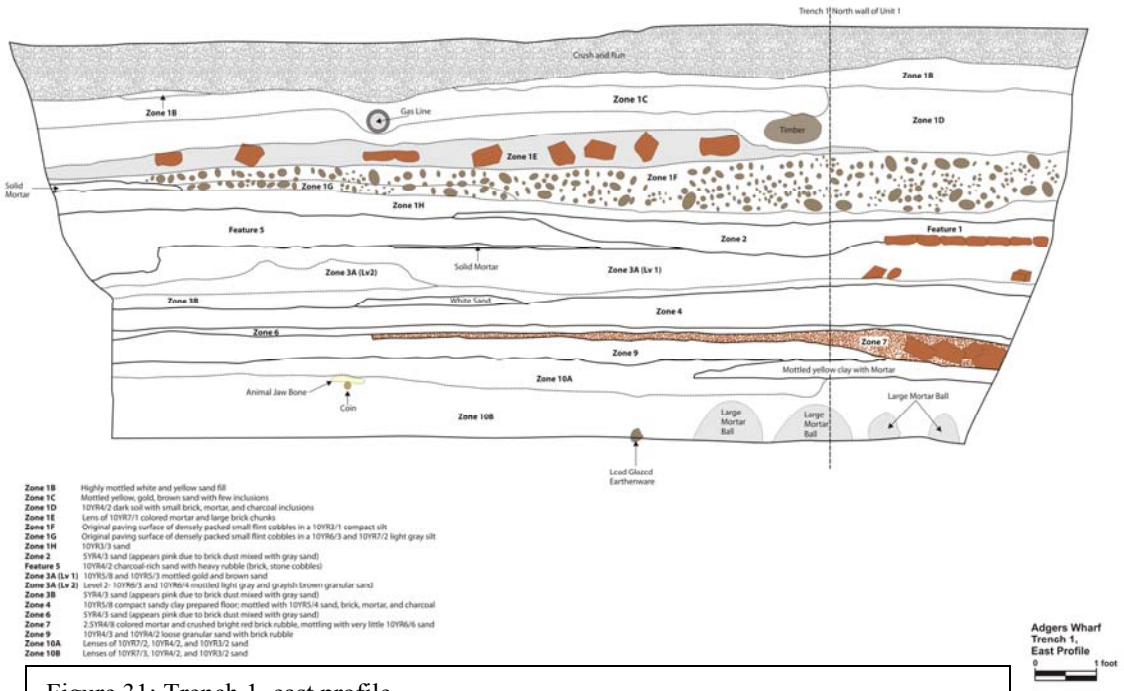


Figure 31: Trench 1, east profile.

Below this was a dark, moist soil, present over the entire unit. This was designated Zone 10 and was excavated in multiple levels. The soil in Zone 10 featured lenses of lighter sand and darker charcoal, with large amounts of cultural materials. The two voids in the southwest corner proved to be wooden posts, with a small portion of intact wood. These were left *in situ* and levels of Zone 10 excavated around them. Four levels of Zone 10 were excavated. Beginning with Level 2, large boulders of limestone, coral, and other fill material, were present in the deposit. Some of these were retained as samples. Excavation continued to a depth of 6.6 feet below ground surface; at which point the wooden posts were becoming unstable and the soil was too moist. As a goal was to leave the wooden posts in place, excavations were halted at this level.

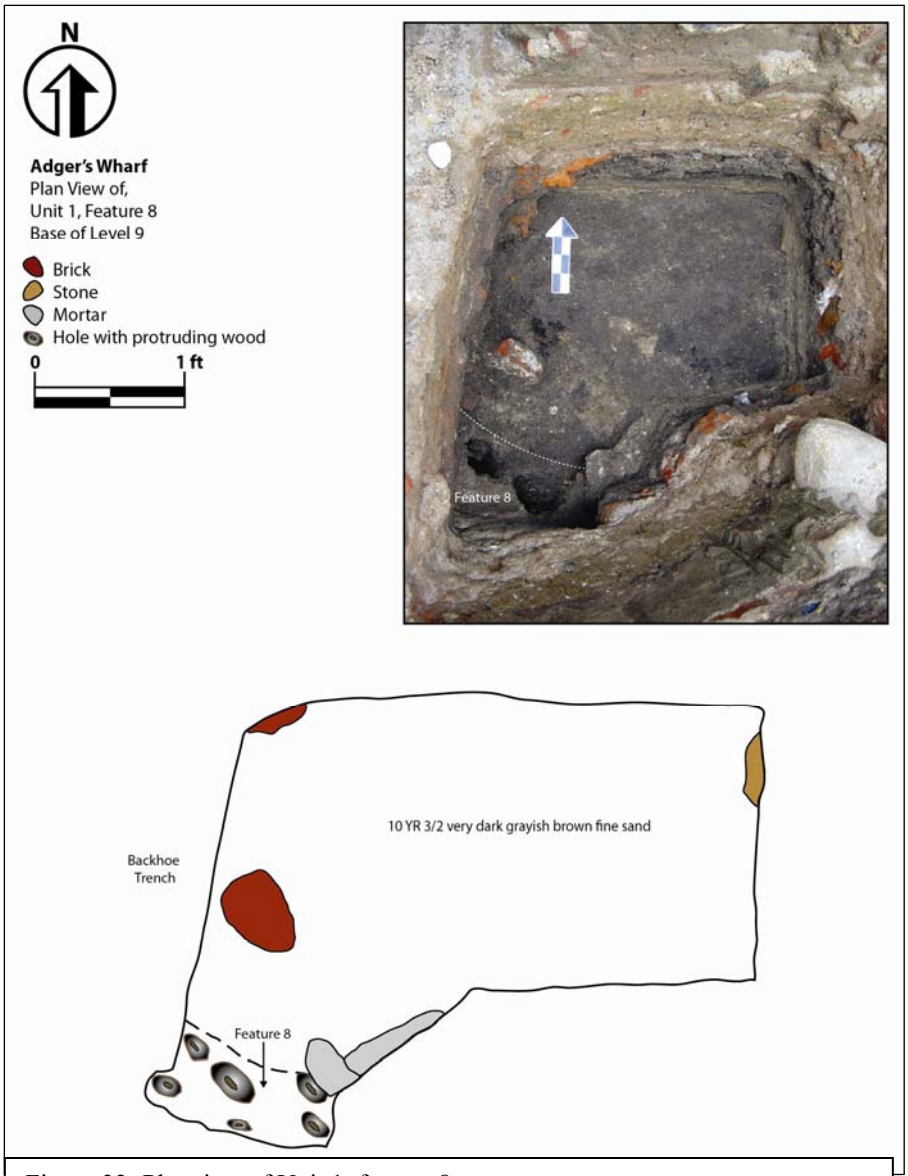
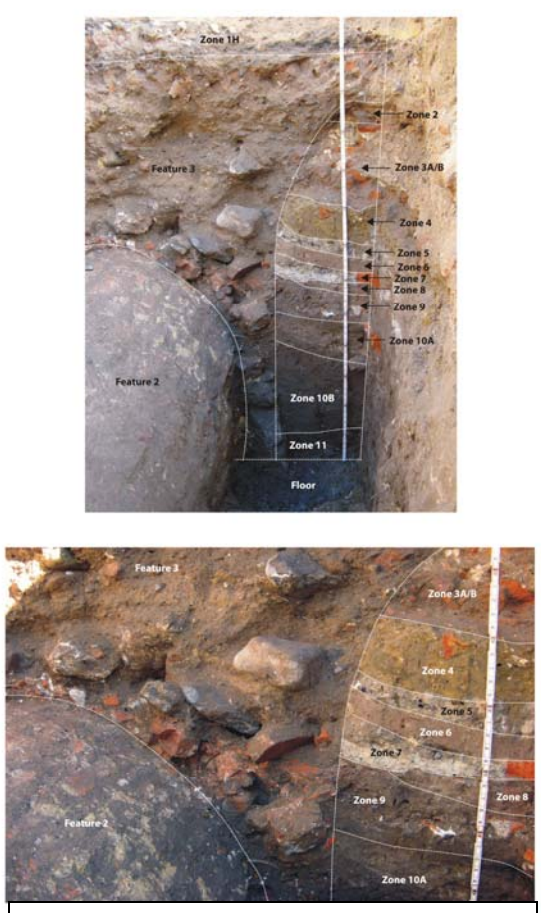


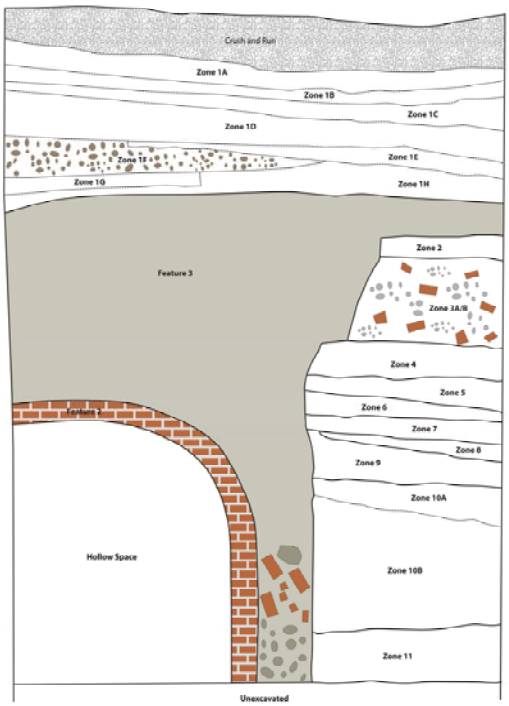
Figure 32: Planview of Unit 1, feature 8.

The posts were designated Feature 8, and eventually six were exposed. These were present in the southwest corner of the unit, intruding into the southern profile. They appear to be in two parallel rows, 0.3 feet apart. Though only a narrow strip was exposed, they also appear to be parallel to the north wall of the redan (Feature 4). Zone 10 and the associated posts are tentatively interpreted as the moat and palisade placed in front of the redan in the mid-18th century.

Trench 2

Trench 2 ran east/west along the southern border of the site. Excavation began on the eastern edge, parallel to the southern curb. Excavation initiated at E145' and the area first exposed was 6 feet wide and 14 feet long. This exposed a large brick drain vault, oriented exactly with the trench and the curb, and the stratigraphy exposed in this cut revealed only the deep, mixed soils of the construction trench for the drain. The east profile of Trench 2 was cleaned and photographed at this point. Exposure of the east face of Trench 2 provided a soil profile 6 feet wide and 8.2 feet deep, two feet deeper than the profile of Trench 1.





Zone 1A 10YR6/3 fine sand
Zone 1B 7.5YR2.5/3 and 10YR7/4 mottled sand
Zone 1C 10YR2/2 fine sand
Zone 1D 10YR6/3 compressed sand
Zone 1E 10YR5/3 sand
Zone 1F Original paving surface of densely packed small flint cobbles in a 10YR3/1 compact silt
Zone 1G 10YR3/4 sand with brick rubble and shell
Zone 1H 10YR3/2 compressed sand with charcoal and brick rubble
Zone 2 10YR3/4 sand
Zone 3A/B 10YR6/3 sand with heavy brick and mortar
Zone 4 10YR4/3 fine sand and 10YR6/8 sandy clay mottled together
Zone 5 10YR5/1 very fine sand and 10YR7/3 sand mottled together evenly
Zone 6 10YR4/3 loamy sand
Zone 7 2.5Y6/3 fine sand
Zone 8 10YR3/3 coarse sand, possibly water-born
Zone 9 10YR4/3 sand with pockets of mortar
Zone 10A 10YR4/2 coarse loamy sand
Zone 10B 10YR3/2 sand
Zone 11 10YR3/2 sand with shell
Feature 2 19th century brick drain
Feature 3 10YR4/2 and 10YR3/2 sand with rubble, cobbles, and pebbles
Unexcavated GL1-2.5/G fine sandy clay

Adgers Wharf
Trench 2,
East Profile
0 1 foot

Figure 33: Trench 2, east profile, showing intact zones in relation to Features 2 and 3.

Trench 2 was the first unit to receive provenience designations, and so the attributions assigned here were used throughout the site; designations in Trench 1 were based on attributions in Trench 1. Designations for some of the lower levels were adjusted as excavation of Units 1 and 4 proceeded. Soil descriptions are noted below, particularly those that differ from the strata of Trench 1.

The multiple strata defined as Zone 1 were 2.4' deep in Trench 2. The limestone crush layer received no designation. Zone 1a was fine dark gray sand (10yr4/3), followed by mottled gold, yellow, and brown sand, designated Zone 1b (7.5yr2/3, 10yr7/4). This was followed by a dark fine sand (10yr2/2), designated Zone 1c. A somewhat deeper layer of compressed sand (10yr4/3) containing shell was designated Zone 1d. Zone 1e was a wedge of light sand (10yr5/3) present only in the southern four feet of the profile; this deposit was not present in Trench 1. The dominant feature of the Zone 1 deposits was the level of small flint cobbles, designated Zone 1f. This was present across the Trench 2 profile, as well as across the site. In Trench 2, Zone 1f was present in the northern portion (3.5 feet) of the profile, narrowing to a point. This may indicate the limits of the roadbed at the early -19th century. Beneath this was a narrow lens of brick and shell rubble in a dark soil (10yr3/4), designated Zone 1g, and an underlying level of compressed sand with brick and charcoal, designated Zone 1h.

Directly beneath the multiple layers of street paving was a large feature, representing the construction trench for the brick drain. The large brick drain was designated Feature 2, and the overlying construction trench designated Feature 3. This feature measured 4.8 feet across, and was 2.3 feet from the top of the trench to the top of the brick vault. Soils in Feature 3 were relatively unconsolidated, dark gray-brown sand (10yr4/2). Feature 3 was characterized by the inclusion of large rubble, including brick, mortar, and large ballast stone. A layer of darker soil, without the rubble was noted directly on top of the vault (0.2 feet thick) and along the sides, likely representing an original builders trench. The feature on the side of the drain was 0.7 feet wide. Excavation exposed 2.0 feet from the top of this trench to the base of the vault.

Feature 2 was not completely exposed in Trench 2, so exact dimensions are not available. Based on the proportions of the exposed portion, Feature 2 is likely 5.0 feet wide and 3.5 feet high. The dark, homogenous soil on top of and beside the drain may reflect initial construction of the drain; the looser, rubble-filled soils above may be part of the same event, or may be the result of later repair to the feature.

Intact strata, similar to those described for Trench 1, were present in the southern half of the unit. These were the first designated, and they vary somewhat from the layers present in Trench 1. Zone 2 was present, 0.3 feet thick, as a coarse sand with brick dust, giving a pink to reddish cast to the sand (10yr3/4). The underlying Zone 3 was deeper here, approximately 1.0 foot thick. The soil was medium brown-gray, and did not exhibit the mottling with gold soil that characterized the upper levels of the deposit in Trench 1. Further, there was no differentiation between the upper and lower levels, as described before, so the deposit was simply designated as Zone 3.

This soil was directly on top of the prepared sandy clay surface, designated Zone 4. The lens of pinkish sand designated Zone 3b in Trench 1 was not present south of the drain. In this portion of the site, Zone 4 was 0.5 feet thick. In Trench 2, this was followed by a layer of fine gray and yellow sand (10y45/1, 10yr7/3). This was designated Zone 5, and was not present in Trench 1. This was followed by a lens of

pinkish-gray coarse sand, designated Zone 6 in Trench 2 and Trench 1. In both units, a thin lens of crushed orange brick and white mortar followed, and was designated Zone 7.

Beneath Zone 7, likely representing demolition of the redan superstructure, was a thin lens of coarse water-washed sand, present only in this portion of the site. This was labeled Zone 8. The underlying soil was a deposit of gray-brown sand (10yr4/3) with pockets of mortar and brick. This was designated Zone 9, and this particular deposit was 0.5 feet deep. This was followed by a darker, somewhat mottled loamy sand (10yr4/2), designated Zone 10. In the Trench 2 profile, this soil deposit was 0.5 feet deep, followed by a darker gray sand with an increase in artifacts. In Trench 2, this soil change was designated Zone 11, but in subsequent excavation across the site was considered multiple levels of Zone 10. The soils mapped as Zone 11 ranged from 1.2 feet to 1.7 feet in depth; together with the first level of Zone 10, the refuse-filled deposit was 2.0 feet deep.

The layers of Zone 10 were followed by a layer of shell, sand, and artifacts that may represent an original beach or waterfront ground surface. This deposit initiated 7.7 feet below ground surface and was 0.6 feet deep, to the base of trench excavation. This was designated Zone 12. Excavation of Trench 2 ended at this point, but a narrow area of deep exploration revealed a subsequent zone of dark fine sandy clay (GL 1 2.5/GY). Exploration of this deposit (via shovel test) continued an additional foot.

The strata revealed in the eastern profile of Trench 2 were explored through excavation of Unit 4. This 5 foot unit was established along the eastern profile of Trench 2; eastern coordinates for the unit were S27 E145 and S32 E145. Because of time constraints, redundancy, and relation to the central mission of the project, the Zone 1 deposits in Unit 4 were removed with the backhoe, and controlled excavation initiated at the top of Feature 3.

As it was the intrusive deposit, Feature 3 was excavated first. Because it was a deep deposit, Feature 3 was excavated in four levels. The first three removed levels of the loose, rubble-laden sand. The fourth level included the darker, homogenous soil on top of the drain. The portion beside the drain was not excavated.

Removal of Feature 3 exposed the small sample of superimposed layers in the southern portion of the unit. These were roughly 1 foot by 2.5 feet. Each of the zone deposits defined in the profile were excavated separately. There were no new features or lenses discovered during the upper levels of excavation. Designation became more ambiguous in the deeper

Figure 34: Trench 3, exposing the north face of the redan and Unit 3, exposing the interior, or left, side of the brick.

levels. The soils designated Zone 9 (pockets of mortar in brown-gray sand) and Zone 10 (a lens of mottled loamy sand) were excavated together as Zone 9. The underlying dark gray-brown soil initially designated Zone 11 was re-designated Zone 10 and the exposed portion was excavated in three levels. A single sample of the underlying zone, now designated Zone 11 (shell, dark sand, and artifacts) was excavated as well. At this point, standing water and the presence of organic materials were both present, so excavations were concluded 7.1 feet below ground surface.

Trench 3 and Units 3 and 4

The general site stratigraphy revealed in Trenches 1 and 2 continued west across the site, and across the top of the redan (Feature 4). The multiple layers of Zone 1 were present across the site, including Trench 3. Also continuing over the redan were Zone 2, Feature 1, and Zone 3. These continued well beyond the edge of the redan, and were exposed for the full extent of the north and west profiles in Trench 3. Zone 4, the prepared clay surface, extended to the redan as a thick deposit (0.5 feet), and continued on top of the wall as a thin, compacted layer. Zone 4 did not continue past the inside edge of the redan.

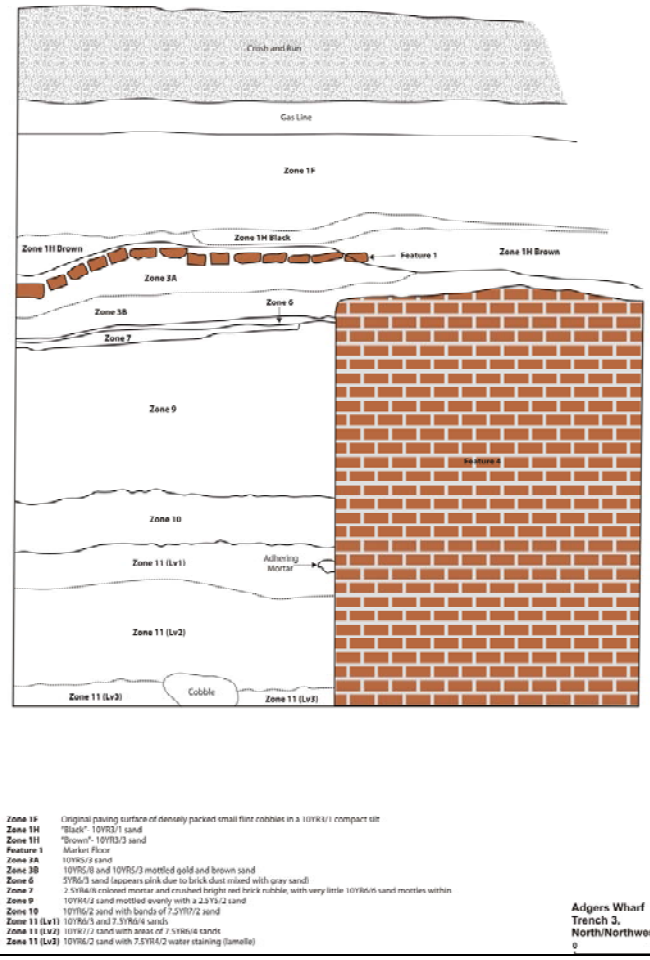


Figure 35: Profile of Trench 3.

Other deposits recorded on the east side of the redan were present on the inside, as well. This included Zone 6, a thin lens of coarse pinkish-brown coarse sand, and Zone 7, the lens of crushed brick and mortar from the redan embrasures. This presented as a thin lens on the west (inside) of the redan, and as a thick deposit of brick and mortar on the east side of the wall. There was no evidence of Zone 8 in this area. The soils defined as Zone 9 appeared to be the same on both sides of the wall, and presented as a deep deposit of loose sand fill (nearly 2 feet deep). The soil was somewhat mixed, but overall a dark gray-brown (10yr4/3).

Zone 9 was filled with large fragments of glass, ceramic, and bone. This was excavated in two levels inside the redan and a single level outside. They appear to be the same deposit.

Controlled excavations on the east side of the wall were terminated at this point, due to instability of the soil. Excavation and soil designation continued in Unit 3, on the inside of the redan. Here, Zone 9 was followed by lensed soil of light gray, dark gray, and brown soil. This was excavated here as Zone 10 and was followed by a dramatic change to white sand. This appears to be construction sand, or fill following construction of the wall. The zone contained occasional artifacts and bone, most of them relatively large, suggesting little trampling or post-discard disturbance. The appearance of the white sand coincided with unfinished mortar joints on the wall interior, suggesting that this was original grade. Excavation of the whitish sand continued for 1.9 feet, when soils became too moist for further excavation. The Zone 11 deposits were excavated in three levels, with some variation noted in the soil profile after excavation. The upper 0.4 feet level appeared to be nearly white, while the subsequent 1.4 feet was slightly darker. The deepest level, 0.3 feet deep, featured lamellae from water table fluctuation, and a good deal of organic staining.

An irregular area of dark soil, brown soil, and concentrated artifacts was noted at the base of Zone 11 Level 2. This was concentrated against the wall face, near the intersection with Feature 2. This was designated Feature 7 and excavated in three levels. The feature yielded a concentration of bone and artifacts from the early 18th century.

Excavation of Unit 3 inside the redan terminated at 8.2 feet below ground surface. Time constraints, safety concerns, and the decision to avoid soils below the water table determined that excavation was halted at the base of Zone 11 Level 3.

Excavation of Trench 3 exposed 4.8 feet of the redan foundation. In the area of Trench 3, north of feature 2, the redan was 3.5 feet wide, with vertical faces inside and out. Deep exploration of Trench 3 on the outside revealed a stepped foundation to a full 5 foot width at 5.8 feet below the exposed surface of the wall. The wall appears to be vertical below this step. Closer to the drain, the front of the wall was stepped to 5 feet at a higher level, and here the wall sloped at an angle; this design evidently reinforced the 'point' of the redan.

Stratigraphic Summary

The soil deposits excavated under controlled conditions are associated with three temporally distinct events:

-construction and use of the redan
-demolition of the redan and expansion of the Lower Market
-demolition of the market and paving of the street

The earliest events are reflected in Zones 10 (on the outside of the redan) and 11 (the inside). These are associated with construction and maintenance of the fortifications and the waterfront. Zones 2 through 9 are associated with demolition of the parapet and expansion of the Lower Market after 1785. Zone 3, Feature 1, and Zone 2 are associated with the 1789 market expansion and paving. The deep deposits of Zone 1a-g reflect the demolition of the market and paving of South Adger's Wharf as a thoroughfare. These associations were strengthened with the controlled excavations in 2009.

Fieldwork Logistics: The Project Continues in 2009

Exploration of South Adger's Wharf in 2008 resulted from two events: discovery of a 1785 plat clearly outlining the redan at Tradd Street in the center of the street, and removal of the cobblestone paving for the City's drainage construction. Excavation of three trenches revealed that the redan, and indeed the surrounding archaeological site, were intact beneath the city street. However, the plat that initially guided archaeologists to the site proved to be difficult to fit to the modern landscape. The redan was exposed approximately 50' south of our interpretation of Purcell's plat. Excavation of Trenches 2 and 3 revealed a central portion of the north face, minus the interface with the curtain line and minus the 'point'. Location of the exposed portion, though, indicated that the redan continued southward into a paved parking lot owned by the City of Charleston. As the 2008 trenches were being filled, plans were launched for excavations in the parking lot.

Continued excavation in the parking lot had several advantages. Unlike the street, excavations here would not interrupt the flow of city traffic. Located behind a brick wall along East Bay Street, the site could be secured against intrusion and vandalism. Together, these features would permit a longer excavation period, one of controlled hand excavation rather than by heavy machinery. The project was planned to coincide with the 2009 offering of the Archaeological Field School by the College of Charleston (CofC) and The Charleston Museum (CM). The site would then be used to train anthropology students in the basics of archaeological fieldwork, while providing a lengthy period for public tours and education by the Walled City Task Force.

With the blessing of Mayor Riley, and funding from the City of Charleston and private donors, a second phase of fieldwork was scheduled for June 2009. Fieldwork continued for four weeks, directed by Martha Zierden of the Charleston Museum, assisted by Ron Anthony (CM) and Barbara Borg (CofC). Research focused on the northwest corner of the lot, literally beginning where we left off a year ago. The western entrance and the metered parking spaces across the western wall were secured with fencing on loan from Meadors Construction.

Space was at a premium, and cleanliness was an issue at a site in the heart of the historic city. Management of the growing backdirt pile was key to satisfying both issues. Therefore, the City of Charleston Parks Department provided a large trailer for management of the backdirt. All soils were carried by wheelbarrow to screens mounted

in this trailer, and all screening was conducted on the trailer. The City crew emptied the trailer daily, storing the soil for backfilling at the end of the project. Pavement was also removed from the study area by a crew from the City.

Following upon the success and challenges of the 2008 project, volunteer docents from Historic Charleston Foundation provided public interpretation of the dig on a daily basis. Visitors and docents were secured behind fencing, but able to view the dig along the northern limits of the site. Historic Charleston Foundation provided signage for the fencing, as well as a distribution box for *Walk the Wall* brochures. Artifacts from the dig were displayed on a table just inside the fencing at the northwest corner.

The area proposed for excavation measured 55 feet north/south by 40 feet east/west. An overall site grid was established by Damon Jackson of Brockington, using a total station. The site grid was established to fit the area available for excavation in 2009, and was not numerically related to the grid system used in 2008. All excavation units and reference points from both seasons were recorded and tied to the State Plane coordinate system.

Figure 36: Excavation site 2009, facing northwest, showing marked pavement; pavement removed.

Because the 2009 grid was oriented to the State Plane, grid lines tended slightly to the northwest, relative to the orientation of East Bay Street. A Chicago grid was established with a beginning point at the southwest corner of the study area designated N300 E300. Grid lines were established north at 5' intervals to N350 E300 and east to N300 E345. A parallel meridian was established at the E345 point, to N350 E345. Tapes were used to establish grid points and excavation units from these points. Nails were established along the N345 line, from N345E300 to N345E345.

Vertical control on a daily basis was maintained with a manual transit, set up in the shoulder of South Adger's Wharf, east of the excavation area. All daily elevations were tied to Reference Point 1, a ground surface brick at the southwest corner of 90 East Bay Street. This point was also used in 2008, so elevations are directly comparable. Additional elevations, including RP 1, were taken with the total station.

Excavations focused on the continuation of the north wall of the redan and the likely location for the point of the defensive feature. Initial excavation, then, focused on the curbing between the street and the parking lot. Based on the location of the exposed portion of the redan, plus the dimensions indicated on the 1785 plat, the terminus of the feature was projected around the N340 line, with the south wall of the redan intersecting the western edge of the site at approximately N320 E300. Based on these projections, three units were opened for initial testing: N345 E320, N340 E325 and N340 E335.

Figure 37: 2009 fieldwork. Laying in 5 foot squares; screening station in trailer.

Stratigraphic Sequence

The 2008 excavation revealed an intact site, with multiple superimposed soil layers. With a few exceptions, zone (or fill) deposits were contiguous across the site and recognized in multiple dispersed units. Every effort was made to recognize these same layers, with corresponding designations. A compacted zone of rubble was the first layer encountered, and was designated Zone 1. This does not correspond to the street paving layers designated Zone 1 (a - h) in 2008, as this was/is not a paved street and ground surface elevation is considerably lower than the cobblestone street.

Zone 1 was heavily compacted, full of brick ruble and some artifacts. A pickaxe was necessary to loosen the soil. James Bonnet's crew from Charleston Water Systems reported that they had filled or leveled this lot with some rubble prior to paving "a few years ago." The amount and source of the fill was not clear. Zone 1 from the three units was screened and retained. A soil difference was noted at approximately 0.8 feet below surface. Content of the soil was the same as zone 1, but here the soil was softer, a brownish sand (10yr4/3). To avoid contamination with the ground surface, Zone 1 was excavated to a depth of 1.0' below surface, before changing to Zone 2.

An intact brick foundation was uncovered in the N340 units shortly after excavation began. Designated Feature 9, the foundation defined the rest of the excavation project. Feature 9 was massive, 2.5 feet wide and ultimately 8.0 feet deep. It was immediately identified as the foundation for the northern Vanderhorst Row, constructed c. 1805 and demolished after the earthquake of 1886. A companion building

to the south is still standing, and is three stories plus a full basement (Poston 1997:98). Given these dimensions, it was anticipated that deposits inside, or south of, this foundation were likely disturbed to a depth of some feet. Excavations thus focused north of, or outside, this foundation.

Figure 38: Initial excavation units expose Feature 9, foundation of the Vanderhorst north tenement; The extant Vanderhorst south tenement in background.

The lines of the foundation to the south and the curbing for South Adger's Wharf follow the dimensions of a wedge-shaped property shown on several plats, and described as "purchased by the Commissioners of the Market from Jacob Motte in July 1768" (Figure 19). This irregularly-shaped tract is the location of the additional sheds shown on plats dated 1793-1804 (figures 15 and 17). This tract, essentially, became the research area for the 2009 project. The area excavated in 2008 was designated on the same plats as "part of the original Tradd Street." At the time of platting, the Tradd street extension terminated at a slip "dry at low water," and the area was described as "lately occupied by the Lower Market."

Based on the excavation of Zones 1 and 2, and the primarily 18th century date of the artifacts recovered from these proveniences, it appeared that the archaeological deposits within the study area were largely intact. Visibility in the N340 units was hampered by the intrusion of Feature 9, and so eventually the entire area between N340 and N355, and E310 and E335 was excavated, by unit. Stratigraphy was consistent throughout the study area.

Table 2: Units Excavated in 2009 (*Unless otherwise noted, the units measured 5' by 5')*

N340 E335	N345 E335 (2.5' extension of N340 E335)	
N340 E330		
N340 E325	N345 E325	N350 E325 (2.0' extension of N345 E325)
N340 E320	N345 E320	N350 E320 (1.5' extension of N345 E320)
N340 E315	N345 E315	
N339 E310		

At 1.5 feet below surface, a soil change was encountered over most of the units. This was a darker gray sand, marked by a decrease in architectural rubble and an increase in artifacts. Soil here was 10yr3/3. Zone 3 was excavated and screened throughout the study area. The deposit varied in thickness, but averaged 0.5 feet in depth. Zone 3 contained large quantities of ceramics, glass, and animal bone, particularly. After completion of the first three units, Zones 1 and 2 were discarded without screening from subsequent units. Controlled excavation in all units began with Zone 3, approximately 1.3 feet below ground surface.

All of the soils defined and excavated to this point did not correspond to those encountered in the Tradd Street extension in 2008. There, multiple layers of street paving (Zone 1) were followed by a reddish-brown coarse sand. This sand was also encountered in the 2009 units, beneath Zone 3. In order to relate this deposit to the 2008 stratigraphy, and yet retain the definitions already assigned in 2009, this deposit was designated "Zone 2 sand." The reddish Zone 2 sand varied in thickness, but averaged 0.3 feet in depth.

The thin brick pavers associated with the market, designated Feature 1, were present across the excavation area, directly beneath the Zone 2 sand. These were set in a thin, but largely intact, bed of light grey lime mortar. As noted in 2008, the bricks used for the market paving are small and relatively thin, averaging 3.5 inches x1.75 inches x7 inches. ("Standard" 19th century bricks, in contrast, measure 4.5 inches by 9 inches by 2.5 inches). Continuing from the 2008 project, Feature 1 was found consistently across the excavation area, with the exception of the locations disturbed by construction of Vanderhorst's Row (Feature 9). Associated with Feature 9 was a substantial builders trench, of varying width, on the north side of the wall. This was designated Feature 10, and was filled with redeposited cultural materials from the adjoining zones. Feature 10 was excavated by unit, and in multiple levels as excavation of the surrounding units proceeded.

The units were excavated concurrently to the top of Feature 1, where they were mapped and photographed. At this point, a fault, or settling, of the brick paving was noted in unit N345 E320, running southwest to northeast. Careful inspection of the soils beneath revealed the south face of the redan, slightly north and west of the expected location. When completely revealed, the 2008

Figure 39: 2009 block excavated to the top of Feature 1. The 'break' is beneath the pvc conduit. Feature 9 is on the right (south).

excavations "missed" the point of the redan by only 2.5 feet. The redan will be discussed in detail following a complete description of the stratigraphy.

Figure 40: East profile, N345-350 E325, from Feature 1 to Zone 10.

Directly beneath Feature 1 was a layer of construction sand, also noted in 2008. Zone 3a was a compacted, mottled grey and gold sand. A layer of Zone 3a, for example, separated the top of the demolished redan and the feature 1 paving. Zone 3a averaged 0.4 feet in depth and contained a moderate amount of cultural material. Present in some locations beneath this was a second lens of reddish-grey coarse sand, similar to Zone 2 sand. Following the 2008 designation, this was designated Zone 3b.

Beneath Zones 3a/b was a thin, but distinctive lens of dark grey sand with a heavy concentration of coal and oyster shell. Soil in Zone 3c was very dark, 10yr3/1, and artifacts were relatively dense. The deposit averaged 0.2 feet in depth. Depending on variations in stratigraphy, Zone 3c might be isolated, or excavated with Zone 3b.

Absent from the 2009 units was a dense cap of orange clay/sand, designated as part of Feature 4. This was associated with demolition of the upper portions of the redan. This layer was not identified in the 2009 units.

Beneath Zone 3c was another deposit identified in 2008. This was a layer of dark brown sand containing brick rubble. The brick was bright orange-red, and the mortar white, while the surrounding soil was dark gray (10yr3/3). The distinctive color of the brick suggests the rubble is from the redan. Following the 2008 designation, this was

labeled Zone 7. Soils defined as Zone 8 were present in some of the units, from 2009 and 2008. In N345 E325, Zone 8 was a layer of yellow sand and pinkish coarse sand.

Zone 9 was the most extensive layer, and consisted of loose, friable lenses of dark and light grey sand, some possibly water-washed. Zone 9 contained large amounts of cultural materials, with many mends and matches among the distinctive ceramics. Zone 9 was nearly 2.0 feet deep, and was excavated in three to four arbitrary levels.

Zone 9 was followed by a distinctive lens of compact yellow clay-sand, containing red brick from the redan. This relates to demolition of the parapet. A similar deposit was recorded in Trench 1 in 2008, but was not given a particular designation. Here, the deposit was more substantive, and was labeled Feature 12. The soils in Feature 12 ranged from 10yr5/6 to 10yr7/6. Large sections of the detached parapet were present in Feature 12.

Directly beneath Feature 12 was dark grey mucky soil, full of olive green bottle glass, oyster shell, coal, and other cultural material, including bone. The soil was moist, due to the depth of excavation, and was very dark grey-brown (10yr2/2). The soil was consistent with marsh soil, and was likely the moat in front of the redan. This was designated Zone 10, consistent with the 2008 designation. Zone 10 initiated 5.7 feet below ground surface in N340 E320, and continued an additional 4 feet to the base of the redan (and base of excavations). The top foot of Zone 10 was hand-excavated in four levels, and all soil was screened. Beneath the top 0.6 feet, the soil was filled with large ballast stones, likely some sort of revetment to reduce wave-induced erosion near the base of the redan. Beneath the base of Level 5 (the first foot of soil), excavation proceeded with a backhoe, and soils were transported by wheelbarrow to a water screen station.

Table 3: Stratigraphic Sequence for 2009 Excavations

Zone 1	re-deposited material/recent paving	20th cent/early 19th cent
Zone 2	brown sand/dense artifacts	early 19th cent
Zone 3	dark brown sand/dense artifacts	1790s
Zone 2 sand	pink/tan granular builders sand	1790s
Feature 1	(market extension paving)	1780s-paving
Zone 3a	compact grey/brown mottled sand	1780s-paving bed
Zone 3b	brown sand	
Zone 3c	dark grey sand w/coal, shell	1780s
Zone 7	brown sand w/brick rubble	(redan demolition)
Zone 8	lenses of fill	
Zone 9, levels 1-4	fill above redan demolition 1780s	
Feature 12	demolition of parapet	1785
Zone 10, levels 1-5	deep levels (moat, waterfront)	1710-1750

Features and Horizontal Patterning

The purpose of the project was to expose as much of the Tradd Street redan, including the remainder of the north face, the point, and the south face, as possible within the time and space allowed. The excavations were located adjacent to known architectural features encountered in 2008, and followed significant features as encountered. Immediately framing the unit location was Feature 9, the foundation to Vanderhorst's Row. Following discovery of this foundation in the first unit, excavations focused on the narrow tract north of the Vanderhorst property. The western 15 feet of this tract contained a number of electrical junction boxes, and so was unavailable for excavation.

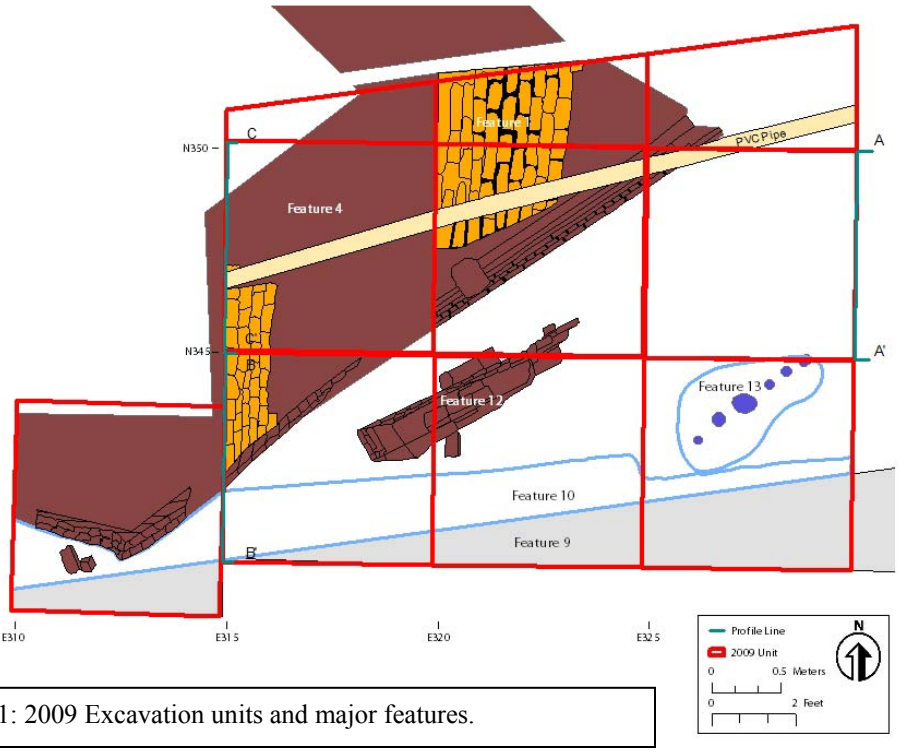


Figure 41: 2009 Excavation units and major features.

The remainder of this available area was part of the expanded Lower Market property purchased in the late 18th century. Evidence of the market included the contents of Zones 3 - 3c. Above Zone 3, there was evidence of small brick piers. These were noted in the east profile of N345 E325, and in the west profile of N345 E315. These were three bricks deep (0.7 feet) and two stretchers wide (0.7 feet). These were collectively labeled Feature 11. This feature was not present in the excavation units, and any evidence of the foundation may have been removed with the construction of the electrical conduit trench. It is unclear if these represent separate brick piers, or a continuous brick foundation. Feature 11 may reflect the stalls added to the Lower Market in 1790, or some of the small buildings shown on the property in the early-19th century.

Upon discovery of the redan point in N350 E325 and the south face in N345 E320 beneath Feature 1, units were located to follow the feature and maximize exposure of the wall. Units N340 E330 and N340 E335 were discontinued after Feature 1, when it became evident that they were beyond the wall (Feature 4). Units N340/345 E315 and N339 E310 followed Feature 4 to its intersection with Feature 9.

The south face of the redan interfaced with Feature 9 in N339E310. Here, the redan was cut or chopped in a ragged manner to permit construction of the Vanderhorst tenement. Also filling this unit was Feature 10, the construction trench for Feature 9. Beyond this point, it became evident that the wall likely continued on the inside, or south side of Feature 9, before continuing beyond the western limits of the available site area. Two units were excavated at the western edge of the site, N330 E300 and N335 E300. These were located to expose Feature 9 (in N335 E300). Exposure of the tenement foundation left little space for excavation on the north side of the wall, as the electrical features were located just north of this feature. Excavation of this area was suspended at the base of Zone 3.

Excavation then focused on N330 E300, on the inside, or south side, of the tenement foundation. Documentary evidence suggests the 3-story building collapsed in the 1886 earthquake, replaced by a warehouse in the 20th century. This was dramatically reflected in the fill encountered inside of Feature 9. Excavated as Zone 2/3, the foundation was filled with brick and mortar rubble (excavated as Zone 2), followed by a deep deposit of powdery grey mortar (Zone 3). Excavation of this unit was challenging, as the rubble fill was very loose, and prone to slumping. At 4.5 feet below ground surface, a layer of brown sandstone pavers was encountered, followed by a thin lens of dark soil. This was evidently the basement paving for the Vanderhorst tenement. The dark soil, excavated as Zone 4, contained a number of artifacts dating to the third quarter of the 19th century.

Figure 42: Redan (feature 4) beneath Feature 1; damaged by Feature 9.

Directly beneath Zone 4 was the redan, evidently demolished to this level to make way for the 19th century building. We were able to expose the top of the wall, as well as large, ragged section of builder's trench between Feature 9 and Feature 4. Instability of the overburden led us to abandon further excavation of this unit. But it was possible to

determine that the wall face sloped outward at this point, suggesting that the entire south face slopes toward the water, in contrast to the north face, where all but the easternmost 5 fee was vertical.

Once the redan was discovered in N345 E320, excavation focused on the units abutting the south face of the wall. These included N340 and N345 E320, and N340 and N345 E325. This area was truncated by Feature 9 and, more significantly, Feature 10. The builder's trench for the Vanderhorst foundation initiated at the base of Zone 2, and continued to the base of the foundation. In the westernmost units, Feature 10 was 0.6 feet wide. In the western sections, however, the builders trench was much wider, perhaps evidence of re-excavation and re-exposure. At 3.0 feet below surface, the builder's trench widened to nearly 2.0 feet. There was clear evidence of re-deposition of artifacts from adjoining deposits (such as displaced pavers from Feature 1). The foundation was 2.5 feet wide, and 8.0 feet from top to the base. The foundation is English bond, with a row of headers at 4 feet below surface. The foundation sits on a wood crib.

As the adjoining unit to the east (N345 E330) was not excavated, this profile served as a guide to ongoing excavations along the face of the redan. Eventually, this mapped profile was 9 feet from ground surface to base of excavation.

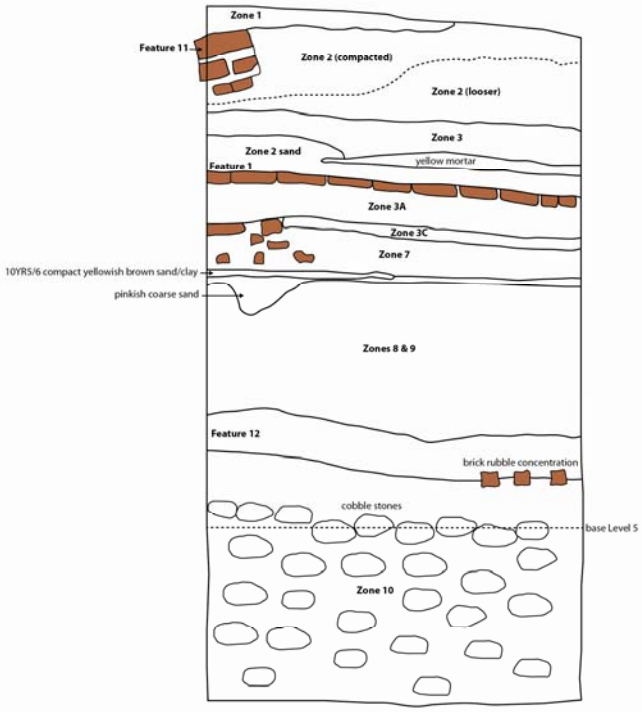


Figure 43: East profile drawing, N345E325.

The redan (Feature 4) was 5 feet wide at the top, and sloped, or battered, toward the water, increasing in width by 3.1 feet at the base of the foundation, 7.2 feet below surface. At the nose, the width increased 1.6 feet at a depth of 5.2 feet. The redan displayed an 82 degree spread. Brick at the nose, or point, was quite battered in the first 4 feet, but was intact and not worn for the deepest 3 feetof foundation. The intact brick corresponded with the top of the large ballast stone fill inside the moat.

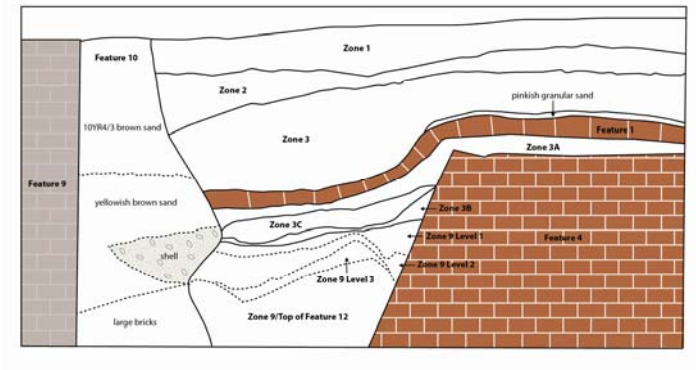
The moat, or outer protection, was marked by a palisade, or line of palings, 5 feet from the face of the redan and parallel with it. The upright posts were first noted in N345 E325, near the top of Zone 10. These posts were collectively designated Feature 13. Five posts were mapped *in situ*, and eleven were eventually discovered in the excavation block. All but one of the posts was cypress, with a single cedar post discovered. All were crudely formed from tree tops, with branches removed. A sharp pointed bottom was prepared, and the tops, when not eroded, were gently pointed.

Fill inside the palisade was homogenous dark loamy marsh soil, and the area between the palisade and the redan was filled with large ballast stone. Wine bottle glass and animal bone characterized the fill. Outside of the palisade, the Zone 10 soils contained quantities of oyster shell and brick rubble. The Zone 10 soils continued to the base of the redan.

Figure 44a: N345-350 E315, west profile, showing Feature 1 over Feature 4; layering on interior of redan.

A small area inside the redan was also available for excavation. This section, in the northern portion of N345 E315 and N350 E315, evidenced stratigraphy identical to the rest of the square, to the top of the redan. As discussed earlier, Feature 1 continued across the top of the redan. This was followed by the layers designated “Zone 2 sand” and Zone 3a. The compacted preparation surface, designated Zone 3a, was immediately followed by a moderately thick deposit of brick rubble, part of Zone 7. Zone 7 reflects demolition of the parapet, and was present in front of the redan, but not particularly obvious on the south side of the redan wall (in unit N340 E320-E315).

Zone 7 was followed by a relatively narrow band of loose, grey sand. This deposit was only 0.25 feet thick inside the redan, in contrast to the front of the feature, where Zone 9 was over 2 feet deep. Zone 9 contained a moderate amount of cultural material. Following this narrow band of grey sand, excavators encountered a pure white sand fill, similar to that designated as Zone 11 during the 2008 project. Unlike the Trench 3 deposits, where Zone 11 initiated some 3 feet below the top of the redan, here Zone 11 initiated less than 1 foot from the top of the brick. Zone 11 was excavated in two levels, to a depth of 2.5 feet below the top of Feature 4 and to a point where excavation inside the narrow opening was no longer possible. The base of Zone 11 was not encountered in 2009.



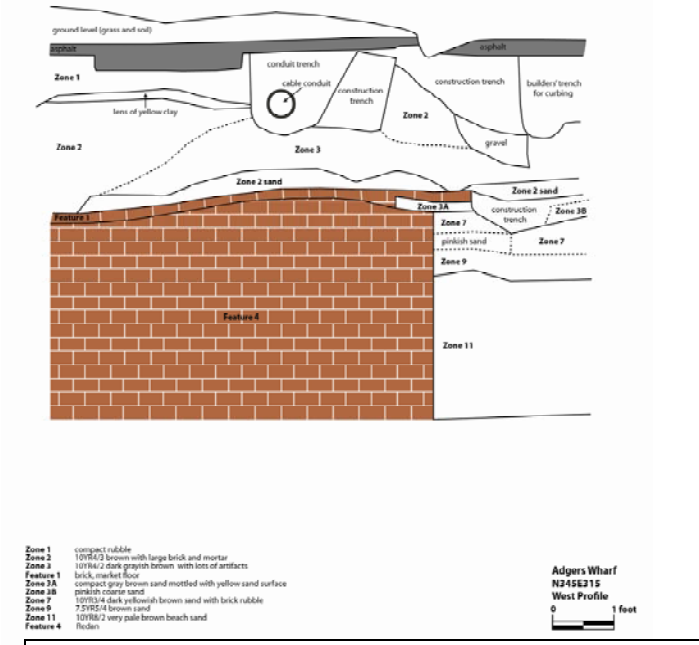


Figure 44b: Schematic of profiles N345 E315 and N350 E315.

Table 4: Summary of Features designated in 2009

Feature #	Unit	Function	Association
1	all	paving for lower market	1790s – market
4	N330E300 N350 E325	redan foundation	1706-1780s
9	N340 line	building foundation	Vanderhorst Row, 1805
10	N340 line	builders trench	Fea 9, Vanderhorst Row
11	N345/350	brick pier/foundation	Lower Market addition? Or Vanderhorst Wharf
12	N345E320	cap of orange clay, brick	demolition of parapet, 1780s
13a-g	N340E325	line of wood palings	palisade, moat for redan, 1706

Deep Excavations

The block excavations described above were dug by hand to a depth of 6 feet below ground surface, to the top of the water table. Soils became moist at the base of Feature 12, and so excavations below this continued in N340 E325 and N345 E325, an area approximately 5 foot by 10 foot. Hand excavation of Zone 10 in five levels exposed the tops of the palings, collectively designated Feature 13. When excavations reached standing water, the Task Force decided to continue excavation below the water table with heavy machinery. Such deep excavation was avoided in 2008, as there was no budget for the anticipated organic materials preserved below. However, successful exposure of the point and a 15 foot expanse of the redan face presented the first opportunity in decades to reach the base of the wall and inspect the construction methods.

Plans were made to excavate the 5 foot x 10 foot sample with the backhoe and vacuum truck provided by Charleston Water Systems. A water screening station was established, and soils of Zone 10 were excavated in levels, to the extent possible, and the soil deposited directly into wheelbarrows for water screening. Surprisingly, and fortunately, very little organic material was present in the soil. Five additional levels were segregated during backhoe operation.

Figure 45: Excavation of Zone 10 using backhoe; water screening material from Zone 10, Levels 1-5.

As part of the deep excavations, two of the pilings were retrieved for conservation and exhibition. These were pulled from the mud via cable attached to the backhoe. The piles were so closely set that eventually eleven were dislodged in the area of excavation. These were placed in makeshift water pools, constructed by Eric Poplin from heavy-grade black plastic nestled inside a foundation of bricks and cobblestones. The pilings were washed, photographed, measured, and wrapped in towels soaked in fresh water. Two were selected for retention, and the rest were returned to the base of the excavations, laid horizontally against the face of the redan, and marked with a plastic label.

Figure 46: Excavation of palings in front of redan; top of palings exposed in Zone 10; palings in place exposed by vacuum truck; palings removed from soil and immersed in water for conservation.

Excavations continued with the backhoe and vacuum truck to the base of the redan. Removal of the water via vacuum presented a brief opportunity to view, photograph, and sample the wood piling foundation for the brick. The redan was positioned on 2-inch thick horizontal planking of cypress, on top of a grillage of 2-foot cypress piles, roughly pointed at the base. One of these was retrieved for conservation and recording, and the excavations were allowed to refill with water.

The following day, the excavations were backfilled with clean soil transported to the site by Charleston Water Systems. The area was re-paved and the parking spaces re-established.

Figure 47: Excavations to the base of the brick redan, below water table, with aid of the vacuum truck.

Figure 48: Backfilling of 2009 excavations by Charleston Water Systems.

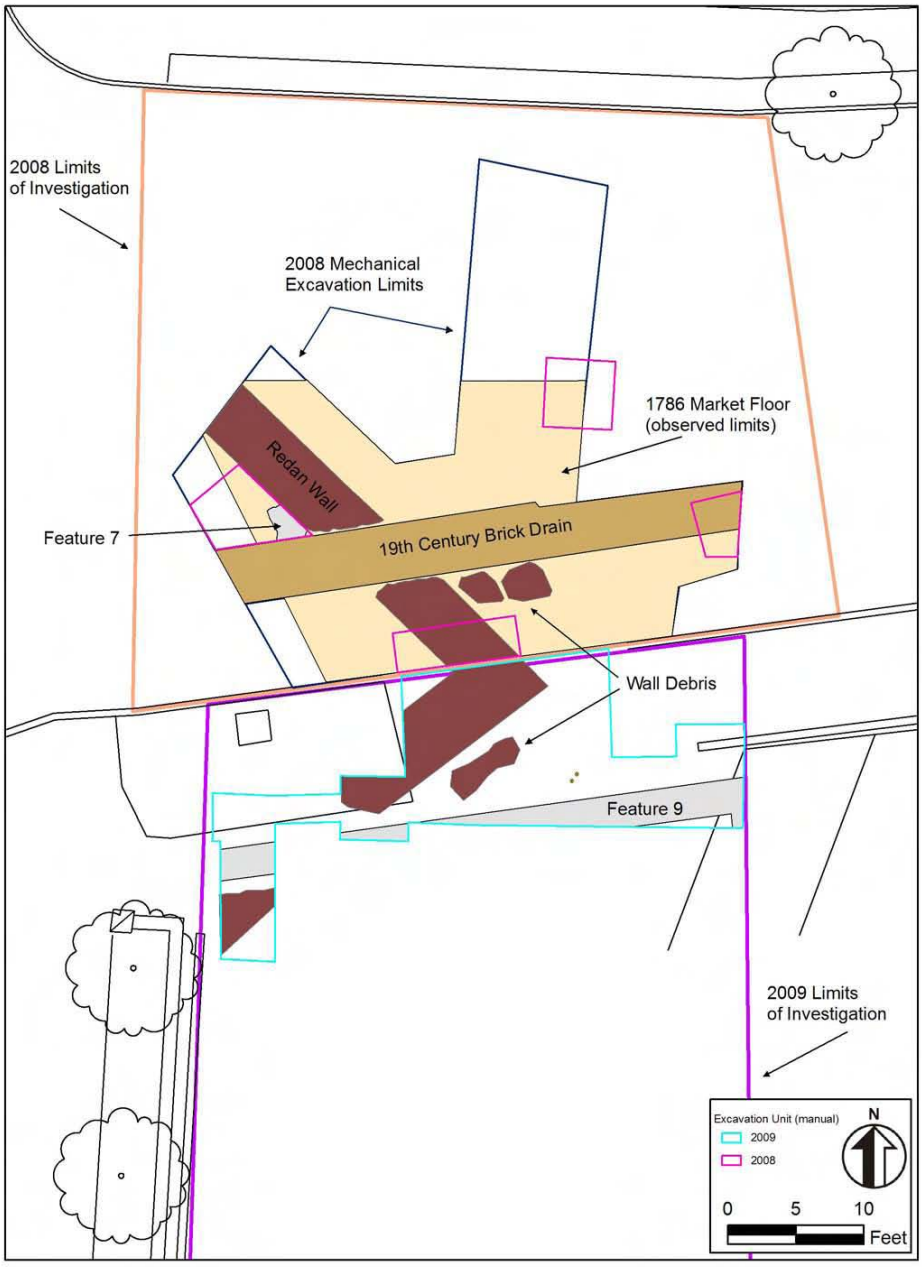


Figure 49: Composite planview of excavations and exposed features, 2008-2009.

Chapter IV
Cultural Materials

Laboratory Methods

In the field, all of the artifacts, architectural samples, and environmental samples were placed in plastic bags and labeled by provenience. Large assemblages were placed in multiple bags with the same provenience information. These bagged artifacts were transported to The Charleston Museum, where they were sorted and inventoried. Cultural materials, soil samples, botanical samples, faunal samples, and architectural materials were then separated.

Soil samples ranged in size from one quart to two gallons. All diagnostic soil samples were stored in doubled plastic bags for permanent curation and boxed separately. Portions of selected samples were dried and re-bagged for special analyses. The soil samples will be retained as part of the permanent collection; they serve as a basic record of site formation, as well as a source of data for future studies.

Faunal materials were separated from the cultural items, washed, and weighed by provenience. Selected proveniences were then shipped to the Zooarchaeology Laboratory at the University of Georgia for analysis. Funds were sufficient to analyze selected samples; additional analysis was conducted by zooarchaeology students as part of a class project.

All bagged cultural materials were sorted by the field provenience number (FS#) and inventoried. Each artifact in each provenience was then washed in warm water with a soft brush and re-bagged when dry. Analysis by provenience included identification and counting each artifact by type. Washing and sorting commenced immediately after each field project, in 2008 and 2009, and was conducted by students from the College of Charleston and experienced volunteers.

Most of the metal artifacts retrieved from the waterfront were in an advanced state of deterioration, and were deemed too fragile for active conservation. Those ferrous and non-ferrous artifacts stable enough for conservation were selected for treatment by electrolytic reduction. Ferrous items were placed in electrolysis in a weak sodium carbonate solution with a current of six ampheres for a period of some months. Upon completion of electrolysis, the artifacts were placed in successive baths of distilled water and air-dried. The artifacts were coated with a solution of tannic acid and phosphoric acid, and dipped in molten microcrystalline wax to protect the surfaces. Non-ferrous artifacts were also placed in electrolytic reduction, in a more concentrated solution with a current of 12 ampheres. Electrolytic reduction of these small artifacts was usually accomplished in a few days. They were then placed in distilled water baths to remove surface chlorides, air-dried, and gently polished before being coated in Incralac to protect the surfaces.

The few wood and leather artifacts were sent to conservators for treatment. The pilings were conserved at the Maryland Archaeological Conservation Laboratory. The leather and wood materials were prepared at the Clemson Conservation Laboratory. Detailed conservation reports are on file at The Charleston Museum.

The City of Charleston decided that permanent curation of the collection at The Charleston Museum was appropriate, and donated the collection to the Museum. The South Adgers Wharf materials received the accession number 2008.047. Each provenience (FS#) received a museum catalogue number and they are catalogued as ARL 29,187 - ARL 29,323 for the 2008 assemblage and ARL 48,036 – ARL 48,197 for the 2009 project. Materials from the South Adgers's Wharf project were entered into the Museum's digital collections records using PastPerfect IV.

Analysis

The first step in the analysis of materials was the identification and quantification of the recovered artifacts. Though decades have passed since its initial publication, Ivor Noel Hume's *Guide to Artifacts of Colonial America* remains the primary source used to identify historic materials. Indeed, previously undiscovered artifact types recovered from South Adger's Wharf were quickly identified by consulting the worn copies of Noel Hume adorning the museum laboratory. In addition, the Museum's type collection, Stone (1974), Ferguson (1992), and Deagan (1987) were the primary sources used. Ceramics references included Towner (1978), Gaimster (1997), Austin (1994), Grigsby (1993), Wilcoxen (1987), Sussman (1997), and Cushion (1975). Catalogues and a web site maintained by ceramics expert Garry Atkins provided dates for specific styles of recovered ceramics (www.englishpottery.com). Web sites maintained by Jamestown Rediscovery (www.apva.org), The Maryland Archaeological Conservation Laboratory (www.jefpat.org), the Florida Museum of Natural History (www.flmnh.ufl.edu), and the Digital Archaeological Archive of Comparative Slavery (DAACS) maintained by Monticello (www.monticello.org) provided photographs and additional references for specific artifact types. Other references were consulted for specific artifact types, and are referenced in the appropriate section. Beaudry et al. (1983) was used to standardize vessel form descriptions.

For basic descriptive and organizational purposes, identified artifacts were then sorted by functional category, based on Stanley South's model for the Carolina Artifact Pattern (South 1977). For the past three decades, archaeologists in the southeastern United States have followed South's suggestion that artifacts be classified by function, or how they were used in the everyday life of their owners. While attempts to discern broad patterns among sites have been less common in recent years, the organizational methodology is still used to facilitate inter-site comparison. All of the Charleston data have been organized in this manner. Following this exercise, the relative proportions of a variety of artifact types were examined, based on the work of King (1990, 1992) and many others in the mid-Atlantic region. Temporal subdivision and quantification of the

Charleston assemblages (Zierden 1993, 1994) has provided more details on proportions of consumer goods and how they were used in Charleston.

The Material Assemblage

The South Adger's Wharf assemblage showed some variation through superimposed strata, but overall the assemblage was remarkably homogenous. Moreover, the assemblage was unique, exhibiting artifact proportions unlike those from contemporary domestic sites in the city and throughout the lowcountry. First, the range of artifacts recovered from the site was significantly narrower than from residential sites. Artifacts from groups other than kitchen wares and architectural materials were very rare. There were very few clothing, personal, or furniture items recovered. Arms materials were also rare. The activities group was also reduced in relative frequency, and dominated by barrel strap fragments. The assemblage was dominated by bottle glass, ceramics, and tobacco pipes. As will be described in detail later, the assemblage was most similar to, but not identical to, the Beef Market.

The assemblage from the two projects was very large. The controlled excavations in 2009 produced over 35,000 artifacts. The 2008 project produced an additional 5,800 artifacts from controlled excavations and 3,500 recovered from unprovenienced backfill. General collection of diagnostic materials produced another 960 artifacts. Based on the stratigraphic history described in Chapter III, all of the materials from Zone 3 through Zone 9 are associated with demolition of the redan and operation of the Lower Market between 1785 and 1799; these are considered as a separate assemblage. The moat fill, excavated as Zone 10 and Zone 11, was visually different and generally much earlier. While upper levels of Zone 10 contained some late 18th century material discarded prior to the demolition and filling of the block, most of the materials were significantly earlier. The Zone 10 assemblage was quantified and considered separately.

Because the redan assemblage is so large, and the majority of the artifacts and soil were deposited in a relatively short, and well-documented time, artifacts will be described as a single assemblage. Following description of the overall artifact assemblage, by artifact type, various temporal subdivisions of the South Adger's Wharf material will be quantified and compared to other Charleston assemblages.

Olive Green Bottle Glass

Though there was some variation by provenience, the dominant characteristic of the assemblage was green bottle glass. Olive green beverage bottle fragments were twice the number of ceramics in the late-18th century (market) assemblages and 80% of the artifacts in the Zone 10 (moat) assemblage. A proportionately large number of green bottle fragments were recovered from the backhoe spoil during the 2008 project. The assemblage included a number of intact bases and necks, as well as general body fragments.

Wine or liquor bottles of dark olive green glass were hand blown throughout the 17th and 18th centuries, and are commonly found on all archaeological sites. The vessels often exhibit a pronounced pontil scar on the base from the blowing rod. All vessels exhibit a prominent 'kick up' base, and hand-applied string neck, for affixing a cork or other seal, often with copper wire. The form of the globular bottles evolved from the mid-17th century through the late 18th century, from a short, squat form known as "onion bottles" in the late 17th century to a short, but vertical form by the mid-18th century. The form continued to get taller and thinner through the remainder of the 18th century, achieving the proportions common today by 1820 and development of the molded bottle (Noel Hume 1969:60). While height and proportion are the best guides to vessel shape, it is possible to predict the form, and thus a general date, from the diameter of the base alone. Vessel forms spanning the entire 18th century were present in the redan assemblage.

Square-bodied bottles, blown into a mold and suited for shipment or storage in cases, were developed before the globular bottles. Production of this form continued alongside the more common round bottle throughout the 18th century. Known as case bottles, these olive green containers featured a relatively flat bottom with prominent pontil scar, high shoulders, and a short neck. Several identifiable case bottles were retrieved from the redan fill. Green bottle glass dominated the moat fill, comprising 74% of all artifacts and 83% of the kitchen group. Glass comprised half of the artifacts in the kitchen group in Zone 9, and two-thirds in Zone 3. Glass was least common in Zones 3a-3c, 1/3 of the kitchen artifacts.

Ceramics

Ceramic types recovered from the redan ranged from those definitive of the late 17th to early 18th century, to those developed in the last decade of the 18th century. No wares post-dating 1810 were recovered. The assemblage, then, spans the 18th century. The large assemblage includes reconstructable vessels, fragments exhibiting formal attributes, and types rarely recovered in Charleston.

Coarse Earthenwares

The two earliest utilitarian ceramics recovered in the lowcountry were manufactured in the Devon region of England (Outlaw 2002). North Devon gravel-tempered ware consists of smooth pink and grey clay with quartz inclusions, hence its name. Vessels are thick, and rather large. The interior of the vessel is coated with a thick olive-green lead glaze, and the quartz temper often protrudes from the glazed surface. The redan assemblage included fragments of cream pans, jars, and a handled pot. North Devon sgraffito slipware features the same clay body, but minus the quartz temper, resulting in a smooth paste. The interior of the vessel is then covered with a white slip, and often designs are scratched through the slip to expose portions of the brown body beneath. The slipped area is then covered with a yellowish lead glaze. The slip and glaze are found only on vessel interior, and continue around the rim exterior. In his study of 17th century sites in Barbados, Michael Stoner noted that the glaze on Sgraffito is a light

yellow in the first few decades of manufacture, and is darker, almost brown, in the second half of the manufacture period; all of the Charleston examples exhibit the darker glaze. The redan assemblage included fragments of a pitcher, with the neck glazed on the interior and exterior. Other vessels included pans and basal fragments suggesting a jug or pitcher (Beaudry et al. 1983:30).

Figure 50: North Devon gravel-tempered ware.

North Devon gravel-tempered ware is usually cited as a marker of 17th century occupation (South 1977), and is considered evidence of early site occupation in the lowcountry. However, numerous sites in Charleston and elsewhere in the lowcountry contain this ceramic in contexts deposited decades later; indeed, the ware was manufactured from 1650 until the end of the 18th century. Sgraffito, on the other hand, was also developed in 1650, but manufactured only until 1710, and thus may be a more reliable indicator of sites occupied at the turn of the 18th century. Both wares were recovered in small amounts at the redan; together they comprise 0.3% of the ceramics.

Figure 51: North Devon sgraffito slipware.

Two other early colonial earthenwares were found at the redan, and both wares exhibited vessel forms not previously recovered in Charleston. Manganese Mottled ware is thin, but otherwise similar to English (Staffordshire) slipwares in paste composition. The vessels feature a brown streaky glaze with manganese inclusions. The runniness of the glaze results in a relatively thin glaze near the rim and a thick puddling on the interior of the vessel. Michael Stoner has recently identified this ware in 1670s contexts at Charles Town Landing (South and Stoner 2001), extending the date of use in Charleston from 1680 to 1670. Mottled ware was manufactured until at least 1750 (Philpott 1985). While the majority of Mottled ware forms are tankards with cordons at various intervals, some bowl forms are found in early assemblages (Stoner and South 2001: 67), and were identified among the redan samples.

Figure 52: Manganese Mottled ware.

Also recovered was a similar ware, featuring a solid, rather than streaked, glaze. This ceramic was identified as Slip-coated ware by David Barker (Keeper, Potteries Museum, Stoke-on-Trent; see Davey 1988). Slip-coated ware features paste and vessel forms similar to the Mottled ware, and comes in two glaze varieties. The dark variety features a very dark brown, almost black lead glaze over the buff paste, while the light variety is a rich golden-brown. Slip-coated ware was manufactured from 1720 to1740, and thus is a good marker for the second quarter of the 18th century. While hollow ware forms are the most common in Charleston, the redan assemblage included a number of plate rims, as well as open bowls. Manganese Mottled ware and Slip-coated ware together comprised 0.4% of the ceramics.

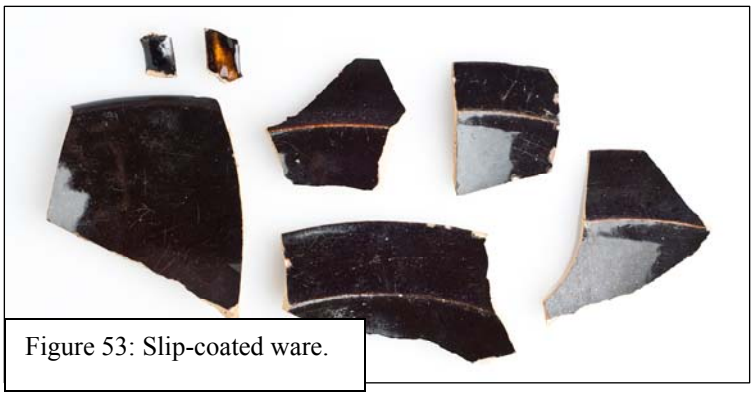


Figure 53: Slip-coated ware.

As is the case elsewhere in Charleston, combed and trailed slipwares from the Staffordshire potteries, manufactured from the late 17th century through the 18th century, were the most common ceramic recovered from the redan fill. Slipwares comprised 16 % of the ceramics. The majority of the recovered fragments were open dishes, featuring a glazed interior with a variety of trailed and combed slip decorations, an unglazed exterior, and coggled rim. Several distinct vessels were identified, including half of a distinctive bowl with a spiral of swirled yellow clay on a dark background. Other vessels included a variety of bold, but simple, trailed decorations typical of the second half of the 18th century (Grigsby 1993:53). More elaborate combed patterns, typical of the mid-18th century, were also recovered in large number (Grigsby 1993: 58). Some of these featured the relatively rare everted rim and molded interior rim. The collection also features examples of relief-decorated press-molded dishes typical of the first quarter of the 18th century; several examples were recovered from Zone 10 (Grigsby 1993:39-42).

Figure 54: Staffordshire combed and trailed slipware bowl.

Figure 55: Early 18th century Staffordshire slipware.

Hollow ware forms were also common in the redan assemblage. Most common were small cups and drinking pots, decorated with a series of dark dots around the rim and trailed decoration around the center of the body. This style was produced through the 18th century. Early-18th century forms include those with "finer-grained, more elegantly executed" combed and trailed decoration (Grigsby 1993:57). Grigsby illustrates a number of whole vessels comparable to those recovered at the redan, dated to the first two decades of the 18th century. The redan site also produced a quantity of reverse-decorated wares, with the buff body covered completely with a dark slip, and decorated with white clay trailing (Grigsby 1993:56), produced principally in the first half of the 18th century. The redan fill also produced examples of slipware candlesticks, a relatively rare form for Charleston.

Figure 56: Early style Staffordshire slipware; bat molded (left), reverse decorated exterior (right).

Buckley ware is a heavy earthenware with ridged sides and a thick black lead glaze. The most common forms are cream pans, butter pots, and large, deep storage vessels. The paste consists of ribboned red and yellow clays. Rather than serving a decorative function, this mixing was designed to make the clay more workable. Buckley wares from Wales appear in the North American colonies after 1720, though a few fragments have been recovered from late 17th century deposits in the Chesapeake (www.jefpat.org). The ware persists on American sites until the Revolution. (Noel Hume 1969:133). Buckley seems most common in Charleston in the second

Figure 57: Buckley ware.

quarter of the 18th century, and was a significant component of the redan assemblage (0.5%).

Lead-glazed coarse earthenwares of various types comprised a significant portion of the redan ceramic assemblage (4.1%). These nameless wares are problematic in that there are no known type names or descriptions, nor specific dates of manufacture, for types consistently identified in Charleston assemblages. They are, therefore, not useful in dating archaeological assemblages. Further, descriptions of paste, glaze, and vessel form are not uniform. The large sample recovered from the redan provides an opportunity to describe at least a few of the more common varieties in some detail.

Pan forms were common among the lead-glazed earthenwares. There were several fragments featuring an orange-red to purple-red clay paste, with a few dark inclusions with a rust-brown lead-glazed interior. The glaze was homogenous, with a sprinkling of dark manganese spots and streaks. A second common pan form features a somewhat thinner buff to orange clay body, with occasional yellow clay inclusions and ribbons, and a yellowish lead-glazed interior. Also common are red-bodied earthenwares with a very dark brown or black lead glaze. Vessels of this type recovered from the redan include small and medium-sized bowls with flared rim, and a straight-sided jar.

Figure 58: Lead-glazed redware.

Another group of earthenwares are those that are imperfectly fired, probably at a lower temperature, and feature red clay paste with a gray core. The paste is sandy, and the thin lead glaze often feels rough to the touch, as a result of the sandy paste. The redan assemblage includes two handle fragments with an olive-green glaze. One handle is from a large vessel, and features a series of scalloped impressions along the top of the handle. Another vessel, represented by a strap handle and rounded rim, features a rust-brown lead glaze.

Figure 59: Coarse lead-glazed redware.

Though English ceramics dominate the artifacts of the lowcountry, and of the redan site, a number of the earthenwares recovered here are from other sources. A distinctive vessel type identified at the Charleston Judicial Center is a large cooking vessel, from the Germanic region, known as a

Figure 60: fragments of German kookpot.

"kookpot." These vessels are wide, with flat bottom and shallow, straight sides. Ridges and wide rims aided in gripping the vessels. The complete vessels include legs, and a matching cover. Complete vessels were recovered from the Judicial Center, while the redan assemblage included two large rim fragments.

As part of the British mercantilism policy, manufacture of goods in the colonies was discouraged. Despite this, local industries, including potteries, developed in the 17th and 18th centuries in most English colonies. Most were small, and served only a local audience. Carolina, in particular, developed very few potteries, the only one known in the lowcountry was built by John Bartlam in 1765 (South 2004). The Moravian settlements at Bethabara and Salem, NC developed potteries that produced earthenwares and more refined tablewares, and some of these were transported to Charleston (Bivins 1972; South 1993). To date, no wares recovered in Charleston have been positively attributed to the North Carolina potteries. A small redware lid with a dark brown lead glaze, decorated with white slip and dark brown trailings, is a good candidate, but this waits further review.

Figure 61: Possible Moravian earthenware.

The most successful American potteries were located in the mid-Atlantic region, particularly Philadelphia, and after 1750 large quantities of these wares were sold in Charleston (Steen 1999). The wares recovered in Charleston are loosely categorized as American slipwares, and are distinguished by a red clay body decorated with trails of white clay, covered with a clear lead glaze. The resulting designs are simpler than those of the Staffordshire wares, and the trailings of white slip often protrude above the level of the clay vessel. These trailings are sometimes absent from eroded or degraded fragments of the slipware, leaving strips that are missing the glaze altogether. The most common vessel forms are flat-bottomed pans with straight, sloping sides. Sometimes the wares are decorated with splashes of green, or copper, glaze. The redan collection featured a variety of American slipware fragments. Several exhibited splashes of green glaze over relatively complex white trailed designs. Another vessel exhibited brown manganese trailed decoration outside of the bowl. Several fragments from a single vessel were decorated with a runny yellowish glaze over the white trailing.

Figure 62: American slipwares.

A new ceramic type was discovered at the redan, and has not been described elsewhere. The overall qualities of the paste and finish suggest a Spanish or French

attribution. Over thirty fragments were recovered from several late-18th century deposits, including Feature 10, the construction trench for the Vanderhorst tenement. The ware features a smooth red clay body with a white slip wash on the exterior, similar to the slip on Spanish olive jar. The vessel is relatively thin (3mm), and the fragments suggest a small hollow ware form. A shoulder fragment suggests a rounded or bulbous body and straight neck, while a single rim sherd suggests a straight rim. No basal fragments were recovered. Two handle fragments suggest a relatively sturdy strap handle. It is possible the vessel is a pitcher; it is also possible that the fragments represent more than one vessel.

Figure 63: Possible Spanish or French earthenware.

Figure 64: French earthenwares.

French earthenwares have been identified in Charleston assemblages relatively recently, and our understanding of them is evolving. Bold yellow and/or green lead glaze on a buff to white paste characterizes many of the French earthenwares. Waselkov et al. classify yellow lead-glazed earthenwares as Charente plain (Olin et al. 2002; www.usouthal.edu). The few fragments recovered at the redan include pan forms and a strap handle. Also present in small amounts is Saintonge earthenware, characterized by a redware paste and rich green glaze. Some vessels feature a white slip under the glaze and are known as Saintonge slipware (www.usouthal.edu). Both are present on Charleston sites in small, but significant, amounts. A final fragment from the redan site featured a redware paste covered with a white slip, and a yellow glaze with deep green spatters.

A lead-glazed earthenware commonly recovered on lowcountry sites has also been attributed to French potters. This is a sturdy vessel with a sandy buff-to-pink colored paste; the interior is finished with an apple-to-olive green lead glaze with dark inclusions. Pots and jars in a variety of sizes have been noted, along with flat-bottomed pans. Following the example of scholars working on French colonial sites along the Gulf Coast, this ware is catalogued as French Green Glazed Coarse Earthenware (FGGCEW). Prior to positive identification as French, it was catalogued in Charleston reports as "Southern

Figure 65: French green-glazed coarse earthenware.

European Ware." This was based on the recovery of significant amounts at Lesesne plantation, Daniel Island in 1984 and consultation with archaeologists Stanley South and Kenneth Lewis. At the time, South reported that he recovered the same ware at Brunswick Town, North Carolina (Stanley South, SCIAA, personal communication 1985; Kenneth Lewis, Michigan State University, personal communication 1985). The ware was firmly identified, and matched to sherds recovered from Old Mobile, by Bonnie Gums in 2000 (Bonnie Gums, University of South Alabama, personal communication 2000; Waselkov 1999). French Green Glazed is a common component of Charleston assemblages, particularly from deposits dating to the second half of the 18th century.

Figure 66: Spanish olive jar.

Spanish coarse earthenwares form a large component of the redan assemblage. Several large fragments of Spanish olive jars or storage jars were recovered. Olive jars are the amphora-shaped vessels ubiquitous on Spanish colonial sites, and commonly recovered in other American colonial settings. The long, narrow vessels feature a rounded-to- pointed bottom, wide shoulders, and a restricted neck. The vessels are thick, with a buff to pinkish sandy to mineral-tempered clay body, and they often feature a finger-ridged exterior. The vessels may be glazed on the interior, often in green, and feature a thin white slip on the exterior (Deagan 1987; 30-35). They were manufactured from 1490 to 1800 and were used to transport and store liquids of all kinds.

Vessels with the same paste that lack the distinctive form of olive jars have been classified by Deagan and others as "Spanish storage jar" (Deagan 1987:36; see Deagan 1983). In Charleston, this term usually refers to a small (12" tall, 2 quart capacity) form with flat bottom, wide rounded shoulders, and flared rim. The redan site produced storage jars of much larger capacity, as evidence by flat base fragments and wide-mouthed rims lacking the distinctive restricted neck. Such large vessels were categorized by Ivor Noel Hume as "Iberian Storage Jar" in 1969 (Noel Hume 1969: 143). Spanish storage jars have a wide distribution and manufacture range into the nineteenth century.

Utilitarian Stonewares

Figure 67: Examples of brown saltglaze stoneware; Bellarmine neck fragments; basal fragments.

A major component of the redan assemblage was utilitarian stoneware vessels. Jugs and jars in a variety of sizes, finished with a brown salt glaze, comprised 4% of the assemblage. Stonewares manufactured at factories at Raeren, Siegburg, and Cologne produced vessels used throughout western Europe and, later, the American colonies. Stoneware from the region was traded during the 17th and 18th centuries. Trade of these wares was first dominated by the Dutch, and later by the English (Gaimster 1997; Noel Hume 1969:280). The best-known brown stonewares are the "bellarmine" or Bartmann jugs, decorated with a bearded face on the neck of the vessel. These were manufactured throughout the 17th century, and are recovered in contexts in Charleston dating to the first quarter of the 18th century. A complete neck and two fragments of the Bartmann figures were recovered from the redan assemblage.

The majority of the brown saltglazed stoneware jugs were undecorated. Bottles and jugs in a variety of sizes were imported into the English colonies through the first half of the 18th century. The redan assemblage ranges from small (one quart) to larger (two gallon) vessels. The bottles feature a constricted neck and a small strap handle affixed to the neck. Some vessels featured a slip or wash on the vessel interior. The pots featured an open neck with rounded rim and were also present in a number of sizes.

In addition to the Rhenish brown stoneware, the British potteries produced brown saltglazed stonewares in the 18th century, beginning with the potter John Dwight of Fulham in 1671 (Noel Hume 1969:112). The Fulham wares are principally tankards and tavern bottles, often with a cream-colored base. A few examples of these wares were recovered from the redan. More common were stoneware bottles, produced in moderate amounts in the 18th century and enjoying resurgence in the early 19th century when the duty on glass bottles was doubled. A number of tall, cylindrical stoneware bottles were recovered from the upper levels of the redan excavation.

Westerwald, or Rhenish, stoneware was less common at the redan. This ware is defined as having a grey paste and grey saltglaze finish, with decoration in cobalt blue. Westerwald of the late 17th century features ornamental friezes and applied relief. Export of the ware to Britain and beyond accelerated after 1720; the forms typical of this period include chamber pots and tankards, and reed-necked jugs. Wares of the first half of the 18th century feature "elaborate floral and geometric designs, from a combination of sprig molding and combed lines." (Noel Hume1969:280). Manganese was applied to the reeded necks of jugs, and to individual ornaments on the vessel body. The careful sprigging was replaced in the second quarter of the 18th century with stamped and incised decoration, often around a central medallion. After 1760, chamber pots are the most common form, bearing a sloppily-applied blue decoration around minimal raised or incised designs. Noel Hume (1969:283) suggests that the importation of Westerwald stonewares ceased after the Revolution.

The redan assemblage included examples of Westerwald that span the 18th century. The earliest example, from the deepest level of the moat, features a carefully sprigged manganese and cobalt design, similar to a jug dated 1702-1714 by Noel Hume

(1969:279) and those dated 1680-1690 by Gaimster (1997:264). Elaborately incised wares, from the second quarter of the 18th century, were common in the redan collection. The most recognizable is the neck and shoulder to a large reed-necked jug, featuring manganese decoration on the neck and elaborately incised cobalt decoration on the shoulder and body. Several smaller fragments with careful incising, and portions of medallions, were recovered from the excavations. Also present were examples of

tankards from the middle of the 18th century, featuring ribbing and cordoning around the body as well as panels of incised decoration. An intact "GR" medallion is of a type typical of the 1740-1760 period. The assemblage also included a number of chamber pots, many with decorations typical of the second quarter of the 18th century.

Gray saltglazed stoneware vessels without the cobalt blue decoration were recovered in smaller numbers. These included a jug handle with incised decoration and fragments of a grey stoneware bottle.

Figure 68: Examples of Westerwald or Rhenish stoneware: reeded-neck jug with manganese decoration; tankards; early-18th century examples with manganese glaze and elaborate decoration.

Table and Tea Ceramics

The redan and lower market assemblage included a range of table ceramics typical of the 18th century, though these were less common relative to domestic sites in the city. The tablewares included coarse earthenware, refined earthenware, stoneware, and porcelain types. The earliest wares are earthenwares.

The most common tableware of the 17th and early 18th century is delftware, a soft-bodied earthenware with an opaque tin-enamel glaze. Developed in the 17th century in Britain and Holland, delft was used as a tableware until the development of more durable ceramics such as white saltglazed stoneware and creamware in the mid-18th century. Tin-enameled earthenwares were also produced in France and Spain, as well as the Near East, resulting in a range in decoration and finish. Because of the range in sources, and a mixing of technologies and potters across national borders, many archaeologists classify all such wares collectively as tin-glazed, designating country of origin when known. Nonetheless, there are certain characteristics typical of British, French, and Spanish tin-glazed wares, particularly for the 18th century when these wares are common in Charleston assemblages.

Figure 69: British delft, with polychrome (left) and blue (right) hand painted decoration.

Generally, British delftware is characterized by a buttery yellow earthenware paste, covered with a tin oxide glaze that is opaque and often somewhat matte or chalky in appearance. The tin background is usually a pale blue, referred to as "robin's egg blue," though pure white examples are known, particularly from the late 18th century. The surface is often decorated in hand-painted designs in cobalt blue, or in a polychrome palette, including pale green, yellow, red, and black. Powdered manganese can be found on examples from the early 18th century. Delftware of the 18th century came in plates, bowls, punch bowls, cups, and mugs. Delftware often copied the more popular, and more expensive, Chinese porcelain. Hygiene forms were also common, and include drug jars and chamber pots. Delft tiles were also produced.

The redan assemblage produced a limited number of delft tablewares, mostly decorated in blue. Small bowls were the most common form, followed by dinner plates. The assemblage also included examples of the plain white round plates produced in the late 18th century.

Figure 70: Delft apothecary jar fragments.

A relatively large number of apothecary jars were recovered from the redan. The assemblage includes several small ointment pots, the squat bulbous containers with an everted rim and cylindrical foot. All of the examples are undecorated and feature a bluish tin glaze that is fairly fragile. There were also a number of bases and body fragments to the taller, cylindrical gallipots (Austin 1994:210). The gallipots featured a flat base, straight sides, and everted rim. They were decorated in bold blue dashes or stripes. One example featured polychrome decorations. Both vessel types were used to hold dry medicines or cosmetics.

Figure 71: French faience.

The redan assemblage also included a few fragments of French tin enameled ware, known as Faience. While most of the Faience arrived in the American colonies at the time of the American Revolution, a small but consistent number of French ceramics are recovered from earlier 18th century assemblages, as well. Faience is characterized by a salmon-colored paste, and the vessels are often large and curvy. Decoration in blue or polychrome is usually confined to a rim treatment. The most common type in Charleston, and in the redan assemblage, was Faience brune. This ware features a white to pale blue tin enamel on the interior, and a dark brown lead glaze on vessel exterior. A band of decoration in blue, or blue and black, circles the interior rim. The redan assemblage included plate rims and a lid fragment (Waselkov and Walthall 2002).

Many delftware vessels were decorated to copy Chinese porcelain, the most popular and most expensive tableware of the 17th and early 18th centuries. By the second quarter of the 18th century, Chinese porcelain was increasingly popular and available. It is commonly recovered on sites in Charleston, where trans-Atlantic imports were readily available. The body of Chinese porcelain is made with kaolin clay and finely ground feldspathic rock, producing a ceramic distinctive in its high gloss and translucency. Porcelain is most commonly decorated in cobalt blue hand painted designs under the glaze. Tea wares, particularly tea bowls without handles, are the most common vessels recovered, though porcelain was also produced in a range of table wares, particularly dinner plates.

The redan assemblage included tea bowls and saucers in a number of hand-painted patterns. Fragments exhibiting formal attributes included a tea bowl with narrow foot ring and flaring sides, identical to one recovered from a 1740s context at the Dock Street Theater, as well as tea bowls from the late 18th century with wide foot ring and an unglazed base. Fragments of a teapot in underglaze blue were also recovered. Larger vessels included at least four dinner plates. These include elaborately decorated plates from the late 18th century. Service vessels included the base to a large punch bowl and a tall cylindrical vase.

The assemblage also included porcelain decorated over the glaze. These enamels, applied after the first firing, are usually red and gold. Sometimes the two techniques are used together; Imari wares, dating 1700-1780, feature blue underglaze decoration and the addition of red and gold overglaze enamel. Only a few examples of Imari ware were recovered at the redan. These include fragments from dinner plates and a small teapot or cruet lid.

Figure 72: Overglazed Chinese porcelain.

Other vessels, decorated entirely in overglaze enamel, were produced in the second half of the 18th century. Many of these vessels were elaborately and extensively decorated, often in red, gold, and black. Robert Leath (1999) notes that, by the mid-18th century, Charleston imported an array of expensive Chinese goods, including elaborate polychrome enameled porcelains. The redan assemblage included many fragments from dinner plates, commonly featuring a red and gold dart border around the marley. Several fragments from saucers were also present. By the end of the 18th century, enameled decoration on export pottery declined to a point of minimal rim and basal decoration. Often, fragments of undecorated porcelain with a white tint are portions of these vessels. The redan assemblage included such wares.

Figure 73: Vitrified British porcelain.

Also included in the redan assemblage were a small number of British porcelains. A small, but consistent, number of British-made porcelains are recovered in Charleston. These are usually tea wares, decorated in underglaze blue. They were made at Bow, Worcester, Liverpool, and Caugley (Noel Hume 1969:137). Recently, a number of vitrified examples of phosphatic porcelain have been identified in Charleston collections, and attributed to the Bow factory (Owen et al. 2010). Several fragments, in various stages of vitrification, were recovered at the redan. Most are from teawares (bowls and saucers), exhibiting a ridged pattern and floral decoration.

A small amount of three well-made coarse earthenware types, developed in the mid-18th century, were recovered. Astbury is the name given to a group of wares produced principally in teaware forms. First manufactured in 1725, Astbury features a delicate red clay body with a clear lead glaze. Vessels are often decorated with a band of white clay along the rim, or sprigged designs of white clay. The resulting vessels are thin and well-made. Only a few identifiable fragments of Astbury were recovered from the

redan. One featured an elaborate sprigged design, likely on a teapot form. A fragment of a teapot lid and another from a small bowl featured the typical white clay band on the rim.

Agate ware features a body of ribboned red and yellow clays, covered with a clear lead glaze. This allows the mixed clay to be visible through the glaze, giving a marbled or 'agate' appearance. Initially manufactured in 1740, the ware was made through the third quarter of the 18th century. The redan assemblage included fragments of very light (mostly white clay) agate ware, as well as darker bowls decorated with white clay, manufactured after 1760. The assemblage also included the base and handle from a tankard or pitcher.

Figure 74: Examples of Agate ware.

The third ware was more common. Jackfield refers to a finely-made ware with a grey to dark red body under a shiny, almost oily, black lead glaze. The various paste colors are the product of two potteries, the Jackfield Pottery in Shropshire, founded by Maurice Thursfield and the Staffordshire potteries operated by Thomas Whieldon and others (Noel Hume 1969:123). Jackfield vessels are most often tea wares, including handled cups, tea bowls, and footed teapots. Jackfield was produced between 1740 and 1780. The redan assemblage included both red and grey-bodied examples in a range of forms. Two fragments from a footed teapot were recovered, as well as a crabstock-style handle. Several fragments from a cann or pitcher, with gently curving shoulders and rim and a flattened handle were found. A saucer with sprigged decoration in the form of grapevines was also recovered.

Figure 75: Jackfield ware.

Many stoneware tablewares were recovered from the redan. The first is known as Nottingham stoneware, characterized by a lustrous brown glaze over a white slip, on a grey stoneware body. The earliest examples were often decorated with freehand inscriptions; after the mid-18th century a range of decorations and embellishments were added to the surface, including molding, sprigging, piercings, raised cordons, and bands of rustications (www.jefpat.org; Oswald 1974). Some fragments are decorated with grog or frit, often in bands. A similar ware, with a buff paste that is soft enough to be considered an earthenware rather than stoneware, is commonly recovered on lowcountry sites. These have been catalogued consistently as "Nottingham-like," though Oswald (1974) includes these wares in a general definition of the Nottingham wares (www.jeftpat.org). Variations in glaze color and design may be attributed to a range of factories. The redan assemblage included fragments of plates or other flatware forms, but the majority were from hollow ware forms and included handles, foot rings, and

Figure 76: Nottingham stoneware.

vertical body fragments. Fragments of a heavier ware appear to be the shoulder of a tea pot.

The assemblage also included a few fragments of tankards classified as Fulham, or British brown stoneware. A number of British potters produced these wares through the 18th century. These are often characterized by a cream colored base and varying portions of the vessel glazed in brown. Tankards are the most common form, but the forms could be globular, waisted, or straight sided (www.jefpat.org).

Figure 77: White saltglazed stoneware.

Noel Hume suggests that the "most important stoneware development was the production of an entirely white ware" (Noel Hume 1969:114). The earliest ware, developed in 1715, features a white salt glaze over an off-white to grey body. The rims were usually finished with a band of brown oxide. The rim is often the key to identifying this early ware, though careful inspection of the paste can reveal non-rim fragments, as the glaze is distinct from the body in cross-section. A few fragments of slip-dipped white saltglazed stoneware were recovered from the redan assemblage, including the base of a tankard, and a fragment featuring a rolled rim.

By 1740 block-pressed molds and slip-cast vessels with a truly white paste were developed, allowing the production of intricately-shaped vessels. Elaborately-molded plate rims, in standardized patterns such as "barley," "dot-diaper-basket." and "bead and reel" were developed. The redan assemblage included a wide range of vessel forms and decorations. "The versatility and durability of white salt-glazed stoneware allowed it to quickly replace tin glazed earthenware and to serve as an affordable substitute for porcelain" (www.jefpat.org). The three common rim patterns were present in standard-sized plates and larger flatware vessels, presumably platters. Less common plate rims were present, as well, and included a molded floral pattern (popular after 1750, as noted by Noel Hume 1969:115) and Queen's shape (Noel Hume 1969:116, no 4). There were thinner, flat rims with both a straight edge and a scalloped edge.

A wide range of hollow ware forms were recovered, including saucers, canns, pitchers, and teapots. While most of these were undecorated, there were also fragments of tea pots in barley pattern and dot-diaper-basket pattern. More unusual vessels included a pierced saucer form, suggesting a colander, and an elaborately molded leaf-shaped vessel.

The most expensive vessels were "overglaze decorated by enamellers" (www.jefpat.org), and these are rare in Charleston collections. The redan assemblage produced a relatively large number of these wares. Most dramatic were fragments of a coffee pot with an elaborately executed Chinoiserie decoration, including a Chipendale bridge in red and a landscape of trees executed in black. Other vessels included saucers with simple floral motifs in red, yellow, green, and black enamel. The most unusual ceramic find was two fragments of "Littler's blue" stoneware, both shoulder fragments from a teapot. This extremely rare ceramic (only four sherds have been recovered in Charleston) was produced by mixing cobalt blue with clay and frit to produce a lustrous blue surface. Littler's blue was likely produced from 1750 to 1765 (Noel Hume 1969:119).

Figure 78: Examples of salt-glazed stoneware. Enameled (upper left), scratch blue (upper right), Litler's blue (lower left).

Another decorative technique applied to white saltglazed stoneware, and perfected around 1744, is called Scratch-blue, where incised lines were etched into the vessel surface and filled with cobalt or iron oxide (Noel Hume 1969: 117). In earlier, better made, examples the excess glazed was wiped away, leaving the etched grooves filled with blue or brown color. In a later form, called Debased, the excess cobalt was left on the vessel, resulting in a saturated, but blurry pattern outside of the incised lines. Debased scratch-blue was popular from 1765-1775. While the earlier Scratch-blue includes tableware and tea wares, chamber pots were made during the debased scratch blue period. These are often decorated with a GR medallion, for George III. The redan assemblage included saucers and teapot fragments in Scratch -blue, and a chamber pot in Debased scratch-blue, including a portion of the GR medallion.

A finely-made red stoneware was developed by the Staffordshire potters and the Elers brothers, Dutch potters, and bears their name. Elers ware is an unglazed, dry-bodied red stoneware. Teapots are the most common form, and the well-turned vessels often mimic silver forms. Red-bodied stoneware was manufactured off and on through the early-18th century, but the tea wares became common after 1763. The earlier vessels are often decorated with thin, well-made sprigged ornaments, often in rococo motifs (Noel Hume 1969:120). Wedgwood introduced engine-turning on a lathe, resulting in delicate, detailed etched lines on the vessel surface. The redan assemblage included fragments of several vessel forms and decorations. There were fragments of at least two globular-bodied teapots or pitchers, with a constricted base and elaborate engine-turned decoration. Fragments of a pouring spout and rim suggest one of these could have been a pitcher. Other fragments of engine-turned ware suggested the more common straight-sided teapots. The sprig-decorated vessels, represented by several fragments, also appear to be straight-sided teapots.

Figure 79: Elers ware engine-turned creamer; sprigged teapot. Black basalt ware finial; Burslem teapot lid.

Wedgwood and the Staffordshire potters also produced a black version of the unglazed stoneware, called "Black Basaltes." Developed at the same time as Elers ware, Black basalts continued in production through the early 19th century and was used as a mourning ware. Only a few fragments were recovered from the redan, the most notable being a teapot lid finial in the form of a spaniel. This was definitely the favorite artifact of the dig! A second unusual find was a coffee pot lid of dark reddish-brown stoneware with a dark brown saltglaze, the rim exhibiting a well-made white clay edge. Noel Hume describes a ware patented by Ralph Shaw of Burslem in 1733, " a curious ware…whose outside will be of a true chocolate colour, striped with white" (Noel Hume 1969:118). This is the first example of Shaw stoneware recovered in Charleston.

The redan assemblage included a small, but remarkably varied, collection of the refined earthenwares that dominate ceramic assemblages of the late colonial period. The most significant ceramic development of the 18th century was the gradual perfection of a thin, hard-fired cream-colored earthenware that could be dipped in a clear glaze. The ware fired at a lower temperature than stoneware, and was thus a refined earthenware. The resulting wares were durable, attractive, and relatively inexpensive, and they rapidly spread throughout the industrial world. Pioneering efforts in this direction were made by potters Thomas Astbury and Thomas Whieldon, but it was Josiah Wedgwood who ultimately perfected these wares and marketed them successfully. The original cream-bodied ware, which featured clouded or swirled underglaze designs in brown, green, yellow, gray, and purple was introduced in the 1740s. In 1759, Wedgwood produced a wholly green ware. All of these are loosely categorized as Whieldon ware by American archaeologists (Noel Hume 1969:123). Whieldon ware is a consistent, but minor component of Charleston ceramic assemblages.

Figure 80: Examples of Whieldon ware, showing variation in the type.

Whieldon-type wares were evidently a principal product of the only documented lowcountry potter, John Bartlam, who operated his pottery in nearby Cain Hoy from 1765 until his move to the Camden area in 1774 (South 2004). Efforts to identify Bartlam products in Charleston assemblages have been largely unsuccessful, as they closely copy English counterparts. The most distinctive element of Bartlam wares is the addition of an orange to pumpkin color to the palette of glaze colors.

The redan assemblage produced many examples of standard Whieldon ware patterns. There were a number of plate rims, produced in the same molds as White saltglazed stoneware, finished with a brown to green speckled and swirled glaze. Plates included Queens pattern, Barley pattern, and Bead and Reel, as well as a plain octagonal form. The assemblage also included the range of hollow wares cast in naturalistic, rustic, and rococo designs (Noel Hume 1969:124). There was a tea bowl, a teapot lid, and a service plate in the form that mimics cauliflower. There were also multiple fragments of a pineapple teapot. Several fragments of a green and yellow zoned teapot were recovered, as were numerous fragments of the green glazed ware, including teapot handles, bases, and body sherds. Whieldon ware was 1% of the redan ceramic assemblage.

In 1759 Josiah Wedgwood went into business on his own at Burslem and refined a plain cream-colored ware, which he called "Queen's ware" after giving a gift to Queen Charlotte. Wedgwood appears to have perfected the ware by 1762 (Martin 1994), though earlier examples are known. Regardless of initial manufacture date, by 1770 these wares could be found in the four corners of the colonial world, and are ubiquitous on archaeological sites of the period. The earlier creamware was often deeper in color, and many of the molds used for White saltglaze stoneware were also used for creamware. By 1770 a lighter colored creamware was produced by other Staffordshire potters. Wedgwood and others were able to produce wares that "combined lightness with strength and ….great delicacy of workmanship" (Towner 1978:21).

Figure 81: Examples of creamware; molded rims (left), sprigged designs (center), pierced, tinted, hand painted frags (right).

The relatively plain and affordable patterns dominate Charleston assemblages; occasionally the highly decorated and more expensive pieces are also recovered. The redan assemblage contained a relatively robust collection of the latter. Fragments of teapots, coffee pots, tankards, and canns with sprig-decorated handles and adornos were common in the collection. Smaller fragments of unidentified serving vessels, featuring elaborately molded designs, were also recovered. There were several small fragments of pierced decoration in various sizes and styles. Unusual forms, such as candlesticks, were also present.

Decorated creamware included several small fragments with enamel applied over the glaze, principally in orange-red. Other fragments featured a black transfer-printed design over the glaze. Two fragments, a handle and a bowl rim, featured a zone of green against the cream background. Finally, a large base and several fragments from marbled vessels were recovered. Creamware plate rims included the common rim forms of royal, queen's, and feather-edged. There were also examples of a spear pattern and a diamond or rouletted pattern. In addition to plates, there were fragments of serving bowls with a feather-edged rim.

The creamwares were augmented after 1780 with pearlwares. Throughout the 1770s, Wedgwood continued to experiment with production of a whiter ware, which in 1779 he termed "pearl white." Thus 1780 marks the beginning of the era where some British refined earthenwares feature a bluish tint to the glazing and blue pooling in the cracks and crevices. It was not Wedgwood's intention to replace the earlier creamware,

but this did occur to a certain extent, as other potteries produced the new wares in quantity (Noel Hume 1969:128).

Pearlwares come in a wide range of decorations, compared to creamware. Undecorated vessels were rare, and the undecorated fragments recovered from archaeological contexts are usually from the unadorned areas of decorated types. The earliest decorations were hand painting, often in underglaze blue and featuring chinoiserie designs. Contemporary pieces were decorated in a polychrome palette, often in delicate floral designs. These are catalogued as polychrome pearlwares. Hand-painted wares, both blue and polychrome, were most often tea wares, and the handle-less cups, saucers, cream pots, and small pitchers come in a large, but finite, number of floral and geometric designs. Shell edge pearlware is perhaps the most readily recognizable historic ceramic. The vast majority of these wares are plates and flatware in various sizes, characterized by molded feather edging finished in blue or green. A small number of all of these types was recovered from the upper zones of the redan fill.

Figure 82: Examples of pearlware. Shell-edged with overglazed painting (left); blue and polychrome hand painted, blue and green shell edged (right).

Two other decorative styles were applied to pearlware in 1795, and they dominate the early-19th century ceramics. These are also the latest ceramics recovered at the redan. Transfer or bat printing involved the creation of detailed designs in a myriad of patterns. The North Staffordshire potters, led by Josiah Spode, successfully produced this blue on white ware in 1784. This development, coupled with a significant reduction in the importation of porcelains from Canton after 1793, resulted in a large market for the new ware (Copeland 1994:7; Miller 1991). Transfer printed wares were the most expensive of the decorated earthenwares and are recovered in a wide variety of forms, including plates of all sizes, bowls of all sizes, tea cups and coffee cups, mugs and saucers. The list of service pieces is equally lengthy, including platters, tureens, and tea wares. Prior to 1830, all underglaze transfer printing was blue.

The second style, known collectively as annular wares, represents the least expensive of the early-19th century refined earthenwares (Miller 1991). These wares feature engine-turned stripes in a variety of patterns and the vessel forms are confined to bowls, tankards, and pitchers. A wide variety of decorative techniques was applied to the ware, known collectively as 'factory-made slipware' (Sussman 1997). Most of the secondary decoration was applied to bands of machine-applied slip. A wide variety of

decorative techniques (trailing, cabling, cat's eye, marbling) are classified by archaeologists as 'wormy finger-painted' or 'cabled'. Various colored slips were applied with chambered slip bottles; these held three colors of slip, dispensed through quills. The resulting decorations ranged from small circles to long chains of mixed colors. Mocha refers to the application of an acidic solution (made with tobacco, coffee, hops, stale urine, turpentine, etc.) to the band of slip. The acidic "tea" immediately spread into intricate fern-like patterns. Black mocha was the most common, though other colors were used as well. The flow, and thus the decoration, of the mocha flow could be controlled by holding the vessel and tilting it appropriately (Sussman 1997).

Figure 83: fragments of pearlware mug decorated in marbled slip and blue dendritic glaze; pearlware with maker's stamps.

Banded wares were relatively scarce in the redan assemblage. There were, however, multiple fragments of a vessel that combined several of the above decorative techniques. This mug or pitcher exhibited a blue, rust, and cream marbled surface, bordered by wide blue bands. A blue mocha decoration was applied over the marbled surface.

Finally, three pearlware vessels exhibited imprinted maker's marks on the base. A "W" is attributed to Thomas Wolfe, who operated a Staffordshire pottery from 1784 to 1800. Two others imprinted "HERCULANEUM" are associated with the pottery that operated from 1793 to 1841 (Godden 1964: 321, 681).

Colono Wares

Colono ware is an unglazed, low-fired earthenware found mainly in South Carolina, and principally in association with African-American occupation. Colono ware was produced by both Native Americans and African Americans from the 17th to early

19th century, with the height of manufacture in the 18th century (Anthony 2002; Singleton 1991:160; Cooper and Steen 1998:5-7; Joyner 1984:75). The wares exhibit attributes of all three cultures; European American, Native American, and African American. Recent research has also suggested that much of the colono ware recovered in Charleston was a marketed ware produced for sale or trade (Joseph 2004; Crane 1993).

Colono ware from Charleston sites has been classified into three broad categories, following the work of Wheaton and Garrow (1985), Anthony (1986), and Ferguson (1989). These are Yaughan, Lesesne, and River Burnished. Recent studies suggest that these types may be associated with a specific function, and possibly origin. In addition to these three sub-types, a particular paste variety, associated with Native Americans, has recently been recognized in colono ware assemblages, including those from South Adger's Wharf (Anthony 2002).

The Yaughan variety was produced from the early 18th century to the mid-19th century, and this ware is most frequently associated with African American occupation (Isenbarger 2005). The vessels exhibit a laminar paste. The surfaces are commonly smoothed, but poorly burnished, and there is a good deal of variation in the overall quality (Anthony 2002:10-11). Yaughan is the least well made of the colono ware varieties, and is coarser and less well-fired than both the River burnished and Lesesne lustered. Yaughan is interpreted as used for utilitarian purposes, associated with food preparation and cooking (Ferguson 1992:31; Anthony 1986:46; Wheaton and Garrow 1989:178).

Lesesne lustered, or Lesesne wares were produced from the late 17th century to early 19th century, and were first classified by Ron Anthony in 1986. Lesesne tends to be a medium quality ware, between River burnished and Yaughan varieties, and is commonly found on sites occupied by plantation owners (Anthony 1986:46). It is characterized by a non-laminar, fine to medium paste which commonly lacks temper. The surfaces are burnished and the vessels are well-fired. Lesesne vessels are more uniform than Yaughan, but thicker and less well fired than River Burnished (Anthony 2002:13).

River burnished is a well-fired, well-burnished colono ware that was produced from the late 18th to mid-19th century (Anthony 2002:10; Ferguson 1989:188). The paste is typically micaceous, contains fine sand, and is non-laminar. River burnished vessels are well fired, and much harder than other colono wares. The vessels are usually 3 to 7 mm. thick. Some River Burnished is decorated in red or black hand-painted designs. In recent years, excavations of Catawba sites from the late 18th and early 19th century have demonstrated that the wares identified as River burnished in Charleston are the product of Catawba potters (Riggs et al. 2006; see also Baker 1972; Anthony 2009).

Colono wares have been the subject of study for over thirty years, and attribution of these wares has evolved. Colono ware was initially attributed to Native American potters by Ivor Noel Hume and others, and called colono Indian wares (Noel Hume 1962; South 1974:181-188). By the late 1970s, the sheer volume of ware and the locations

producing the ware suggested to a number of scholars (Drucker and Anthony 1979; Ferguson 1980; Wheaton and Garrow 1983; Lewis 1978; Lees and Kimery-Lees 1979) that African Americans might be the primary producers, as well as users, of the wares. By the early 1980s, with the growing data base of plantation sites producing colono ware, researchers began to recognize variation in the paste, finish, and overall composition of colono ware, and to define varieties. Wheaton and Garrow (1983) identified two varieties, while Anthony (1986) identified four.

Researchers at The Charleston Museum and elsewhere have followed the lead of Anthony, who subsequently combined two groups to amend the divisions to three. This method has been used to describe colono wares from lowcountry plantation sites and from sites in downtown Charleston.

More recent scholarship has expanded our understanding of the sources for colono ware, the dates of manufacture and use, and the distribution of the wares. While the majority of scholars attribute the majority of colono wares to African Americans, there is increasing recognition of Native American influence and production, as historic period native sites are discovered and excavated (Brilliant 2011a). Attribution of River Burnished wares to Catawba potters of the late 18th and 19th centuries has been discussed above. River Burnished ware is recovered from late contexts in Charleston. Carl Steen, and others, have recently suggested that the Catawba tradition, in turn, rose from the production and trade of pottery among remnant coastal Indians, termed "neighbor Indians" or "settlement Indians" by the mid-18th century (Steen 2012). Many argue that colono ware is a product of creolization, the mixing of cultures (Cooper and Steen 1998; Steen 1999; Anthony 2002; Brilliant 2011b).

Traditionally associated with the 18th century, the dates of colono ware have recently been pushed forward and backward. The recovery of classic Lesesne pottery, as well as stamped Native American pottery, at the Lord Ashley site dates this variety to the mid-1670s (Agha and Phillips 2008; Agha 2012; Brilliant 2011b). The Lord Ashley site functioned as a trading post for Native people, and as a plantation worked by newly-imported Africans. Likewise, colono ware with distinctive markings was recovered in large amounts from mid- to late-19th century contexts at Dean Hall plantation in Berkeley County (Agha, Isenbarger, and Phillips 2012). Catawba pottery production, of course, initiated in the second half of the 18th century and continues to the present, though the function has shifted from functional to decorative.

Joseph's (2002) decade-by-decade analysis of proveniences from the Judicial Center site indicates that, in the city, colono ware peaked in popularity in the 1740s (29% of pottery sherds), and declines rapidly after the 1760s (7%) to a low of 2% in the 1790s and 1800s. A similar, though less dramatic, trend was noted at the Heyward-Washington house and the Beef Market. On these sites, colono wares account for 5% of the ceramics for the 1760-1830 period, suggesting steady use and discard into the early 19th century (Zierden and Reitz 2005; 2007).

Finally, Joseph and Isenbarger have suggested that at least some of the colono ware was produced for market sale and distribution (Joseph 2004; Isenbarger 2006). These scholars have argued that the better-made colono wares, particularly the Lesesne ware, were made for market distribution, likely by enslaved Africans. The dominance of these types in Charleston assemblages, and on planter assemblages, is cited as support for this theory. It was expected that the Charleston markets, such as the Beef Market and the Lower Market, might be the locus of such sales. Colono wares were remarkably scarce in the market assemblages, however (Isenbarger in Zierden and Reitz 2005). If colono ware was sold here, it was not broken and discarded in representative numbers.

The Adger's Wharf site is notable for the paucity of colono wares. A lower proportion of colono wares were noted at the Beef Market site, compared to individual residential sites throughout the city, and the general proportions for the city as a whole. Colono wares are generally more common in the first half of the 18th century. Charleston averages 22% colono ware in the 1720-1760 period. The early assemblage from the Beef Market contained only 8% colono wares. The Zone 10 assemblage from SAW (1710-1750), in contrast contained 4% colono ware. Colono wares for Zones 3-9, dating from 1785-1800, are only 2% of the ceramics; this contrasts with an average of 5% for the 17660-1830 period for Charleston in general and 4% for the Beef Market from 1730-1760 and from 1760-1796.

The colono ware assemblage from South Adger's Wharf mirrors the trends noted elsewere in the city. The majority of the wares are Yaughan or Lesesne, and the latter is slightly more common. A number of rims were recovered, and they reflect the two common vessel forms, open bowls and globular jars. Three examples of scalloped rim treatment were recovered, all on Lesesne sherds. Three handle fragments, round to slightly flattened in cross-section, were included in the assemblage. The dominance of Lesesne and Yaughan varieties is typical of 18th century Charleston assemblages. Only a few fragments identified as River Burnished were recovered. This fits with the 18th century date of deposition for the South Adger's Wharf assemblage; River Burnished is most commonly recovered in very late 18th to early 19th century deposits in Charleston.

Figure 84: Examples of colono wares. Historic Aboriginal ware (left), Lesesne (right).

The most remarkable aspect of the South Adger's Wharf discoveries was a relatively large assemblage of grit-tempered wares identified as the products of historic-period Native Americans. The wares from Tradd Street are all relatively thin and well-made, and feature a smoothed or brushed surface, somewhat roughened by the underlying temper. Almost all were fired in a reducing atmosphere and are black on the interior and exterior. Only one rim was recovered, this from an open bowl. Several large body fragments were recovered, and these also appear to be from bowls. The group included three strap handle fragments. Three sherds exhibited unusual decorations. Two were incised. Both fragments featured very fine incising, with narrow grooves and narrow bands between the grooves. They appeared to have been incised with a comb or some other manufactured item that produced very regular, parallel incisions. The third, consisting of two large fragments that mended, featured brushing and rouletting with a finely coggled item, possibly the edge of a metal thimble.

Finally, the most unusual recovery was a fragment of pottery that is likely from the Yamasee. The vessel is a brimmed plate, with red filming over the rim. Such ceramics have been identified at Altamaha (Green et al. 2002; Southerlin et al. 2000; Saunders 2000; Sweeny 2009) in Beaufort County, and elsewhere in the lowcountry. This is the first firmly-identified fragment from urban contexts.

Figure 85: Possible Yamasee red-filmed ware.

Bottle Glass

Hand-blown bottles of dark olive green glass are the most common artifact of the colonial period, and bottle glass was particularly prevalent in the redan assemblage. The large number of intact bases, in particular, reflects their durability as well as ubiquity. The overwhelming majority of all artifacts recovered from the moat fill (Zone 10) were fragments of green bottles. Many complete bases and necks were recovered, providing information on relative dating, based on stylistic elements. First produced in the mid-17th century, green wine bottles feature a prominent pontil scar on the base, or evidence of polishing the scar. The body, neck, and lip were all hand-finished. Green bottles held a variety of liquids, and were often reused, the wine bottles filled from barrels or casks.

Hand-blown bottles evolved in form and proportion, from short, squat 'onion' bottles in the 17th century, gradually taller and thinner until the bottles evolved to the proportions known today. The production of entirely hand-blown bottles continued until the body was mold blown and the neck and lip finished by hand. The great majority of green bottles found on American colonial sites are British (Noel Hume 1969). Following the evolutionary drawings shown by Noel Hume (1969:63-68), the redan assemblage included bottles produced from the earliest decades of the 18th century through the post-Revolutionary period.

Figure 86: Examples of olive green glass bottles.

The assemblage also included a large number of case bottles, those hand-blown into a mold to produce a square form. Case bottles feature a nearly flat bottom, short neck, and everted lip, but also the prominent pontil mark on the base.

The redan assemblage produced a single green bottle seal, bearing the name "Laurens." Often made for gentlemen and affixed to the shoulder of hand-blown bottles. Owner's seals are relatively rare in Charleston, but a number of examples bearing the names of prominent lowcountry residents are known. The largest collection includes a dozen sealed bottles for "G.A.Hall 1764," recovered at the Heyward-Washington house, home of Mr. Hall's brother-in-law, Thomas Heyward. Seals belonging to Charles Pinckney, framer of the U.S. constitution, have been recovered from his Snee Farm plantation and from the Miles Brewton house on lower King Street. Miles Brewton's sealed bottle was recovered from an adjoining property at 14 Legare Street. Evidently, gentlemen presented wine in their personalized bottles to friends and business relations, or took them to gatherings. The Laurens family was prominent merchants and planters of the 18th century; Henry Laurens was a wealthy and influential planter, merchant, and slave importer of the late 18th century; his son, John, was killed during the American Revolution at Combahee Bluff (Rogers 1980:48). John Laurens was co-owner of Motte's Wharf from 1739 to 1791, and is likely the source of the seal.

Figure 87: Bottle seal "Laurens."

Pharmaceutical glass

The redan assemblage included a large collection of small aqua bottles, usually associated with medicines. Those of the mid-18th century are dark aqua glass, rounded with straight sides and an everted lip on a constricted neck. Bases are typically 1 inch to 1.5 inches in diameter (Noel Hume 1969:73, no 10, dated 1730). Later in the century, the vials are longer and narrower, but they exhibit the same formal attributes (Noel Hume, no11-14, 1760-1780). A number of necks, bases, and body fragments, spanning the 18th century in style, were recovered from the redan. The upper levels (zones 2 and feature 10) yielded several broken bottles of "London Mustard." Dating from the late 18th

century, these bottles are clear and square with champfered corners, a short neck and string rim.

The assemblage also included a few unusual small bottles. First were several examples of the cello-shaped pharmaceutical bottles of the 1750s, for Robert Turlington's "Balsam of Life" elixir. A small, round base of very pale blue glass is probably what Noel Hume (1969:75) describes as a 'miniature wine bottle shape' in this color, produced in the 17th century and again in the early 18th century. Noel Hume suggests they were used for oils or vinegar. A complete pharmaceutical vial was recovered. The style is reminiscent of late-17th century forms, but the metal is clear, suggesting a mid-18th century date. The vial is triangular with an everted neck and 2.5 inches high.

Figure 88: Examples of pharmaceutical glass. Aqua hand-blown vials (upper left); London Mustard (upper right), Turlington's Basalm of Life (lower left), hand-blown vial.

Table Glass

The redan assemblage included a small, but diverse, group of table glass fragments. This included goblets, tumblers, decanters, tankards, and cruets. Glass was faceted, etched, and molded. The earliest table glass was produced in Venice or

Antwerp, but a British industry developed in the 1670s when the Glass Sellers' Company engaged chemist George Ravenscroft to develop a formula for fine clear glass. He used a lead oxide, producing a product superior to the common soda glass, and the British glass industry was flourishing by the turn of the 18th century (Bickerton 1984:3). The softer leaded glass was ideal for engraving and shaping, and throughout the 18th century table glass was produced in a range of styles and decorations.

The earliest English stemmed glassware, produced from the last quarter of the 17th century through the first quarter of the 18th century, were balusters. The conical bowl was fitted on a stem consisting of a single knop or series of knops. A second style of this period was the molded baluster, producing a stem piece with four to six sides. This type has been recovered in Charleston assemblages dating to the first quarter of the 18th century, and the redan assemblage included a 6-sided stem with large air bubble in the center.

By the second quarter of the 18th century, a trend toward lighter stems was driven by style and by the Glass Excise Act, which taxed glass by weight (Noel Hume 1969:192). Instead of building stems with individual knops of glass, the stems were produced by drawing a single knop of glass into a long, narrow stem, sometimes inserting an air bubble into the center. Drawn stems are common, and were often paired with a folded foot (Bickerton 1984:11). A single example was recovered from the redan.

Figure 89: Table glass. Drawn and faceted stems (left); air and enamel twist stems (right).

The most elegant and recognizable English glass of the 18th century are stems with an air or enamel twist decoration. Tears (or air bubbles) or rods of opaque glass were introduced into a cylinder of glass. The glass was heated, drawn out, and twisted to give a delicate and attractive pattern to the stem interior. These were produced from the 1730s through the 1770s. Several examples of both air twist and enamel twist stems were recovered from the redan.

Beginning in 1760, drawn stems were decorated by cutting into diamond or hexagonal faceting. Cutting or engraving decorations into the bowl also became popular in the late 18th century and continued into the 19th century on more expensive glass. The redan assemblage included a single faceted stem, and many fragments of cut or etched glass from the bowls of goblets, as well as from tumblers. Numerous fragments of undecorated bowl glass were also recovered; these are recognized by the overall quality of the glass, as well as by the rounded edge of rim fragments.

Several tumblers were represented in the redan collection. These hand-blown drinking glasses of the 18th century are characterized by a heavy base with a pontil scar, and sloping sides. One of the tumblers featured ribbed sides, while another featured the diamond or waffle style typical of the third quarter of the 18th century. Both types were blown into molds. Several fragments from the sides, or bodies, of tumblers were recovered, as well; these can be plain, or feature engraved or cut decoration.

The redan assemblage also included bases and necks from decanters. The single intact neck was faceted, in a style common in the late 18th century. A shoulder fragment from a cruet was also faceted. Cruet sets were popular among Charleston's wealthy citizens. These sets, for condiments and spices, usually featured a stand of silver or ceramic, and a set of small bottles or casters. The contents typically include sugar, pepper, mustard, oil, and vinegar (Emerson 1991:9).

Figure 90: Hand-blown table glass.

The redan assemblage also included a few small fragments of enamel-decorated glass, which is relatively rare on all American colonial sites (Noel Hume 1969:194). Tea caddies and other decorative glass were sometimes enameled in white, or polychrome colors. The small fragment features the colors typical of the Stiegel glasshouses in Pennsylvania and the glass houses of Bohemia and the Rhineland. All of the wares were produced in the mid 18th century. The fragment from the redan, though tiny, features a complex design in white, black, yellow, and red.

Other Kitchen Items

Several bone handles to knives or forks were recovered from the redan, all in challenging physical condition. A central iron knife blade or fork was affixed with a wooden handle. Two types are commonly recovered. First is a solid piece of bone with a drilled hole, which was placed over a pointed tang. The more common are two halves that fit to a similarly shaped portion of iron, affixed with brass pins. The latter were either straight or with a curved 'pistol grip' end. The bone was often plain, but there are many examples with carved linear grooves or cross-hatching. Handles for expensive cutlery were made from silver, porcelain, or ivory. The least expensive were wood. Bone is the only type of handle cover recovered from archaeological contexts in Charleston. The redan assemblage included two straight and three pistol-grip handles. In all cases, the iron portion was too corroded and fragmentary to determine if they were knives or forks. There were also two solid bone handle fragments, the groove for the iron tang evident in the broken cross-section.

Finally, British colonial sites occasionally contain fragments of metal cookware, particularly iron kettles. The redan assemblage included several fragments, including a large rim/body fragment.

Architectural Materials

The architectural assemblage from the redan was relatively small in both number and types of artifacts, relative to domestic sites in Charleston. Architectural materials averaged 15% to 20% of the assemblages. The most common artifact was nails or fragments of nails. The salty conditions of the waterfront site adversely affected the nails – and all of the metal from the site – so that all of the nails were too corroded to identify method of manufacture. Given the date of the site, most are presumed to be hand-wrought, though nails with machine-cut shanks, developed after 1780, could be present. The assemblage also included a number of larger nails, loosely classified as 'spikes,' likely for framing.

Nails of the 17th and most of the 18th centuries were hand-wrought. The shaft was square in cross-section and the tip might be pointed (straight) or spatulate (expanded). The heads were hand applied and hammered to various shapes. The most common was a 5-sided 'umbrella' shape, known as rose head. A flat disc hammered on opposing sides was known as T-head. Others were flat or L-headed.

The first machine-cut nails were produced about 1790. The shafts were cut from sheet iron, and were rectangular in cross-section, while the heads were still shaped by hammering. These machine-cut nails with hand-wrought heads were produced until 1815, when entirely machine-made nails were available. Machine-made nails produced until 1830 featured a waisted shaft, with diagonal corners cut in the shaft just below the head. Around 1850, round-shafted wire nails, with round heads, were developed. The earliest were small, but by the last quarter of the 19th century wire nails were available in a variety of sizes (Noel Hume 1969:253-254).

The assemblage also included window, or flat, glass typical of the 18th century. Window glass was pale aqua or green in color, hand-blown, and common through the first quarter of the 19th century. Crown glass began as a bubble of hand-blown glass, gradually worked into a disc. These then featured a thick edge, which was trimmed away and wasted, and a central pontil scar, or bulls-eye, which could be up to one inch thick. The circles of glass were known as 'crowns' and were shipped to America in crates, to be cut to size by the purchaser (Noel Hume 1969:234). The scrap from cutting panes, namely the portion with the bulls-eye or fragments with a finished edge, are often recovered on archaeological sites. Several such fragments were recovered at the redan, including two bulls-eye portions, suggesting that the waterfront may have served as a convenient location for dumping glass scraps. Generally, fragments of window glass may be scrap from pane production, breakage during the use-life of a structure, or evidence of abandonment or destruction of a structure.

The most dramatic, and varied, architectural artifacts were fragments of delft tiles. Tin-enameled tiles were used for wall skirting and fireplaces. The tin-enameled tiles originated in Holland in the 16th century and were produced to the present. Dutch potters arrived in England in 1567 and began making tin-enameled wares, including tiles. Tiles were made in most 18th century English delftware factories (Noel Hume 1969:288).

Most of the English tiles were painted in blue or manganese, with a range of corner designs. A distinctive type with a blue background color with white floral border is known as *bianco sopa bianco*, and dates to the mid-18th century. The most distinctive British tiles were produced by Sadler and Greene, with overglaze transfer printed designs in black or red. These were produced in the third quarter of the 18th century.

Figure 91: Examples of delft tiles.

The redan assemblage contained a number of tile fragments, in both blue and manganese. The rim and corner designs represented in the collection all date to the first half of the 18th century to mid-18th century. Those present included Noel Hume's types 16, 21, and 24 (Noel Hume 1969:291). A single fragment of bianco sopa bianco tile was recovered. Three fragments of Sadler and Green transfer printed tiles were also recovered, from the upper zones.

Noticeably absent from the redan assemblage, compared to other Charleston sites, were the small brass nails used for slate roofing. Only one example was recovered. The assemblage also included a lock and two hinge fragments.

Arms

Arms materials were relatively rare in the redan fill. Several round musket balls, typical of the colonial period were recovered. Most were of standard size (15mm – 17mm). One larger shot (22mm) and two smaller balls (8mm) were also in the assemblage. A small iron shot (43mm), classified as grape shot, was recovered.

All of the finished gunflints recovered were brown or honey-colored, suggesting a French origin (Noel Hume 1969:220). All were spalls, made from chert nodules, featuring a single bulb of percussion and generally rounded by secondary flaking along the opposite edge. The assemblage also included two lead flint grips. These are strips of lead, folded in half, that wrapped around the back of the flint before it was inserted into the cock grip (Noel Hume 1969:221).

In addition to finished gunflints, the redan fill contained a large amount of flint cobbles, likely dumped on the waterfront as ship ballast. Riverfront cobbles of flint and other stone are commonly found in Charleston soils, particularly in fill layers from the waterfront. There is accumulating evidence for local use of these cobbles to produce flints and other stone tools. A relatively large amount of worked flint was recovered at the Beef Market site (Zierden and Reitz 2005:72). Re-worked flint from the redan ranged from broken cobbles to re-worked secondary flakes. Many of the worked cobbles were dark grey English flint, though some brown (presumably French) cobbles showed evidence of work. Secondary flakes along the edges of these cobbles suggest that blades for gunflints were not the only tool in production.

Figure 92: Examples of worked English flint.

Clothing

The relative number of clothing items was small, compared to domestic sites in Charleston. Still, an interesting assemblage of materials was recovered. The site produced a range of shoe buckles in brass, typical of the 18th century. The rectangular shoe buckles average 2" by 3", with a central pin and likely a set of central tines. They ranged from plain to elaborately molded.

Figure 93: Clothing items; brass shoe buckles (left); silver military button, brass button with paste jewels (right).

Brass buttons typical of the 18th century were recovered. The majority were stamped brass discs with a shank or wire eye, produced in the second half of the 18th century. These ranged from small vest buttons to larger coat buttons. A few were tinned or had a thin gold plating. There were several examples of hollow-cast brass buttons typical of the earlier 18th century, some with a bone back and others with a metal back. These were all in a stage of advanced corrosion, due to the salty waterfront soil. The collection also included the more common bone disc with a single central hole. These were often produced locally, cut from a section of long bone. They were used as the foundation for a thread- or fabric-covered button, and were produced in a range of sizes.

The most elaborate button was a carved disc of mother-of-pearl, surrounding a brass setting containing a clear paste jewel inset. The back featured a brass eye. A small mother-of-pearl button with four holes was also recovered. The most unusual button was a silver-plated officer's button of the 71st Scottish Regiment of Foot. This was recovered from Zone 2, and is associated with the American Revolution.

A small, but varied, group of glass beads was recovered from the redan. Traditionally associated with the Indian trade, or with Native American sites in the colonial southeast, glass beads produced in Venice are also part of the assemblages on African American and European American sites. The bead assemblage included those found in 18th century contexts on Native American (Marcoux 2013) and Spanish colonial (Deagan 1987) sites. Most common were drawn tube beads in blue. These are commonly recovered from 18th century contexts in Charleston, though Deagan (1987:177) suggests they were made in the 17th century, as well. These are commonly 1" long, and the ends are eroded, exposing individual glass threads. The redan assemblage included two plain blue tube beads and one, slightly longer, blue bead with red and white stripes, a type associated with 17th century sites. The assemblage also included three white tube beads, 1" to 1.2" in length, with red stripes. Finally, two smaller tube beads were recovered. Both heavily patinated, they are either turquoise or green. Unlike the plain blue tube beads first described, the striped and turquoise varieties are not common in Charleston assemblages, most of which were deposited after 1720. It is likely that the striped beads are earlier than the second quarter of the 18th century, following the suggestion of Deagan (1987:177).

Figure 94: Glass beads.

There were also two small-diameter white tube beads. Marcoux associates these with the second half of the 18th century (Marcoux 2013). Other beads recovered, typical of the 18th century, included a small white tube bead and a faceted white wire-wound bead. Deagan notes (1987:177) that wire-wound beads are typical of the 18th century. The assemblage also included a barrel-shaped cornaline d'alleppo bead. These are tube beads of varying proportions, characterized by a finish of opaque red glass over a translucent green core. They are common on Spanish as well as British colonial sites, and recovered in contexts dating from the late 17th through the 18th centuries.

Finally, three unusual beads were recovered from the redan. First is a large spherical wire-wound bead, of clear glass. The bead measured 2cm in diameter. Second was a large oval wire-wound bead of translucent white glass. The bead was fragmentary, but large enough to determine that it was oval or barrel-shaped. The bead was 23mm long and of undetermined width. Finally, a fragment of eroded glass appears to be a chevron bead, composed of layers of white, red, white, and blue glass. Chevron beads are usually

associated with the 17th century, but those of the 18th century, like the one recovered from the redan, have four layers of glass (Deagan 1987:165, 174). To summarize, the beads recovered from the redan are typical of the late-17th and 18th centuries, and reflect the long date of occupation and deposition at the waterfront.

The clothing group traditionally includes items used to make or mend clothing, such as pins, needles, sewing scissors, and lace bobbins. Two such items were included in the redan assemblage. A handle portion of brass scissors was recovered. These were relatively large and heavy, and may have served multiple functions. Two portions of bone containers, threaded for a lid, were likely from pin or needle cases.

Personal Items

This group included a diverse group of artifacts, united under the functional concept that they would be an individual's possessions, in possession of the individual, or used for personal maintenance. This concept unites a small, but diverse, group of artifacts, related to personal hygiene, personal fashion, or simply items found in pockets.

Coins are the most commonly recovered item in the personal category. Almost all are small denomination, and must have been lost. As is usually the case, the majority of the copper half-penny sized coins were badly eroded, and impossible to identify; six such coins were recovered from the redan fill. Two George III halfpennies were recovered. These are common in late-18th century deposits; George II reigned from 1760 to 1820.

The redan fill contained earlier, less common coins as well. There were three showing George II, who reigned from 1727 to 1760. These are distinguished from the later English halfpennies, as the bust of the king faces to the left. One of the George II coins is Irish. The earliest coin is a William III halfpenny; again, the date is illegible, but William's short reign (1694-1702) dates the coin to the turn of the 18th century. The upper levels of fill and construction trenches also contained some later coins. Included in this group are a 1915 wheat penny and a 1906 dime.

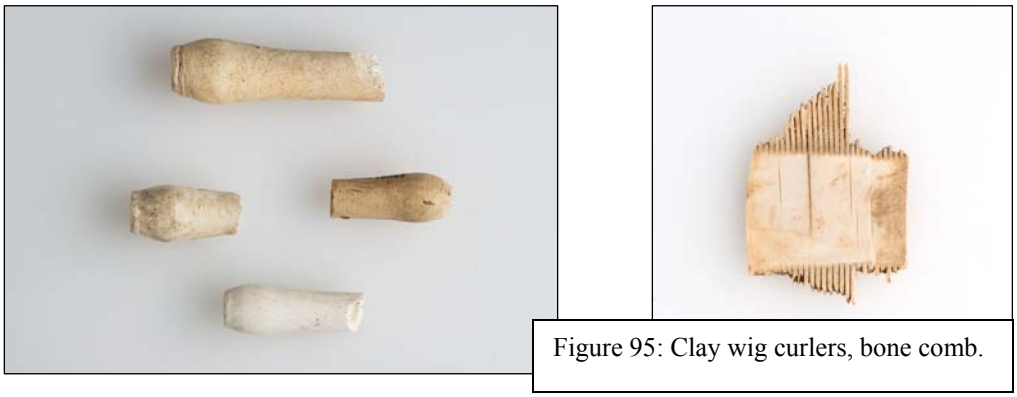


Figure 95: Clay wig curlers, bone comb.

The site produced four kaolin wig curlers, an artifact relatively rare in Charleston. These distinctive artifacts, much like hair rollers of the 20th century, were used to curl the hair on wigs, worn predominantly by English men. Wig curlers may have been used in the colonial home, as well as the barbers' and wigmakers' shops (Noel Hume 1969:321).

They are usually made of white pipe clay and are 2.5 to 3 inches long, with a narrowed center. The relative paucity of wig curlers in Charleston may relate to the warm climate, and associated reticence in wearing the hot, heavy wigs. The Charleston sites that have produced wig curlers all have early-18th century contexts, and most of them are public sites; they are much less common on sites of the late-18th century.

Far more personal than the wig curlers are bone combs, used for the head, the beard, and for the removal of body lice. They were cut from flat sections of bone, or other material, and were double sided. Two fragmentary combs were recovered at the redan.

Jewelry is classified as a personal possession, and is recovered only rarely. Jewelry items were particularly rare at the redan site. A small brass ring may be a finger ring, though it may have had another function. A large paste stone of purple glass was recovered. This was rectangular, flattened on the bottom with a faceted top. Artificial stones of glass or paste were popular in the second half of the 18th century and into the early-19th century (Fales 1995). These were often set into buttons, cuff links, and shoe buckles, but could also be found in gold and silver jewelry. A small rectangle of polished clear glass may also be a jewelry setting.

Women's fashion items were present in limited numbers. There were three brass ribs from parasols. These distinctive items are a flat strip of brass, of varying length, forked at both ends. The forked ends are pierced to hold a small brass pin, which affixes the rib to a central slide. Sometimes the ribs are twisted or decorated in some manner. These are consistently recovered on Charleston sites. The site also produced a fragment of a fan slat, made of highly polished bone.

Furniture

Furniture items were scarce at the redan, and the group included a few pieces of furniture hardware. Drawer pulls were the most common. Two bale handles with bulbous center section are typical of the Chippendale style, manufactured in the third quarter of the 18th century; a portion of the accompanying plate was also recovered. A third bale handle with balusters and central knop is an earlier style, dating to the second quarter of the 18th century. A small loop handle and its post were also recovered. The bowl from a brass candlestick of the 18th century was also recovered, a rare find in Charleston.

Figure 96: Brass candlestick, collar buckle.

Tobacco Pipes

Clay pipes for smoking have been relatively rare in Charleston assemblages. This is particularly so when Charleston is compared to sites in other colonies, notably the tobacco-producing Virginian and Maryland, but also the North Carolina sites used to develop Stanley South's Carolina Artifact Pattern (South 1977). Generally, pipes are relatively more abundant in early-18th century assemblages, but average far fewer in late-18th century and 19th century proveniences. The exception to this was the Beef Market, where pipes averaged 13 -16% of the assemblages throughout the 18th century. Most of these examples were fragmentary, though, and not useful for detailed analysis.

The redan assemblage contained a large number of pipes, with many intact bowls that could be dated to a general period. Following the example of Bradley (2000), Hamby and Joseph have described the general evolution of kaolin pipe forms (2004:144). The bowls of 17th century pipes were generally bulbous and stubby, and sloped away from the stem at an obtuse angle. Some pipes of this period used a foot or heel on the base of the bowl that allowed it to sit upright. There was little decoration, other than a rouletted rim on the bowl. Maker's marks can be found on the side or back of the bowl, and occasionally on the heel. Eighteenth century pipes were more upright in relation to the stem, and the rim of the bowl became parallel with the stem. The heel was reduced in size, and known instead as a spur. The rouletted rim gave way to greater decoration, including fluting, leaves, and more elaborate molded decorations by the early 19th century.

Figure 97: Tobacco pipes from South Adger's Wharf.

Noel Hume, based on the work of Adrian Oswald, provides a general guide to bowl form (Noel Hume 1969:303). Eric Ayto (1979) provides a similar profile chart; these were used to determine general dates for the samples from South Adger's Wharf. The earliest retrieved from the redan feature a slightly bulbous body and flat heel, and an angled rim. The bowl is much larger than the 17th century pipes, and so these types are dated to 1660 to1680 by Ayto and 1650 to 1680 by Noel Hume. Those with the long, narrow bowls at an obtuse angle to the stem, with flat heel, were more common; this style dates 1680 to 1710. By the early 18th century, the long, narrow bowl was more upright and the rim was parallel to the stem. Some of these exhibited heels, while others did not. This style is generally dated 1700 to 1770 (Noel Hume 1969:303; Ayto 1979:cover). Those with a spur, rather than heel, were manufactured in the first half of the 18th century. None of the elaborately molded pipes of the very late 18th to 19th century were recovered at the redan.

Some of the recovered examples exhibited maker's stamps. A side cartouche featured the initials "I C", while another featured an "R" in an armorial. There were two examples of stamped bowls in "F R", while an elaborately molded stem featured "N E [illeg.]." All of the marks are associated with the first half of the 18th century. The latest mark is a "T D" bowl from the first decade of the 19th century. One pipe with an obliterated cartouche on the side and the initials "E R," and another with the initials alone, on the back of the bowl may be the product of Edward Reed, dated about 1740 at the Heyward-Washington House (Herold 1992:129). "R T" may be the product of Bristol pipemakers Robert Tippett II and III in the early-18th century. Herold also recovered a pipe with the "I C" cartouche on a bowl style dated 1740-1772 (Herold 1992:131).

Activities-related Artifacts

This is a diverse group of artifacts, reflecting a range of activities that may occur on a site of habitation, outside of the basic functions of food, shelter, and furnishings. They range from commercial to military activities, construction and storage events. As developed by Stanley South, on-site activities may also be reflected in a higher than normal presence of artifacts in other groups, such as a plethora of straight pins reflecting a tailor shop (South 1977:102).

Several unusual artifacts were recovered from the redan, as might be expected from waterfront fill in the center of the commercial district. Three pieces of type reflect printing activities. There were also three weights from a small scale. The weights were identical, except for varying sizes, suggesting they may come from the same scale set.

Three lead seals from fabric indicate commercial trade. Lead seals were attached to bales of cloth. Their exact function is not known; some were applied after a check on the quality, while others were attached to show that excise tax had been paid (Egan 1978; see also Adams 1989). They usually consist of two discs of lead connected by a strip, that are pressed together to form a loop. Some are elaborately stamped, with place of origin, heraldic devices, and scratched numerals. A large seal, from the late-18th century deposits, exhibits all three, which provide details on the source of the seal and its associated product. The stamp reads "RICHARD 7 IOHN MILNES 7 Co WAKEFIELD." Geoff Egan suggests it was put on a traded West-Yorkshire woolen cloth from that town. The seal bears the arms of the Milnes family. Wakefield was a market town and woolen manufacturing center through

Figure 98: Lead cloth seals.

the 17th and 18th centuries. A John Milnes was active from the 1760s through the 1790s (Universal British Directory; Yorkshire Archaeological Society Archives; Geoff Egan, personal communication 2010). A second seal, somewhat smaller, was a Dutch merchant's seal, reading "WOLLE DEEKEN GEMAAKT BINNEN LEYDEN." The impressed front has a heraldic device consisting of crossed flags in a chevron border.

The most unusual activities artifact was a piece of kiln furniture, a triangular sager, of creamware. It is likely that this came over in ballast, rather than reflect any on-site activity.

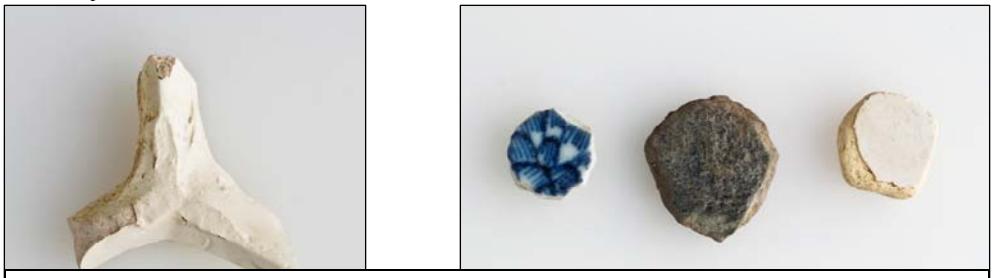


Figure 99: Kiln furniture, game discs from Chinese porcelain, colono ware, delft.

Toys and games are also grouped under Activities; these are most often associated with the presence of children, but this is not necessarily so. The most common toy of the 18th century is the marble. The majority were simple brown or grey clay marbles, often locally made. Stone marbles were first made in the 17th century, but agate marbles weren't developed until the late 19th century (Barrett 1994:15). Glass marbles decorated on the interior with swirled latticinio canes were developed in the mid-19th century, and were instantly popular. Glass marbles of various types dominated the 20th century market. The redan deposits included four clay marbles, two stone marbles, a cane-cut glass marble, and two 20th century glass marbles.

While marbles are associated with children's games, the attribution of flat ceramic discs are not so clear. Pottery sherds re-shaped into round discs of various sizes are often recovered. These are presumed to be markers for games such as checkers, games often enjoyed by adults. The redan assemblage included a disc of undecorated delft, a small disc of blue-on-white Chinese porcelain, and a somewhat larger disc of slate.

A commonly recovered artifact was portions of iron straps from barrels or casks of various sizes, the standard storage and shipping container of the colonial period. Made of thin metal, these are often rusted and fragmentary, and it is therefore not possible to determine the diameter or size of the container.

For lack of a better solution, unidentified scraps of brass and lead are counted in the Activities group. These are placed here under the presumption that they are by-products of a range of activities, such as lead shot production. Several such fragments were recovered at the redan.

Ecofacts

As a landscape that began as open beach or marsh, was then altered to serve as a protective zone against waterfront fortifications and, later, waterfront wharves and docks, followed by high land that served as a central market, the soil contains numerous organic remains that inform on this evolution. While some are studied and quantified separately, namely the vertebrate faunal assemblage, many of these items were not. Still, a representative sample of these ecofacts was retained, to expand discussion of the landscape.

As would be expected from the waterfront, a large number of shells were in the fill. These include bivalves such the oyster (*Crassostrea virginicus*) and, to a lesser extent, the clam (*Mercenaria mercenaria*). A surprisingly common find was the knobbed whelk. While these might be part of the natural marsh deposits, they are still part of lowcountry cooking. A cowrie was a more unusual find, and may have come from a Caribbean port. Many fragments of branch coral were also recovered.

The waterlogged deposits of Zone 10 included some organic remains. Most common were peach pits, followed by peanut shells. These are the most durable plant remains on historic sites. Pine bark (Pinus spp.) and marsh grass (*Spartina alterniflora*) were also present.

Perhaps the most interesting ecofact was, in fact, artifacts. Several fragments of water-worn pottery were recovered from the site. While some of the fragments were from late-18th century deposits, all of the eroded types were early 18th century, or even late-17th century, ceramic types, suggesting they were deposited at the time of open water along the sea wall.

Figure 100: water-washed pottery from zone 10.

The Zone 10 Assemblage

While all of the artifacts from the entire project were grouped for the above descriptions, the various proveniences were dated on the basis of Terminus Post Quem and stratigraphy, and separate analytical units were considered and compared. All of the materials from the top of the ground to the demolition of the redan, defined as Feature 12, were deposited between 1780 and 1800. All of this material is fill, or direct deposition, in front of the brick sea wall, most associated with activities at the Lower Market. Zone 10 was a different event, in terms of physical description, date of deposition, and artifact content. The characteristics of this distinct deposit will be described briefly before considering the quantitative analysis.

Zone 10 appears to be original land, the pluff mud of the intertidal zone, in front of the brick seawall. The deepest levels of Zone 10 appear to be associated with construction of the wall, particularly the brick laid below the water table. This is based on the physical characteristics of the soil, as well as the vertical relationship between the palisade posts, the top of the soil, and the brick foundation. The presence of mid-18th century artifacts in the upper levels of Zone 10 suggests that the mudflat continued to accumulate casual refuse through the first half of the 18th century. This was 'capped' with demolition of the parapet and filling of the areas around the redan and market.

Figure 101: Artifact assemblage from a Zone 10 provenience. Note the quantity of green bottle glass.

If casual disposal was the method of site formation, then the most commonly disposed artifact was the wine bottle. Olive green bottle glass dominated the Zone 10 assemblage, comprising 83% of the kitchen group and 75% of the total assemblage. Ceramics were far fewer, and included types typical of the early-18th century. The lowest levels included delft galley pots and serving vessels, as well as a small amount of porcelain. Staffordshire slipware was the most common ceramic recovered, and included early-style bat molded vessels. Other utilitarian wares included Buckley earthenware and lead-glazed redwares. Utilitarian stonewares, particularly brown saltglazed stoneware and Westerwald stoneware were also a significant component of the assemblage. The wares typical of the late 17th and very early 18th century were less common – North Devon gravel tempered ware, Sgraffito slipware, Manganese mottled ware and Slip coated ware. The relatively small collection of colono wares included those associated with Native American potters.

Figure 102: Ceramics from zone 10; lead-glazed earthenware.

The upper layers were distinguished by inclusion of ceramics typical of the mid-18th century. Creamware (developed in 1760), Whieldon ware (developed in 1740) and particularly White saltglazed stoneware (developed in 1740) were present in significant amounts in the upper levels. While this may reflect a continuation of casual refuse disposal, it may also reflect construction of the market and increased traffic and activity in this area.

Architectural artifacts were relatively scarce in Zone 10, comprising only 7% of the assemblage. Nails and window glass were the only materials retrieved. There were only three clothing items, and no furniture or personal items. Activities materials were also scarce, and included only fragments of barrel straps and scrap metal. Tobacco pipes were more numerous, comprising 3.5% of the assemblage.

The Zone 10 assemblage, then, exhibits both functional and temporal differences from the deposits above. The artifacts in Zone 10 are likely the result of casual discard and loss in an otherwise unoccupied area. A modern example would be a vacant lot that accumulates discarded fast food refuse from passers-by. The lack of architectural debris reflects a lack of construction on the site during this time, in contrast to the larger amount after the wharves, market, and waterfront storehouses are constructed. Finally, like other commercial or public sites that are not residential, household and personal artifacts (arms, clothing, furniture, personal possessions) are virtually absent. These proportions will be explored further in subsequent chapters.

Organic Materials

Only a few wood and leather objects were retrieved from the waterlogged Zone 10 deposits. These were conserved gratis by the Clemson Conservation Center. A detailed conservation report is on file at The Charleston Museum.

Most notable was a complete man's shoe, retrieved from unprovenienced deposits in 2008. The shoe style was typical of the mid-18th century. The ankle-high shoe included a tongue and closed with lacing or a buckle. The shoe was complete, but flattened and very fragile. Each fragment was conserved separately.

Two wooden artifacts were recovered and conserved. Both were fragments of wood, likely portions of handles. One was a larger pole, narrowed on one end to be fitted to a tool. The second was a small, straight utensil handle, featuring a small hole for a nail or screw.

Figure 102a: Leather shoe from Zone 10.

Table 5: Artifact Assemblage from deposits associated with Redan Demolition

	Z.3/f.1	Z3a	Z3b-c	Z.2sand	Z.9	F.12	total
Ceramics							
Porcelain, Chinese b/w	61	177	104	20	421	21	**804**
Porcelain, overglazed	17	25	23	3	55	6	**129**
Porcelain, British		6	2		1		**9**
Brown saltglaze stoneware	72	51	23	32	206	12	**396**
Westerwald stoneware	20	44	20	6	49	4	**143**
Grey saltglazed stoneware	29	16	23	3	51	2	**124**
Nottingham stoneware	15	15	3	1	25		**59**
British brown stoneware	1	1	1		3	1	**7**
Slip-dipped white stoneware	3		1	1	7		**12**
White saltglaze stoneware	101	176	102	23	473	33	**908**
Scratch blue stoneware	4	21	4		15	2	**46**
Elers ware	4	6		2	15	2	**29**
Black basalts		1			3		**4**
Stoneware bottle	5	1	2		5	1	**14**
North Devon gravel tempered ware	5	1	3		11	1	**21**
North Devon sgraffito		1	1		2		**4**
Manganese mottled ware	4	7	4		14		**29**
Slip coated ware	2				11		**13**
Combed and trailed slipware	133	318	155	29	857	66	**1558**
Buckley ware	11	17	2		27	8	**65**
Lead-glazed coarse earthenware	41	70	33	6	237	22	**409**
Unglazed earthenware	3		3				**6**
French green glazed coarse earth.	6	1	2	2	8	1	**20**
Saintonge earthenware	1				6		**7**
Olive jar	3	6	11	2	20	1	**43**
El Morro ware					1		**1**
American slipware	13	33	13	2	60	6	**127**
Mid-Atlantic earthenware	1	1	3		15	1	**21**
Unglazed slipped earthenware			5		16	2	**23**
Delft, undecorated	42	59	67	12	218	12	**410**
Delft, decorated	87	180	58	9	246	17	**597**
Faience	2	2	6		2		**12**
Astbury	2	2			4	1	**9**
Agate ware	1	6	2		13		**22**
Jackfield	4	33	8	1	61	1	**108**
Whieldon ware	4	18	15	1	50	4	**92**
Creamware	392	442	441	144	749	68	**2236**
Pearlware	377	85	37	112		3	**614**
Colono wares	24	57	30	1	63	12	**187**
Olive green bottle glass, body	2555	708	525	601	3475	885	**8749**
Base	35	17	20	5	96	23	**196**
Neck	33	12	11	4	132	24	**216**
Aqua pharmaceutical glass	56	48	25	11	76	2	**218**
London mustard bottle	65		4				**69**
Clear container glass	119	55	10	25	116	4	**329**

Table glass	45	28	13	2	33	6	**127**
Blue table glass					2		**2**
Cutlery	2						**2**
Iron cookware					1		**1**
Nail, unidentified	232	339	180	56	1060	174	**2041**
Nail fragment	336	245	157	119	722	39	**1618**
Aqua flat glass	502	193	119	31	600	59	**1504**
Delft tile	4	3			15		**22**
Spike	56	1	3			3	**63**
Lock	1						**1**
Hinge	2						**2**
Brass nail			1				**1**
Arms							
Flint							
Shot		1					**1**
Folded lead		1					**1**
Clothing							
Brass button	3	1	2				**6**
Bone button	1	1					**2**
Bead					4		**4**
Scissor	1						**1**
Buckle		1		1			**2**
Personal							
Slate pencil	1						**1**
Coin		1					**1**
Furniture							
Hinge/hardware			2				**2**
Drawer pull	1		1		1		**3**
Finial	1						**1**
Pipes							
Pipestem	176	242	101	18	866	109	**1512**
Pipe bowl	13	40	15	4	140	16	**228**
Activities							
Scrap iron		3	10	4	36	45	**98**
Scrap lead					16		**16**
Barrel strap fragment	27	1	7	9		8	**52**
Clay marble	3	1			1	1	**6**
Iron hook	1	1					**2**
Staple	2						**2**
Water-worn frags	4				2		**6**

Table 6: Artifact Assemblage from Zone 10

Kitchen - Ceramics		
	Porcelain, b/w	54
	Porcelain, overglaze	3
	Brown sg stoneware	36
	Westerwald stoneware	22
	Nottingham stoneware	25
	Slip-dipped stoneware	1
	White sg stoneware	83
	British brown/Fulham	1
	Scratch blue stoneware	11
	North Devon gravel-tempered ware	6
	Sgraffito slipware	1
	Manganese mottled ware	3
	Slip coated ware	1
	Combed and trailed slipware, flat	180
	Hollow ware	12
	Buckley earthenware	23
	Lead-glazed earthenware	26
	French green-glaze coarse earthenware	9
	Olive Jar	2
	Delft, undecorated	23
	Blue on white	65
	Polychrome	3
	Colono ware	27
	American slipware	2
	Agate ware	3
	Jackfield ware	5
	Whieldon ware	9
	Creamware	19
Kitchen - glass		
	Olive green glass	2992
	Olive green bottle base	164
	Olive green bottle neck	117
	Aqua pharmaceutical glass	77
	Table glass	8
	Clear container glass	17
Architecture		
	Nail fragment	23
	Nail, unidentified	97
	Delft tile	1
	Aqua flat glass	194
Arms		
	Lead shot	2
Clothing		
	Buckle	1
	Button, brass	2

Tobacco	
Pipestem	119
Pipe bowl	41
Activities	
Ud metal	9
Barrel strap	1
Tool handle	1

Chapter V
Architecture of the Walled City

Charleston, South Carolina is unique among the 17th century British towns of North America insofar as a line of fortifications designed to accommodate and resist artillery surrounded it during its formative years. Located at the southern edge of English influence along the Atlantic coast, this town was vulnerable to attack by sea and land, from Spanish and French forces and hostile Indians. During the first half of the 18th century, Charleston evolved from a densely populated "medieval" town encircled by walls to a larger, more secure urban center with strategically placed fortifications. By the late 18th century, the last remains of the fortifications had been sold out of public ownership, demolished to ground level, and built over. At this point they disappeared from the urban landscape. Several historical and archaeological investigations throughout the 20th century focused on locating the wall and defining the architecture and construction methods for various sections of the fortifications. Historians have examined documents relating to the planning, construction, maintenance, and abandonment of the fortifications. Archaeologists have identified and described the wall in only a few locations.

The initial settlement (1670-1680) of the Carolina colony was located approximately five miles west of present-day Charleston. "Charles Towne upon the Ashley" was fortified with two wooden palisade lines above ditches approximately three to five feet in width, each running across the neck of the point. Along the creek front, the fortification line was armed with twelve pieces of artillery, while "the V-shape of the ditch would provide for an enfilading crossfire against anyone attempting an aggressive landing on the tip of the peninsula" (South 2002:77). The fortified ten acres could provide a safe haven for the settlers in event of an attack (South 2002:6; Saunders 2002:199). Fortifications like those at Albemarle Point are found on other 17th century colonial sites, and suggest the need for quick and effective defensive measures.

The second and more permanent location for what would become the city of Charleston was located at the confluence of the Ashley and Cooper rivers. The peninsula could be easily defended, and the Cooper River provided a good harbor. In 1671 the Lords Proprietors of Carolina delivered the "Grand Modell", a plan for the new town that dictated dimensions for streets and lots (Figure 7). Surveyor John Culpepper was directed by the governor to "admeasure and lay out for a town on Oyster Point" (McCrady 1897:163). After considering other locations, this was made official in 1679, with the instructions that "Oyster Point is the place we do appoint for the port town of which you are to take notice and call Charles Town" (McCrady 1897:182).

Sound urban planning for the port city was encouraged by the Lords Proprietors, the eight English noblemen to whom the province of Carolina had been granted in 1663 by King Charles II. Proprietor Anthony Ashley Cooper was especially insistent in this regard, urging that care be taken to "lay out the Streets broad and in straight lines," and

that town lots be evenly apportioned (Bates and Leland 2007:23). Placing the Grand Modell on the actual lowcountry landscape was a challenge. The surveyor-general, Maurice Matthews fit the plan to the creeks and low-lying areas of the peninsula, focusing the town on an area of high ground between Vanderhorst's Creek and Daniel's Creek, on a deep and navigable stretch of the Cooper River. By May 1680 the four principal streets had been laid out and space reserved for public structures (Saunders 2002:201).

Limited amount of space along the riverfront coupled with a growing population contributed to an increasingly dense urban environment. In 1680, the town's population was estimated at 1,000. Two years later that figure had more than doubled and there were about one hundred houses in town (Waddell 2003:40). Long narrow lots predominated and most residences were attached multi-story row houses with common walls. By the mid-1680s, much of the high ground had been laid out in a "grand modell" by warrants, certificates and grants. Even though roughly 300 acres of land would be laid out in lots by 1698, only about 150 acres would be intensively developed in the next several decades (Bates and Leland 2007; Waddell 2003:39). Only 62 acres would be within the walled city.

Charleston's earliest defensive works, as seen on the Boyd map of 1686, were built along a low bluff facing the mudflats of the Cooper River (Figure 8). At its eastern edge, parallel to the river, early settlers laid out a "wharf" or landing that became modern East Bay Street. Between 1680 and 1686, an earthen entrenchment was built along the front of this landing, stretching approximately one thousand feet southward from Broad Street. This earthen barrier, which formed a curtain line between two small wooden forts, was probably designed to both protect the landing from tidal surges and to screen defenders during an attack (Leland and Resinger 2006; Salley 1908:34; Butler 2008).

This front line of defense, strengthened in the 1690s because of erosion, had to suffice until a plan to provide for a continuous defensive trace could be developed. In 1694 the South Carolina General Assembly ratified the first of many statutes authorizing the construction of a brick "wharf wall" or "curtain line" along the eastern edge of the town. Construction commenced in 1696, and continued for more than a decade, requiring several million bricks. Also in 1696, the legislature commissioned a brick "fortress" to replace the old timber one at the southeast corner of the town, later christened Granville's Bastion. In 1699 a brick "half-moon" was also begun at the eastern end of Broad Street to replace an earlier fort on that site (Acts of the Assembly, SCDAH:147; McCord, Statutes 1840:28-33). A law passed in 1700 required persons holding lots "on the Bay of Charles Town" to build a brick wall before their land and to keep it in repair at their own cost (Joseph et al. 2000:4; Lipscomb and Olsberg 1977:53)

These first steps toward constructing a walled city were based upon the prevailing European fortification design principles of the day. Charles Town's fortifications particularly reflected the influence of Sebastien Le Prestre de Vauban, the 17th century master of fortification and siege warfare. Vauban's plans were based on the principal that "if you were on flat ground, you did not bring in material to make a wall, but dug a ditch and built the wall with the dug earth. Thus, "in one action you doubled the height

and strength of your defense" (Lapham 1970 in Hamby and Joseph). The relatively low, wide proportions of the brick seawall, and the placement of the longest side of the fortification along the water, were also reflective of Vauban's principals.

At the turn of the 18th century, Charles Town's future was anything but secure. Even though the arrival of new settlers contributed to an "upsurge in the acquisition of lots" this was tempered by a more or less transient population, sluggish economic growth, devastating fires, hurricanes and serious epidemics. All of this, along with the continual threats of an invasion by Spanish forces in St. Augustine and rumors of "the ffrench's Designe upon this place" (letters- 101 – Blake to proprietors) meant that Charles Town was "on the cusp, or that point on the arc of its development where future movement might equally well be up or down" (Weir 2002:66).

Queen Anne's declaration of war on France and Spain in 1702 combined with a somewhat botched siege of Spanish St. Augustine by Carolina's Governor Moore that same year, added a sense of urgency as the citizens and Proprietors pushed ahead, continuing to draw town lots and formalizing a plan to encircle the town in fortifications. Newly-arrived proprietary Governor Nathaniel Johnson advocated this plan, and was approved by the colonial legislature in 1703 in an act that spoke to the repair of existing fortifications and the building of new works. The act sought to enclose the entire town with a system of entrenchments, flankers, parapets, sally ports, a gate, drawbridges, and blinds. In addition to the existing "fortress" and "half-moon," the new works included more bastions, a ravelin with two drawbridges guarding the town gate, and eight redans or salient angles. A broad earthen wall with wooden platforms for cannon connected all of these features and the entire *enceinte* (enclosed settlement) was surrounded by a moat and palisade fence.

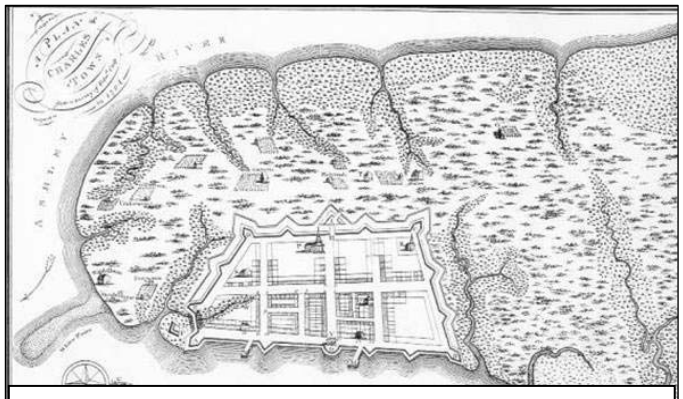


Figure 103: Fortifications depicted on the Crisp map.

These fortifications can be seen on the Crisp Map. This map, while published in 1711, reflects a survey conducted in 1704. It shows a completely walled city, although the designed works were not completely finished by the time of the survey. It also shows the principal streets, the creeks to the north and south of the fortification and the drawbridge system, which was the only land side entrance to the town. Today, this is the location of the Old Charleston County Courthouse at the intersection of Broad and Meeting Streets. The drawbridges, within an outwork named Johnson's Ravelin, allowed goods and people to enter and exit the town from the well-worn Native American path that would eventually become King Street, the principal highway leading to Charleston from the interior of the province. The Crisp Map shows a few scattered properties along present-day King Street but only minimal development along the western edge of town. At this time, development trends still favored the Cooper

River waterfront. Clearly, though, the town anticipated growing beyond the first land side walls. Similar features, with some variation, are shown on the Herbert map of 1721.

Because of a lack of documentation as to their materials and construction, and references for frequent repair, it seems clear that the inland walls were not built of brick. An act from 1704 "to prevent the breaking down and defacing of the Fortifications" stated that " some inconsiderate or evil disposed persons…do presume to climb and get over the said intrenchments (sic) and other works, and so break them down." Fines or public whipping were the punishments intended to "prevent such mischiefs for the future" (Statutes at large Act #230, Vol 7, p.36). Interpretation of the walls as earth is also derived from references to damage caused by cattle grazing on the wall. A 1707 statute outlawed the free range of cattle in the city because they had "damnified" the fortifications (Statutes At Large Act 272, Volume 7 p.48). Because of inferences such as these, and the expectation by the settlers that the town would expand, scholars have proposed that the walls were likely constructed of earth reinforced with wood. Excavation of an entrenchment could provide soil for fortification, piled atop a wooden frame. A parapet of wood likely crowned the ramparts, and solid wood flooring would have been employed in the corner bastions and redans, where heavy guns were placed.

In 1970, architect Samuel Lapham provided this interpretation of the construction of the landward walls:

"The earth wall was probably faced with small saplings tied to logs running through the walls at 10 foot intervals like skewers, and the bottom of the ditch corduroyed with heavier logs to prevent washing away of the walls into the ditch….A wet ditch is a greater deterrent than a dry one and with the walls and ditch completed along the western edge of the town, my opinion is that the builders cut into the headwaters of two creeks and flooded the construction, thus giving a water barrier at high tide along the entire western wall with, possibly, flood gates holding some of the water at all times" (Lapham 1970 in Hamby and Joseph 2004:230).

Following the principals of Vauban, Lapham suggests that "you could make a seven-foot deep ditch at the foot of a seven-foot high wall. The ditch had to be an obstacle, not something one could jump over. It was probably ten feet wide with sloping sides, giving a width of thirteen feet from edge with a ten foot high wall, six feet thick with a raised platform on the inner face for defenders to stand on." (Lapham 1970 in Hamby and Joseph 2004:230).

Wooden elements were also employed in the construction of the ravelin and drawbridge at the land-side entrance to the town. The destructive hurricanes of 1723 and 1728, and the widespread pilfering of earth and other building materials quietly erased the 1703 entrenchments on the back part of the town by the early 1730s.

The fortifications fronting the Cooper River were more substantial. They were repaired periodically and remained intact throughout the Revolution. Between 1696 and about 1708, English masons and African slaves laid approximately seven million bricks along the east side of East Bay Street (approximately 1,500 bricks per linear foot),

creating a solid defensive line from Granville's Bastion to Craven's Bastion. This wall was repaired and strengthened several times in the following decades, and probably attained a height of 6 feet above the street level, or the level of the Cooper River at high tide (Butler 2008).

Included in the design for this curtain wall were three redans, or salient angles projecting from the curtain line into the Cooper River. These were located at the ends of Lodge Alley, Unity Alley, and Tradd Street. The redans included embrasures, or splayed cannon openings, in the upper part of the wall, and were designed to provide additional "lines of fire" in case of an attack from the water. Based on the 1739 illustration, each redan was armed with five to seven cannon.

The South Carolina Legislature waited until March 1784 to authorize the demolition of the city's urban fortifications. In the months and years following, the brickwork was demolished to ground level, the land subdivided, sold, and built over.

A portion of Granville's Bastion was uncovered in 1925; the Half-Moon Battery uncovered in 1965. Both were places of civic importance where proclamations were read and foreign emissaries greeted. These were massive brickworks, extending ten to twelve feet below the current street grade. Rising to a height of six to eight feet above grade, these low thick sloping walls were designed to withstand a heavy artillery assault. They were also visually intimidating, symbolic of the permanence and power of this upstart English colony. It was, perhaps, the strong visual of this front line from the harbor that helped to scuttle at least one invasion attempt by the French and Spanish in 1706.
The earliest view of these brick fortifications and the early buildings along the waterfront is a painting of 1739 by Bishop Roberts, later engraved and entitled "An Exact Prospect of Charles-Town, the Metropolis of the Province of South Carolina." This view underscores the importance of the city's fortifications as the masonry wharf wall, imposing bastions and redans are prominent while none of the wharves that jutted out from that wall are shown.

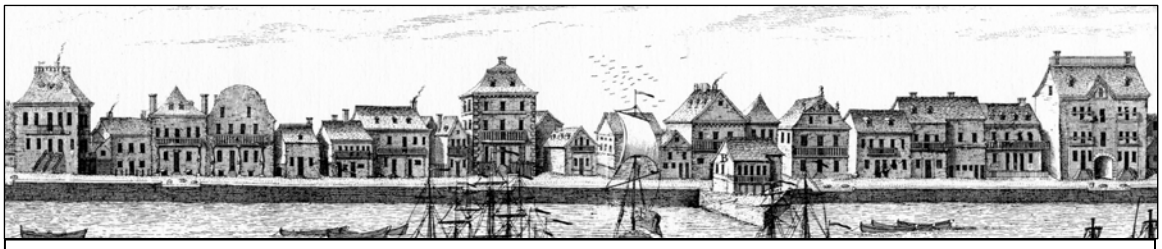


Figure 104: Close-up of the 1739 *Prospect*, showing the redan at Tradd Street.

The Roberts view, made one year before a fire in 1740 obliterated most of the town's buildings, still shows the somewhat medieval quality of the architecture fronting the harbor. Even though this fire and several others burned many of the early buildings within the walled city, the long, narrow lot dimensions remained relatively constant and in many cases, the replacement structures were similar in form if not in style. Some of the new buildings used older foundations or incorporated portions of earlier structures. The density of construction in parts of the old walled area remains tangible, and is perhaps the strongest visual legacy of Charleston's walled city.

Before they came down, the city walls and the natural barriers made by marsh and creeks impeded the flow of people, goods and cannons for decades. Bridges were constructed over the creeks to the north and south of the original walls, reflecting the need to promote improved access to newly developed areas. A bridge over Vanderhorst Creek (now Water Street) was approved as early as 1705 to provide better access to a newly constructed bastion. Another bridge crossed over Daniel's Creek where the City Market is now located; Governor's Bridge was built to provide easier access to the town's new northern suburb of Ansonborough from the area around Craven's Bastion.

By the 1730s, the land side walls on the south, west and north had been completely dismantled. The Yamasee Indian War was concluded in 1717 and proprietary rule was overthrown in 1719 in favor of governance by the crown. (There is actually a strong connection between the proprietor's unwillingness or inability to pay for defense and the colonist's rejection of their rule). No longer encircled by walls, the town had increased dramatically in size and population. This can be seen most clearly in the Ichnography of 1739. The map delineates the previous location of the *enceinte* and shows the growth beyond the old landward walls. By the mid-18th century, the inland earthen walls were gone from the landscape and wharves and landfilling were beginning to overtake the brick line of defense along the Cooper River waterfront. By the late 18th century, the remaining bastions and redans were landlocked and completely redundant. After 1785, they too, were erased from the landscape and gradually faded from community memory.

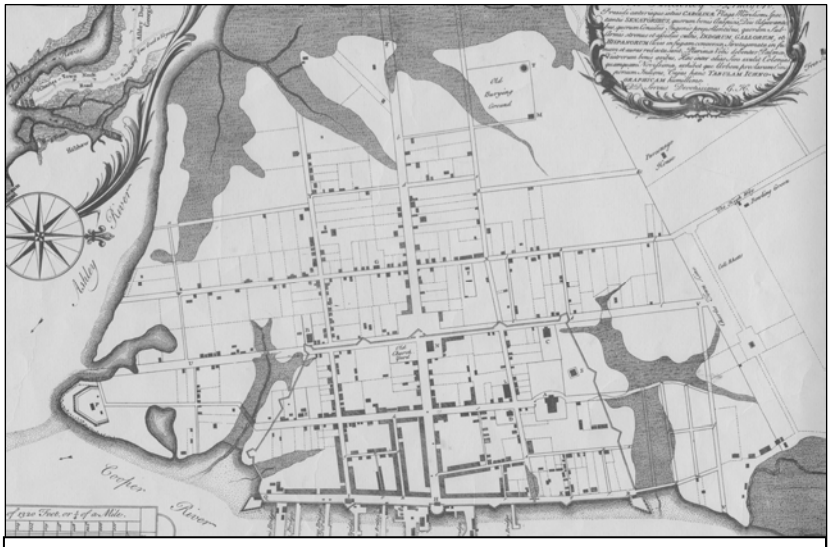


Figure 105: 1739 map showing growth of Charleston beyond walls.

Architecture of the Tradd Street Redan

Architectural details of the redan add to a growing body of data regarding the location, design, and execution of the city walls. Excavation of the redan at Tradd Street is only the third opportunity since 1925 to view a portion of the massive brick seawall, and documentation of the first two projects was limited. Exposure and analysis of the brick redan allowed architects, archaeologists, and historians to assess the details of construction and size and degree of professionalism in the design and execution of the wall and the various defensive features.

Figure 106: Brick and mortar characteristics.

Backhoe and hand excavation in 2008 revealed a 24 foot section of the north face of the redan, and hand excavations on the interior and exterior of the wall provided details on the construction. The wall was constructed of relatively soft orange-to-red brick (2.5yr4/8 to 5/8) set in white (7.5yr8/1) lime mortar. The wall was laid in English bond. The top of the wall measured 3.5 feet and was well-made. The western side, or interior, of the top was well-finished with two headers, end-to-end, a total depth of 1.5 feet. The bricks appear to have been worn down over time, either from traffic or weatherization. Beyond this, the wall surface was uneven for the remaining 2.0 feet, suggesting this section mounted the superstructure that was demolished and pushed forward.

The front 20 feet of the outer face of the north wall battered, and beyond this point transitioned to a vertical face. This was an unexpected discovery. Here, the wall was 3.5 feet wide, and vertical to a depth of 6 feet. At this portion, the wall stepped an additional 2 feet, to a total width of 5.5 feet, and continued vertical to an unknown depth; excavations here were halted at the water table. Experts Doug Scott (Historic Masonry Restoration) and Frank Genello (Professor of Masonry, American College for the Building Arts) considered many reasons for this construction. Mr. Genello noted that laying an angled masonry wall is not significantly more difficult than laying a vertical one. Both suggested that the angled portion could have functioned like a buttress in the wetter soils to the east. It is also plausible that the straight portion could have functioned as a site for a boat landing; later it abutted Motte's wharf.

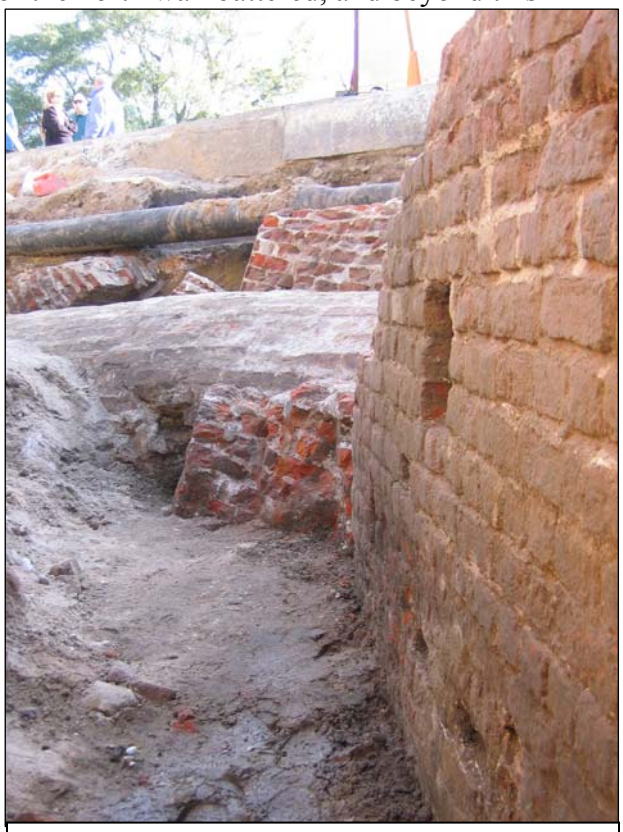


Figure 107: North face of redan, showing sections that are vertical (foreground) and battered (background). Demolished parapet sections are visible in front of the battered portion.

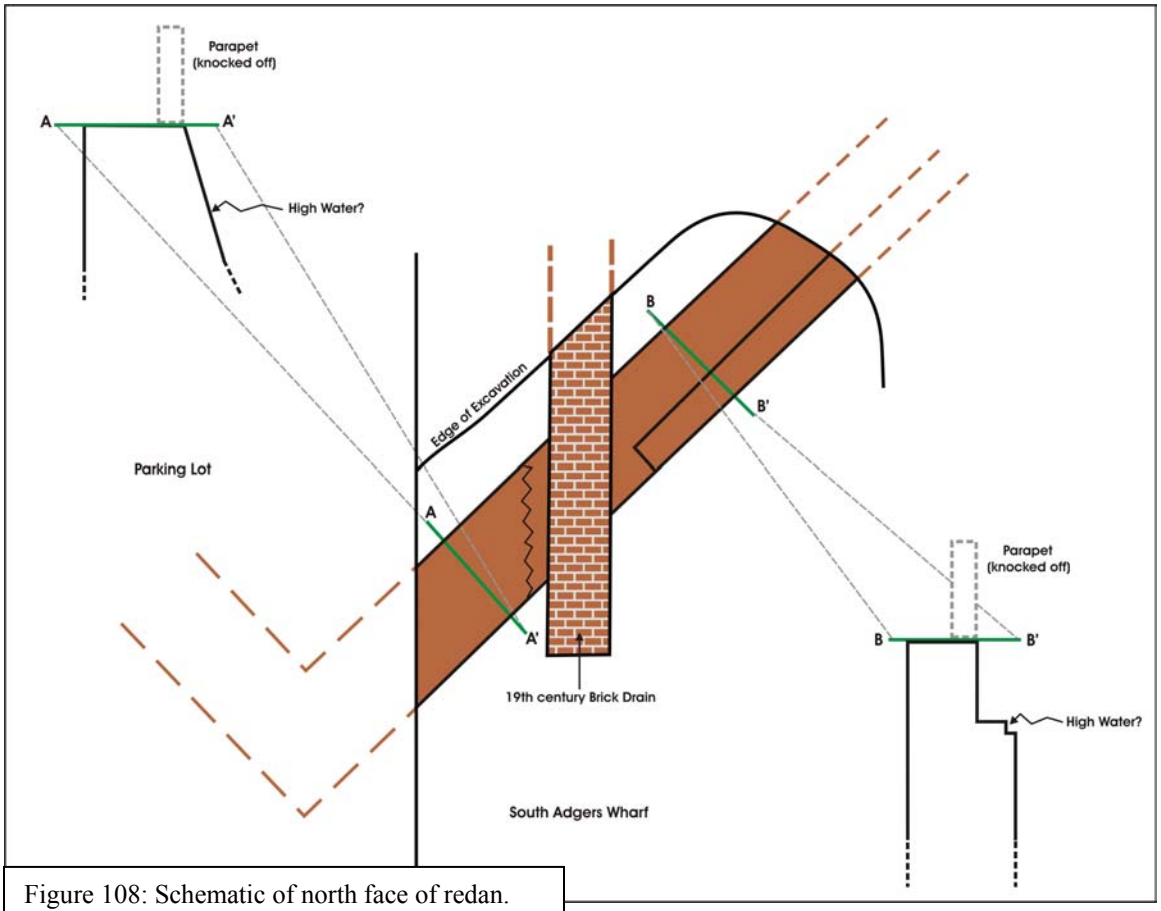


Figure 108: Schematic of north face of redan.

The vertical face featured a series of voids, interpreted by brick mason Doug Scott as mortices for wooden scaffolding used by bricklayers during construction. After completion of the brickwork, the wooden timbers inserted into the cavities would have been sawed off flush with the surface of the wall. Mr. Scott was also able to identify transitions in the brickwork, suggesting the work of different masons, likely working side by side.

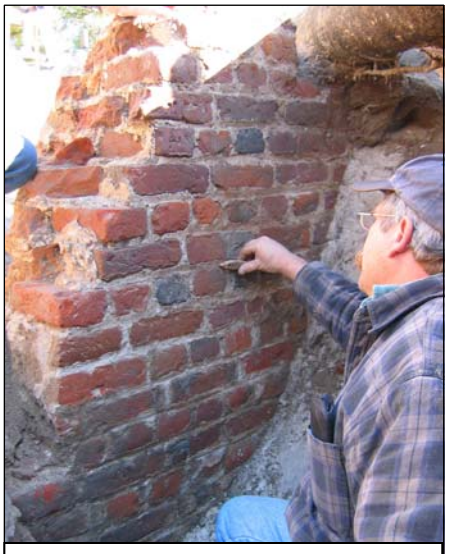


Figure 109: Brickmason Doug Scott.

Excavations on the interior provided additional details on the construction techniques and dimensions of the redan. The interior face was vertical and relatively well-made. A series of fill layers similar to those excavated on the exterior continued for 2 feet below the top of the brick. At this point, fill transitioned to a white sand, containing no organic material and very few cultural materials. Designated Zone 11, this appears to be sterile fill, placed against the interior of the redan at the time of construction. Doug Scott noted that there is sand impregnated deep into the mortar of the lowest courses of brickwork, suggesting this was being

backfilled almost immediately after the brick were laid. This, plus the presence of artifacts that date to the turn of the 18th century, suggest the white sand was filled against the interior face of the redan in the first decade of the 18th century, and serves as interior grade.

Figure 110: Brick work on redan interior, showing sand impregnated in mortar at base of the brickwork.

Several portions of intact brick, located in front of the redan wall, appear to be portions of the parapet pushed forward into the waterfront at the time of abandonment. Soils in Zone 9 and above were then filled on top of this demolition layer. The sections of parapet exposed and removed are 1.2 feet thick and 3 feet tall. The top was finished with a thick cap of mortar that slopes slightly toward the outside of the redan. This mortar cap was weathered to a dark grey, suggesting long-term exposure. A smaller section (1.6x0.9x0.8 feet) recovered from the trench exhibited a well-finished face at an obtuse angle (110°). This appears to be a portion of an embrasure, or opening for cannon.

Figure 111: Section of parapet with finished surface.

Excavations in 2009 exposed the point of the redan. Approximately 2 feet of the north side and 30 feet of the south face were exposed and mapped. A 10 foot section, including the apex, was excavated below the water table, exposing the foundation of the brick. The south face was laid in English bond and battered toward the water. The intact wall was 5 feet wide at the top and was an estimated 7 feet wide at the base. The wall was 8.5 feet high, and the brick was laid in English bond. The brick was laid on a foundation of wood, consisting of 2 foot cypress pilings placed vertically at very close intervals, covered with 2 inch cypress planking.

Figure 112: Students expose the south face of the redan.

The nose of the redan battered at a greater angle, spreading 3 feet from the top to the base. The top 5 feet was weathered and battered, including an area with several missing brick. The lower 3 feet, however, were in much better condition, suggesting this area remained below water table and/or beneath silt after construction.

Figure 113: Top of the redan at the point.

An integral part of the redan was the line of pilings located 5 feet in front of the brick face of the feature. These were 7 foot piles, hewn to a point on the bottom, and driven into the mud side-by-side in a solid line. The area between the pilings and the brick was filled with ballast stone, oyster, and brick rubble, in contrast to the debris-littered soil outside of the pilings. The feature closely matches the construction mandated in the Statute of 1714: "The first or inside pileing [sic] to be of cedar…, between which first pileing and the brick wall shall be put oyster shells or sodds, and to such a height filled, as the said commissioners shall direct, to break the force of the surges of the sea in the most violent weather; the outward pileing shall be of such pine timber as grows on the land belonging to the publick , upon James Island" (Statutes :63) The same statute mandates a second row of pilings, but these were not exposed in the areas excavated.

Figure 114: Row of palings parallel to face of redan.

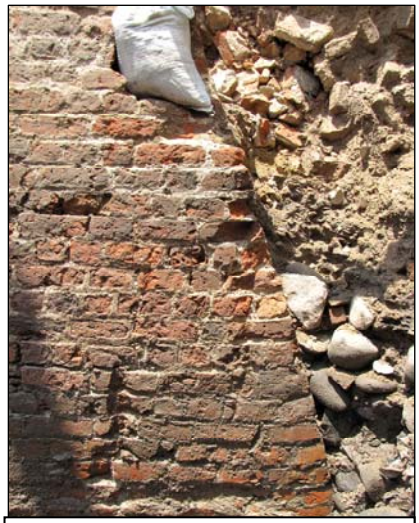


Figure 115: Redan point at base; note the cobble fill.

Figure 116: Cypress pile and plank beneath the brick.

The 2009 project was only the second to expose the foundation of the wall below the brickwork, and only the third to reach the base of the brick construction. All of the projects designed to locate and describe the city wall are explained below. This is followed by a summary of our current understanding of the walled city.

Granville Bastion

Charleston's early wall has been exposed and studied in only a few locations. The first below-ground exploration was in 1925, on the site of the southeastern bastion, the Granville Bastion. The walls of Granville's Bastion were revealed by architects Albert Simons and Samuel Lapham during renovation and enlargement of the circa 1810 Missroon House at 40 East Bay Street (currently headquarters for Historic Charleston Foundation). Though not professional archaeologists, the two architects were able to expose a good deal of the feature, and they left photographs, a site drawing, and detailed description of their findings.

Figure 117: 1920s excavation of Granville Bastion during renovation of Missroon House.

Simons and Lapham excavated a good portion of the Bastion. They observed "the main walls lie about a foot below the present sidewalk level and the general outline was easily traced…It is five feet wide at its present top, of brick throughout" (Lapham 1925 in Saunders 2002:207).

Excavations around the Bastion allowed Simons and Lapham a view of the overall construction. The brick walls, of English bond, extended fourteen feet, sloping out "one inch to the vertical foot" (Lapham 1925; Saunders 2002), while the interior face was plumb. The brick was atop a grillage (or raft foundation) of horizontal palmetto logs, one foot in diameter, "paralleling the run of the wall and four feet wider than the same," overlaid by a two-inch cypress plank, "perpendicular to the run of the wall." Piles or stakes of red cedar and yellow pine were driven vertically to prevent shifting of the palmetto logs (Lapham 1925). Simons and Lapham's excavations also produced a number of cannonballs and exposed a layer of oyster

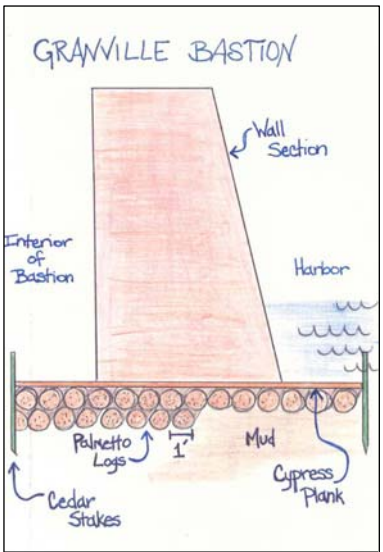


Figure 118: Schematic profile of Granville Bastion.

shells and cobblestones around the exterior of the bastion.

The majority of the 1925 excavations were refilled and covered with new construction, but a portion of the eastern face of the bastion remained exposed in the basement of the Missroon house, and can be viewed by taking a dusty and claustrophobic crawl across the space.

Figure 119: face of Granville Bastion beneath the Missroon House, 40 East Bay Street.

Granville Bastion to Ashley Bastion

The Granville Bastion at the southeast corner of the walled city is the most substantial feature of the city fortifications. It likely faced the greatest onslaught from nature as well as from invading forces. From the bastion itself, the wall continued west-southwest, crossing over a small creek to Ashley Bastion (also called Ioors Fort). Portions of this connecting wall have been encountered in East Bay Street and on the grounds of 43 East Bay Street, across from the Missroon House. In 2000, Brockington and Associates was contacted by Charleston Comissioners of Public Works (now Charleston Water) to investigate a portion of the south face of Granville Bastion encountered in East Bay Street. This section was documented before removal for completion of the waterline project. A corner of the Granville Bastion, just east of the 2000 discovery, was revealed again by Charleston Water Systems in East Bay Street in 2008.

Figure 120: Exposure and remote sensing of Granville bastion in 2000 (above left) and 2008.

A brief ground penetrating radar survey was conducted in 2008 by General Engineering Laboratories (GEL). There was also evidence for the curtain line proceeding north from the Granville Bastion, likely in the eastern edge, or parallel parking spaces, of East Bay Street. At the same time, Mrs. Jane Hanahan reported a brick feature in her garden at 43 East Bay Street, at odd angle to the house and property lines. The ground-penetrating radar suggested this feature was associated with the Granville Bastion finds, and possibly continued. Mrs. Hanahan left a portion of the brick exposed in her front garden.

Renovations of the house at 43 East Bay Street in March 2012 revealed additional portions of this brick wall. A small volunteer project directed by Walled City Task Force members (Zierden, Pemberton, Hudgins) and graduate students from the Clemson/College of Charleston program in historic preservation under the direction of Carter Hudgins exposed portions of the wall in the driveway. The feature was encountered less than a foot below the present ground surface. Excavations to the water table, 6 feet below ground surface, did not encounter the base of the wall, and it evidently continues well below this point. The wall was1.5 feet wide and featured a vertical face. From the point in the front garden, the feature continued at a diagonal through the driveway to an area behind the main house. Though the wall was compromised by later occupation and construction, a length of 50 feet was documented from the front garden to the kitchen building. Analysis of cartographic sources suggests that the wall was some 80' long before angling to a 'bridge' over the small creek to Ashley Bastion. In 1721, the legislature considered a petition to remove or rebuild a long wooden bridge "in Charles Town leading over the Marsh near Granville's Bastion" (Nic Butler – correspondence 11-13-06; Commons House Journal 1721/22). The exact configuration of the bridge and construction method of the bridge is unknown. Time limits and a plethora of above-ground features made a search for these features impractical.

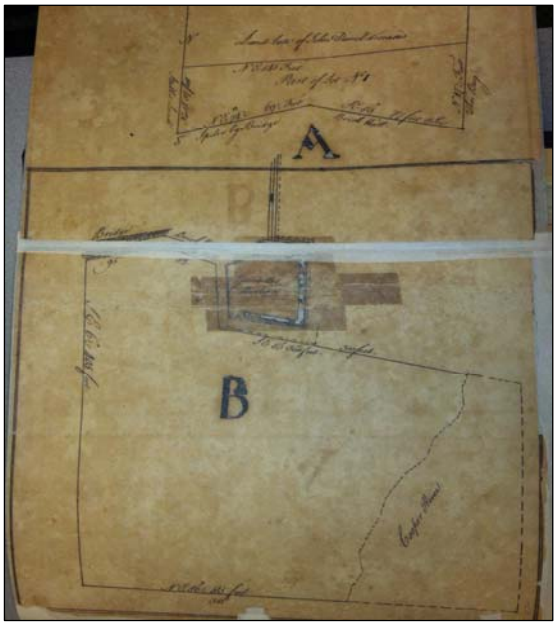


Figure 121: Exposure of a portion of the wall between Granville and Ashley bastions in the driveway of 43 East Bay Street; 1755 plat of Granville (Deed book W:668-670).

The Half Moon Battery

Following work on Granville Bastion, the brick seawall was not explored again until 1965, when John Miller, associated with The Charleston Museum, excavated the Half Moon Battery in the basement of the c. 1771 Exchange building. The excavations were sponsored in part by C. Harrington Bissell, who was responsible for a small museum known as The Provost. Miller excavated the area between the front face of the Half-Moon Battery and the eastern wall of the Exchange building, an area approximately 7.5 feet by 28 feet. Excavations reached the base of the battery.

Figure 122: Excavations of the Half Moon in basement of the Exchange; wood planking and pales at base of the foundation.

Mr. Miller evidently passed away shortly after the project was completed, and did not write up his findings. Mr. Bissell reports that the excavated soil was screened to retrieve artifacts. Few notes were kept, most on the paper bags containing the artifacts. A plan and profile of a portion of the excavation was completed. The collection was divided between The Charleston Museum and the Rebecca Motte Chapter of the Daughters of the American Revolution, owners of the Exchange. There they languished until Dr. Elaine Herold of The Charleston Museum analyzed the materials as part of her investigations on the exterior of the Exchange in 1980. Herold analyzed all of the artifacts and completed a report of the Miller excavations, drawing as much inference as possible from the limited documentation left by Miller (Herold 1981).

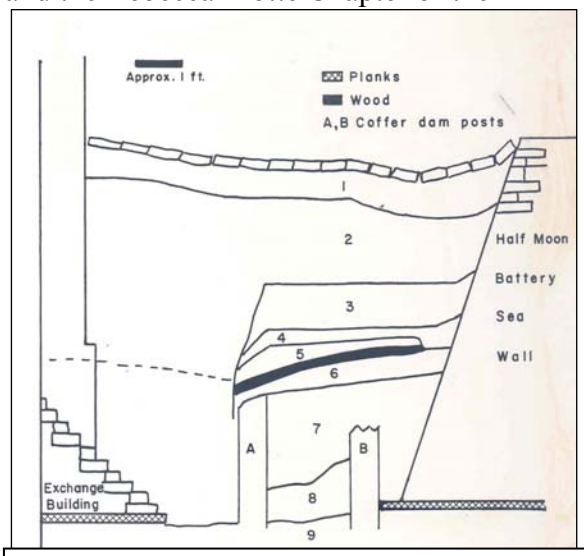


Figure 123: Miller's profile of Half Moon excavations.

Miller's excavations exposed the front of the Half Moon, which battered (or sloped) in a manner similar to the

Granville Bastion (2.5 feet from the exposed top to bottom). The exposed portion of the battery was 8 feet from base to the top portion below the Exchange floor. It is unclear what portion, if any, of the top of the battery was removed for construction of the Exchange. The brick foundation sat on "wooden planking perpendicular to the brick" (Miller notes; Herold 1981). It is likely, however, that the base of the battery was below the water table, and there is no description of the visibility, or lack thereof, of the foundation base. Miller did note that the upper four feet of the battery face had a rough brick surface, while the lower four feet was smooth, and therefore likely below the historic water surface.

A most interesting find was the discovery of two parallel rows of vertical posts, with planks, 15 to 16 inches wide and 2 inches thick, against the inside of the inner row of posts. Miller indicated the inner row was hickory, pine, and oak, while the outer, or eastern, row was cedar. Miller interpreted this structure, particularly the inner configuration of posts and planks, as a coffer dam, designed to hold back the seawater for construction of the battery. Photographs from the dig, however, show that the pilings were nicely finished, exhibiting carefully notched and rounded tops. This degree of finish suggests a visibility and permanence beyond a repair. It is possible that these are a breakwater, like that encountered at the redan, though the piles are 3' from the face of the battery, rather than 5'.

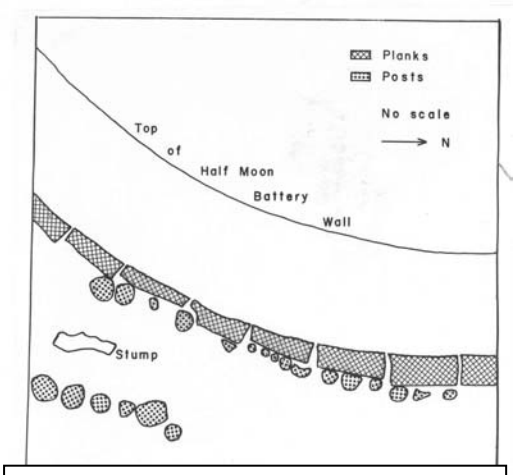


Figure 124: planview at base of Half Moon

Miller suggested the coffer dam was associated with construction of the battery in 1706. Herold's analysis of artifacts retrieved from the lowest level of fill, however, identified artifacts manufactured in the 1740s. She offered an alternative interpretation; that the coffer dam was built to repair the battery after hurricane damage, most likely the major storm of 1752 (Herold 1981:88).

Damage to the fortifications in 1752 was extensive. "Granvill's [sic] bastion, situated at the southeast corner of East Bay street….was much shaken, the upper part of the wall beat in, the platform with the guns upon it floated partly over the wall. The upper part of the curtain line, a solid wall at least four feet thick, was beat in upon the bay…" The cannons at Craven's bastion and the other batteries around Charleston were also dismounted. A few years later, the citizens of Charleston petitioned the crown,

"that by a Violent Hurricane in September 1752 the fortifications guarding the entrance into the Harbor and those about Charles Town were entirely destroy'd, which the province at a great expence have been rebuilding ever since…" (Calhoun 1983:9).

The Miller excavations were not completely backfilled, and the face of the Half Moon Battery is visible in the basement of the Exchange building. This is the only location where the wall can be viewed by the public.

Though Miller excavated and exposed only a small portion of the Half Moon in the eastern portion of the Exchange basement, the entire battery lies within the footprint of the later building. The original brick floor covers most of the basement, but has been removed in the southern quarter of the building, replaced with a raised wooden floor. The Half Moon Battery is accessible beneath this flooring, by crawling through a small entry in the southwest corner. Members of the Walled City Task Force explored this space in 2010, and recorded the interface of the battery and the curtain line beneath the western foundation of the Exchange.

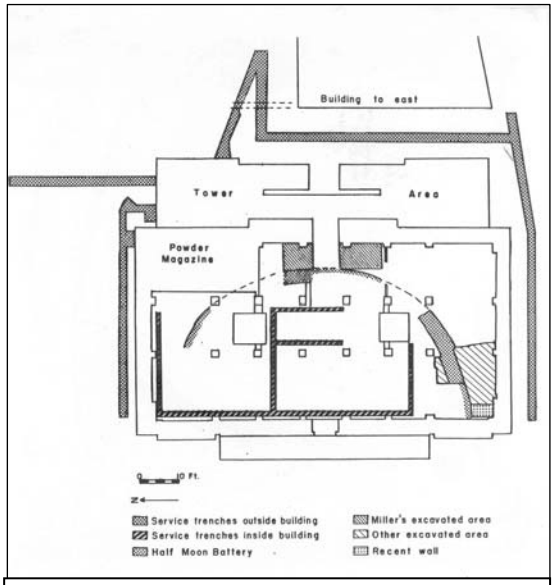


Figure 125: Location of Half Moon Battery in basement of the Exchange building, 1980.

Soil and modern construction debris was cleared away from the wall and photographs and measurements were taken. Inspection of the curtain line and the Half Moon revealed that the two features are not tied together, and there is a space between the two that is filled with soil. Either the two features were constructed separately, or one or both were rebuilt or repaired at a later date. Both features were covered with a layer of modern concrete. The top foot of the curtain line was built of dark red-purple brick, and this brick face sloped, or battered. Beneath this 1.0 foot section of late colonial/antebellum brick, the curtain line is built of the characteristic bright orange brick and bright white mortar. Moreover, this portion of the wall is vertical.

Figure 126: Removing debris and recording Half Moon and curtain line in southwest corner of Exchange, 2010.

The Half-Moon battery is also vertical at the intersection with the curtain line. Visual inspection from this point, coupled with the map prepared by Mr. Thornhill at the time of building renovation shows that the face shifts to a battered profile about halfway to the apex. The notch in the battery footprint shown on Herold's map likely corresponds with this point. The combination of a battered face at the front of the battery and vertical face on the less vulnerable sides matches the features noted on the north face of the Tradd Street redan.

The Wall not Found- the Carteret Bastion

The northwest bastion of the walled city has remained frustratingly elusive. Several archaeological projects have been mounted in this vicinity, and none have found it. Archaeologists have visited construction projects and conducted brief exploratory excavations in the vicinity of the Carteret Bastion, at the corner of Meeting and Cumberland Streets. Construction of parking garages along the north side of Cumberland Street, in the late 1970s and 1990s, were not subject to mitigation requirements. Stanley South visited the construction site in the late 1970s, but did not encounter any evidence of the wall. No professional archaeologists visited the construction site in the 1990s. In 1979, Elaine Herold monitored construction of the office building at the southwest corner of Meeting and Horlbeck, in search of the wall (Herold 1981). Nothing was found relating to the wall, though the project revealed several early -19th century deposits. For those researching site reports, this is known as the Meeting Street Office Building, as there were very few such structures thirty years ago.

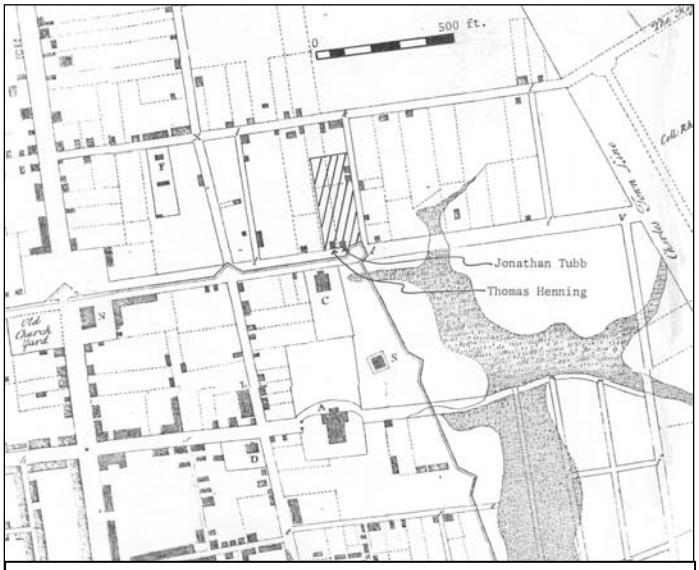


Figure 127: Portion of 1739 map showing Carteret and Herold's 1981 excavation project.

Test excavations were conducted on the northeast corner of Meeting and Cumberland in 1983, in advance of construction of an office building (Zierden et al. 1983b). Here, a double brick wall, with rubble fill between the two faces, was reported to the archaeologists during construction, but was not directly observed by the archaeologist. The wall was described as "incredibly strong" and was 4 feet across the top. The wall ran parallel to Cumberland Street, roughly 74 feet north of the street to roughly 6 feet east of Meeting, where it angled off 10-12 degrees to the south. The wall exterior was laid brick, and the interior filled with a tough mixture of crushed brick and mortar. The site supervisor reported that this was incredibly hard to remove. Both sides of the wall tapered out, but the northern, or outside, wall battered at a

greater angle. We assumed at the time that it is unlikely that this wall was not encountered during construction of the Cumberland Street garage – unless, of course, the wall becomes earth after the limits of the corner bastion.

The third corner of the available four was investigated in 2001 by J.W. Joseph, Theresa Hamby, and Matt Tankersley of New South Associates in Atlanta. This project was supported by SouthTrust Bank as they replaced a mid-20th century building with new construction. After careful consultation of the cartographic sources, New South excavated two trenches across the property, one perpendicular and one parallel to Cumberland Street, as well as a 20 by 30 foot block. These extensive excavations did not reveal any direct evidence of the wall, either. Trench 1 identified marsh soils shown on the 1739 map, and possible post stains. There was no evidence of a brick structure. Joseph suggested that Feature 20, a long, clay-filled stain, may be part of the moat, or part of earthen walls. He still suggests that the corner bastions would require pilings in order to support heavy artillery, and no evidence for these was encountered. The feature likely tracked through the Cumberland Street garage site. Though massive, earthen walls and moats leave subtle archaeological evidence, unlikely to be recognized during construction monitoring.

Joseph then carefully considered all of the studies summarized above. He concluded that the wall could be in the front (or Meeting) street portion of the property, an area badly disturbed by earlier construction. He further suggested that it should have been on the MSOB tract, on the southwest corner of the intersection. The northeast corner (the First Trident site) seemed less favorable, likely too far north. As supporting evidence, Joseph cited the location of the Powder Magazine, and practice of placing such a feature 'close' to a wall, where they would be protected from cannon fire, not in an open and exposed space where cannon fire over the wall could easily make contact.

Figure 128: Excavations at the 1712 Powder Magazine. Note that the Powder Magazine sits at odd angle to Cumberland

In 1801, and today, the Powder Magazine seems to sit at an odd angle to Cumberland Street. This is because it was oriented to the northern wall, and not to the later street. Excavations here in 1995 carried out by The Charleston Museum were designed to investigate the building itself, though a search for evidence of the city wall was included in the research design. The team excavated the 'front' yard to the surrounding fence, and found many well-preserved features, including a surrounding safety wall, shown on the 1739 map, at a distance 15 feet from the Powder Magazine itself, corresponding exactly to the location noted in documents. No evidence for the city wall was encountered within the modern limits of

the powder magazine property. Subsequent construction of an additional garage did not provide an opportunity for archaeological investigation.

The City Gate and Johnson's Ravelin

Figure 129: Portion of 1721 Herbert map showing the drawbridge and ravelin.

The only archaeological evidence of the landward features was discovered at the site of the City Gate and Johnson's Ravelin, at the northwest corner of Meeting and Broad Streets. In 1993, New South Associates conducted archaeological excavations at the Charleston County Courthouse site, to aid in the restoration efforts. Excavations in the courtyard revealed evidence of the 1700-1718 moat northwest of the historic courthouse building. The moat was visible only in a backhoe profile, as the soils were unstable. The fill was virtually sterile, with only a narrow band of organic humus at the base of the moat. The open moat was six- to eight-feet deep during the period of active use. When abandoned in 1750, it was backfilled with the earth originally used for its construction.

Interpretation of this feature was presented with some caution until discovery of four square, hand-hewn cedar pilings in July 1999. By that time, construction of the adjoining Charleston County Judicial Center was underway, and New South Associates had excavated a considerable area between courthouse alley and King Street. Workers discovered the pilings in the basement of the old courthouse, and archaeologists were there to retrieve and interpret these findings. The pilings were 9 inches squared and hewn to a sharp point. They were driven into the ground at least six to seven feet below the historic ground surface, and placed on two-foot centers, forming a seven-foot long section of a diagonal wall.


Figure 130: Cedar piles from the ravelin/drawbridge and *in situ*, Charleston County Judicial Center.

Joseph suggests that the posts formed a part of the ravelin wall made of square pilings covered by boards. The substantial size and their close spacing would have created an outwork capable of withstanding a heavy artillery assault. Two of the posts were conserved and are on exhibit, one at the Judicial Center and the other in The Charleston Museum.

Summary

Since creation of the Walled City Task Force in 2005, we have learned a great deal about the location and construction of the walled city. Exposed portions of the brick sea wall have doubled from two to four, with exposure of the Tradd Street redan and the wall between Granville and Ashley bastions. The connecting curtain line remains frustratingly elusive, however. We have proposed a likely east-west position along East Bay Street, and recorded a location in the basement of the Old Exchange. Total station measurements of the sections in the Old Exchange, the Tradd Street redan, and the Granville wall will be used to place the footprint of the brick seawall on the current landscape with greater accuracy.

The Granville Bastion, which anchored the seaward fortification, appears to have been the most substantial feature. This was the deepest brick construction, 14 feet, with the most substantial wooden foundation supporting the weight of the brick, a double grillage of palmetto logs.

The redan at Tradd Street and the Half Moon Battery at Broad Street are similar in size and scale, measuring 8 feet to 8.5 feet from the base to the intact top. Both were constructed on a platform of cypress planks, though the underlying foundation of the Half Moon was not photographed. Both feature a row of pilings at water level 3-5 feet beyond the face of the fortification.

It appears that multiple brickmasons, of varying skill, constructed the brick seawall. The brick fortifications and seawall were evidently repaired multiple times, as reflected in documents, archaeological stratigraphy, and visual inspection.

Construction of the fortifications evidently included a row of vertical piles 5 feet in front of the brick foundation. Acts of the Assembly call for this feature, and dictate that the area between the palisade and the fortification should be filled with stone, oyster, and pine branches. Such fill was noted at both the Tradd Street redan and the Half Moon Battery. At Tradd Street, the fill inside the palisade was notably different in content than the soil outside of the pilings. Those at the Half Moon were better-finished on top than those at the redan, or perhaps they were simply better preserved by their location inside a late 18th century building. The finish suggests that the palisade was a permanent feature, meant for long-term use. There is also evidence at both locations for a second palisade, likely placed in the moat constructed in 1745. At Tradd Street, there is limited evidence for a double-row of pilings. The single row encountered at the Half-Moon was located

just outside the 1771 Exchange and was likely compromised by construction of that massive colonial structure.

Finally, at the time of abandonment in 1784, the brick wall was demolished to ground level, and the massive foundation left in place. At Tradd Street, this demolition was accomplished by shoving the 1.2 foot wide parapet forward into the marsh and covering the demolished sections and the wall foundation. New colonial buildings were simply built over the wall foundation, and small sections were removed to facilitate this construction, as necessary. Small rounded sections removed from the Tradd Street redan, for example, are likely for construction of the Lower Market expansion in 1789.

Each of the three fortifications explored to-date has been encountered about a foot below the present ground surface. This suggests that most, if not all, of the footprint of the brick seawall is preserved below the buildings and streets of Charleston and that additional sections of the seawall can be located with relatively shallow excavation.

Chapter VI
The Lower Market

As suggested by the 1739 *Prospect* of Charleston's Cooper riverfront, the foot of Tradd Street was ideally situated for defense. It was also an ideal location for trade and commerce. Indeed, the area was used for marketing as early as the second quarter of the 18th century. In 1723 Andrew Allen constructed the "New Market House" inside the redan at the foot of Tradd Street. That building was later used as the Exchange and Court House, and was consumed in the 1740 fire.

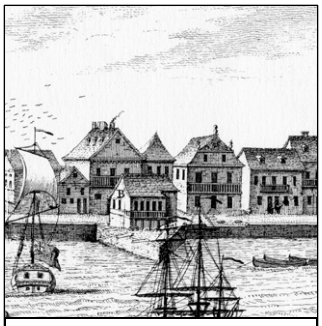


Figure 131: Andrew Allen's market building inside the redan.

Ten years later, a new market was constructed at Tradd Street, this time on wharves outside the curtain line. Known as the Lower Market, the new location was the source of all types of provisions, including meats, fish, vegetables, grains, fruits, and blades (animal feed). The new market evidently became a popular and bustling location, drawing comment from many observers. A visitor in 1774 noted, "towards the south end of the bay is a pretty good siz'd market for pork, veal, poultry, and greens." The same visitor was less kind in describing the Beef Market at Meeting and Broad: "The fourth corner does not answer the other three, for it is only a low dirty looking brick market house for beef" (Merrens 1977:282).

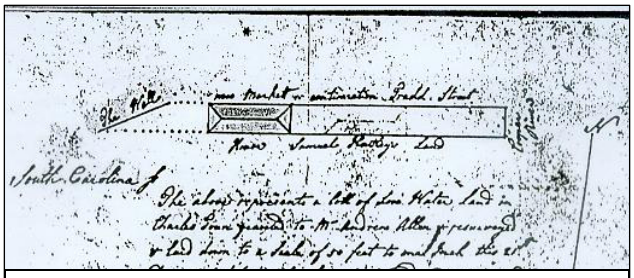


Figure 132: 1767 plat of Lower Market, showing a hip-roofed structure and "the wall".

The waterfront location of the Lower Market was convenient for the arrival of boats and barges loaded with produce and people from nearby plantations. The water was also convenient for disposal of the market's daily refuse, though an expanse of the market dock was "dry at low water". Shoppers, however, were inconvenienced by the necessity of passing through an opening in the curtain line to gain entrance to the market (Butler 2008).

In 1784, the state legislature authorized the dismantling of the fortifications around Charleston; by this time, Mrs. Motte's wharf was crowded with a line of stores and a scale house. A year later, the redan was reduced to street level, though portions of the curtain line along East Bay Street remained. That same

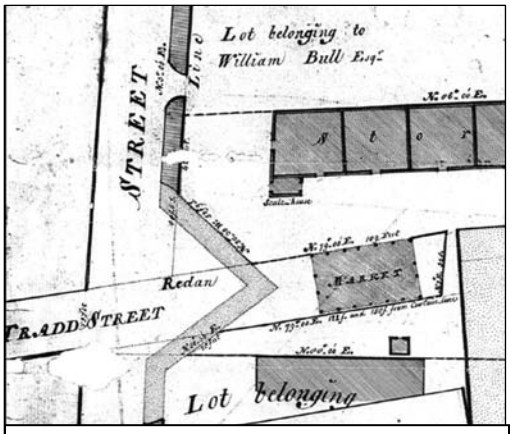


Figure 133: The opening in the curtain line is visible in the top center of this detail from the 1785 plat.

year, City Council authorized extension of the Lower Market "about 29 feet west" over the remnants of the redan. A second shed was constructed along the southern edge of the wharf, and was reserved for black women hucksters. (State Gazette of South-Carolina, 19 December 1785). By the time the property was platted again in 1793, an imposing three story office was constructed in front of the shops, fronting East Bay Street. East Bay had been widened to 66 feet, covering the foundation of the curtain wall, leaving no remnant of the brick fortifications visible above ground (CCRMCO F6, pg. 241).

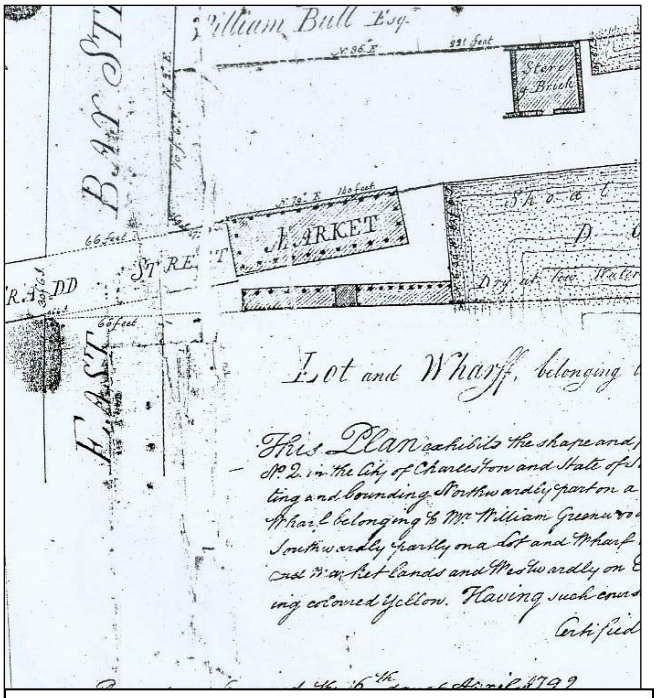


Figure 134: 1792 plat showing market expansion.

Throughout the second half of the 18th century, the Lower Market evidently bustled with activity. It usurped the central role long enjoyed by the Beef Market at Meeting and Broad. The harbor location made shipments of meat and produce more convenient. But the busy market was not without problems. Documents suggest the market was somewhat of a nuisance and was paved to cut down on odor and debris.

By 1799 the Lower Market, the Beef Market, and the 1770 Fish Market at the foot of Queen Street were all closed and the land sold to private citizens. A new Centre Market was constructed farther up the peninsula, on the filled lands of Daniel's Creek donated by six private citizens. All of the facilities of the three markets were incorporated into one new facility that stretched from Meeting Street to the Cooper River waterfront.

Provisioning the City

The major focus of Carolina and Georgia plantations was on commercial staple crops, grown for overseas markets. The cattle-raising industry, for export and local consumption, was one of the colony's first successful economic enterprises. Cattle thrived in the pinewoods and lowlands of the Atlantic coastal plain. A few communities maintained domestic herds by providing them modest food and shelter; as a general rule, however, cattle grazed on unfenced lands and were provided minimal or no supplemental feed or shelter, even during winter (Otto 1986; Stewart 1991). Otto (1986) describes an annual cycle in which fields were burned in the winter to improve grazing; beef cattle were rounded up for slaughter in the fall and the meat salted for shipment to the West Indies. During early decades, many had no brands or other marks of ownership and some wild cattle were simply pests or vermin (Stewart 1991). It was the responsibility of

farmers to fence their crops to keep cattle out rather than the responsibility of cattle owners to fence cattle in (Dunbar 1961; Otto 1986).

The relative ease of raising cattle was described by Thomas Nairn in his promotional pamphlet of 1710:

> "…South Carolina abounds with black Cattle, to a Degree much beyond any other English Colony; which is chiefly owning to the Mildness of the Winter, whereby the Planters are freed from the Trouble of providing for them, suffering them to feed all Winter in the Woods."

Nairn also wrote:

> "Our Cows graze in the Forests, and the Calves being separated from them and kept in Pastures, fenced in, they return home at night to suckle them. They are first milk'd then shut up in a Fold all Night milk'd again in the Morning, and then turned out into the woods…" (Nairn 1718:46 in Brooks et al. 2000:34).

Figure 135: Early 20th century photo of lowcountry cattle (Collections of The Charleston Museum).

Rural cattle centers are broadly known as cowpens, though herd management strategies changed as the 18th century progressed. Dunbar (1961) argues that cowpens were a unique tradition that began in South Carolina; they were ranches, rather than enclosures, and they included large herds and extensive acreage. Lord Anthony Ashley Cooper's settlement at the head of the Ashley River, for example, maintained nearly 600 head of cattle in the 1670s. Slaves imported from Africa in 1674 likely worked the cattle. Many cow hands were Africans skilled as cattle hunters or cattle herders (Dunbar 1961; Otto 1986, 1987). From the earliest settlement, enslaved Africans were given responsibility for the cattle herds, and tended them with little supervision. Wood notes an inventoried James Island property in 1692, described as "in sight and by account appeareth 134 head of Cattle and one negro man." Fifty years later, an estate at Ponpon (the Edisto area) included "A Stock of Cattell said to be from Five hundred to one thousand head. Also a Man used to a Cow Pen and of a good Character." He also suggests the term 'cowboy' originated from these circumstances. The term "cow hunter" characterizes the wild nature of the free-ranging cattle themselves (Wood 1974:31).

By the 1750s, the center of cattle ranching, usually the first industry in a newly settled district, had moved inland. The lower coastal plain was focused on the production of rice and indigo, forcing cattle raisers to the more thinly settled upper coastal plain. The savannahs and cane swamps in the Forks of the Edisto, and between the Salkehatchie and Savannah Rivers was the "classic cowpen area" (Dunbar 1961:128 in Brooks et al. 2000:35). By this time, the cowpen consisted of a fenced compound of about three acres,

which included a modest dwelling and facilities for processing dairy products. The calves were kept penned, while the cows roamed free during the day. The c. 1757 Catherine Brown Cowpen on the Savannah River is an archaeological example of this facility (Groover and Brooks 2003).

Figure 136: late 19th century lowcountry cow (Collections of The Charleston Museum).

Cattle destined for the Charleston market came from several sources. Cattle were raised on the coastal islands and in the region near Charleston, and large numbers of cattle and abundant grazing lands remained throughout the 18th century. At the same time, cattle arrived in Charleston from as far away as Mary Musgrove's Cowpens Trading Post near present-day Savannah, Georgia in the second quarter of the 18th century.

Carolinians evidently followed the British tradition of driving cattle to market on hoof, and then fattening them on grazing lands close to market (Armitage 1978); a Charleston butcher advertised "pasturage at the new race grounds" (likely Hampton Park) in 1791 (*City Gazette and Daily Advertiser*, August 18, 1791). Slaughter pens and houses were evidently located on the edge of town. Legislation was passed repeatedly to keep these facilities out of the cities, but they remained annoying to neighbors, nonetheless. A grievance filed in 1764 complained that two men,

"having Slaughter-pens and killing cattle, in and about Ansonburgh; to the great annoyance of the neighborhood, by the filth and stench of their pens, and to the endangering the lives of passengers passing and re-passing on the public road" (quoted in Maag 1964:70).

A year later, a more elaborate grievance was filed,

"We present as a grievance, the bad custom of butchers shooting cattle in or near Charles-Town, whereby many, who are near their pens, are in danger of their lives; and also, their bringing meat to market in very filthy carts, either uncovered or so exposed to the sun and dust, or covered with very dirty blankets or cloths, to the endangering the health of the people of this town" (*South Carolina Gazette*, June 8, 1765 quoted in Maag 1964:71).

Figure 137: Deposit of cattle bone and horn core at VRTC site, 1988.

Butchery of cattle in close proximity to urban residents evidently remained a problem. A 1783 ordinance again banned the killing of cattle within the city limits, by then located at Calhoun Street *(SC Weekly Gazette*, October 4, 1783). Construction of the Charleston Visitor's Center in 1988 revealed a former creek filled with butchering remains, particularly the horn core of a variety of cattle. This location was a few blocks outside of the 1783 city limits and located on King Street, then known as the Great Path (Reitz 2004; Reitz and Ruff 1994). The recovery of horn cores suggests that the horns were also being processed for use, and possible export. Maag (1964:76) records the export of some 10,000 in the 1760s. The external sheaths of cattle horns were used for a variety of products (Armitage 1990).

Transportation of cattle to market was evidently an expensive and difficult task, and factored into the price of meat at market. Before 1760, a good bit of the cattle transported to Charleston were destined for the export market, principally to the West Indies. The export industry was limited by the availability of high-quality salt for curing both beef and pork. Live cattle and hogs were occasionally shipped from the colony. While shipping records document the amounts of beef and pork exported, there is no comparable record for domestic consumption (Maag 1964:72-80).

Residents of farms and plantations on the coast had ready access to wild and domestic sources, but urban residents were dependent on transportation of provisions from the countryside and sale of these at market. The public market, and the various regulations governing it, was a visible symbol of municipal government in action. Public markets were an important element of the urban landscape, and the size, number, and quality of the markets were a measure of the quality of the town. The rules of the market ensured that people had access to safe food at an affordable price (Walsh et al. 1997:83).

Regulation was made difficult by the number and variety of people who sold goods in the Charleston market. Slaves from both the city and the countryside made up a large portion of the vendors. These vendors huckstered a variety of items, both for their own benefit and that of their masters. A significant source of goods sold in the city was from the small garden plots of plantation slaves. As early as the 18th century, slave vendors competed with formal markets. The majority were enslaved African Americans, working for their own wages and with approval of their owners. The practice of provisioning themselves and the urban market was encouraged by most planters (McInnis 2005:184).

Bondsmen and women from the countryside sold their own eggs, chickens, and garden produce. Black women also sold dry goods, cakes, and other baked goods. Philip Morgan notes that Charleston's large urban market created specialized opportunities for men, as well. There are many references to slaves who were butchers (Morgan 1998:55),

though it is unknown if these men simply butchered on plantations for their master, or earned wages as butchers in the city market. John Jackson's 1790 advertisement for a runaway slave named Peter noted he "is well known in Charleston, having for upwards of four years attended a butcher's stall in the lower market" (*City Gazette and Daily Advertiser*, May 22, 1790).

Figure 138: 1870s Charleston market vendor (Collections of The Charleston Museum).

Likewise, most of the fishing for the urban market was done by African American men. The fishermen's catch was sold by women in the market and men who peddled in the residential areas. By the mid-18th century, African Americans monopolized the fishing industry.

As a result of this monopoly, slave hucksters readily manipulated supply and price for the Charleston markets. Bondsmen from the countryside who spilled into the city selling provisions were often the object of rancor and legislation. The entrepreneurship of the enslaved Africans was the most common complaint among white townspeople. Most of the market regulations provided separate levels of retribution for infringements. A Grand Jury Presentment in 1742 complained of "The unlawful practice of Negroes, buying and selling in the public market…" *(South Carolina Gazette*, March 27-April 3, 1742). Four years later "Many well dispos'd Poor white People" complained of slaves who, as a result of non-regulation, forestalled the market and frequently sold goods "by very indirect methods." The Assembly responded with a law that forbade slaves to vend anything except fish, oysters, and 'Herbage' (Bridenbaugh 1955:82). Despite repeated attempts at legislation, it appears that African women dominated the market, and their monopoly had a direct effect on supply and price of goods in the city. In 1772, a "Stranger" commented on black women around the Lower Market,

Figure 139: Late-19th century image of Charleston's Mosquito Fleet. Note barrels on boat deck (Collections of The Charleston Museum).

"who are stated there from morn 'til night, and buy and sell on their accounts…These women have such a connection with and influence on, the country Negroes who come to market, that they generally find means to obtain whatever they choose, in preference to any white person…" (quoted in Morgan 1998:250).

Nearby plantations were also sources of supplies for the Charleston market. Plantations on James Island, in particular, focused on the production of provision crops. Stono Plantation, for example, raised vegetables for the Charleston market, as well as indigo, during the colonial period (Calhoun 1986). Morgan likewise suggests that James Island slaves formed "an identifiable group" of market peddlers by the late colonial period (Morgan 1998:251). The close

Figure 140: Slave badges for fishermen and vendors (Collections of The Charleston Museum).

relationship between plantation and market is underscored by an ordinance of 1786, reserving "Six stalls at the Lower Market on Tradd Street for the use of the planters that bring or send their own stock to market" (Edwards 1802:39). This reservation was renewed for the new Center Market in 1807. The foot of Tradd Street remained a docking point for James Island vendors even after closure of the Lower Market in 1799 (Bresee 1986:225).

Evidence of the Market

The area available for excavation in 2008-2009 did not include the footprint of the 1750s market. It did, however, include an area directly west of the market structure and within the 1789 expansion. Documents suggest the market was paved at that time to cut down on odor and debris. Excavations revealed the paving of the expanded market square as a single layer of narrow bricks on a base of orange clay. The clay and bricks were placed over layers of refuse-

Figure 141: Exposure of Feature 1, 1780s market paving in the 2009 excavation block, facing east.

filled sand. This also provided a tightly-dated event, so that we could better interpret the dates of fill layers above and below the paving.

The stratigraphic record bore remarkable similarity to the features and events described in the documentary record. The superimposed layers contained a dense artifact assemblage, allowing reliable dating and association with documented site events. Soils associated with marketing activities are Zones 3 through 9, dating from 1770 to c. 1800. These deposits produced a large artifact assemblage that informed on both market and waterfront activities; the controlled excavations in 2009 alone produced 35,000 artifacts.

Figure 142: East profile of N345 E325. The paving for the market is visible in the center. The brick adjacent to the pvc conduit may be related to the additional market stall. Soils below the paving are related to the market in the 1780s.

To explore the content of the market strata, the faunal and cultural assemblages will be compared to the other Charleston market site, the Beef Market at Meeting and Broad Streets. An extensive study conducted in 2004 provides baseline data on a colonial market assemblage. Further, the assemblage from the contemporary and extensively studied Heyward-Washington House at 87 Church Street provides a residential example. Beyond these, the Lower Market will be examined in relation to the general Charleston assemblage, a cumulative study of 30 urban sites, with varying temporal and functional components and with South's Carolina Artifact Pattern that forms a basis for comparative studies.

The Beef Market Assemblage

Testing in 1984 and data recovery in 2004 revealed remains of the 18th century market at the northeast corner of Meeting and Broad Streets. Archaeological evidence of the market and on-site activities was first recovered from Washington Park, but the majority of the site was located beneath the c.1800 City Hall building. Testing showed that the site was largely undisturbed, and sealed from subsequent deposition and deterioration by construction of City Hall.

The excavations revealed that the 18th century site, aside from construction trenches for the City Hall foundations, was undisturbed. Distinct soil layers and discrete features were deposited between 1690, the founding of the market, and 1796, when the third market structure burned and was not rebuilt. Foundations and associated features from the 1760 market building were outlined in eighteen controlled excavation units and later construction trenches.

The well-preserved and easily-defined layers at the market site contained a material assemblage that was distinct from contemporary domestic sites; moreover, the market assemblage remained remarkably consistent through the 18th century, despite architectural changes to the site and social changes throughout the city. Based on these conditions, the materials retrieved from City Hall present a reliable record of activities and products at Charleston's colonial markets. As such, the site serves as an important basis of comparison for the Lower Market assemblage, retrieved from a much more 'open' and complex archaeological site.

Figure 143: Typical soil profile from the Beef Market. Dark soil is the early market square, 1690-1730; the yellow sand cap is the third market, 1760-1796.

The Beef Market assemblage was unique in many ways. First, the market assemblage was unusually dense. The use of open space for refuse disposal, and efforts to reduce refuse disposal, has been measured on Charleston sites by calculating the amount of cultural material present in the soil. To standardize this, the number of artifacts is calculated against the cubic footage of soil excavated, measured by the depth of the soil deposit and the dimensions of the unit or feature. Bone weight has been calculated in the same way.

Figure 144: Bone sample from South Adger's Wharf.

Table 7: Bone and Artifact Density, Market vs. Residential sites

	Bone, gms/ft3	artifacts, #/ft3
Beef Mkt, 1760s floor	224.4	60.4
Beef Mkt, 1739 midden	90.8	82.7
Beef Mkt, 1700s surface	219.9	31.8
HW, 1730-1740	26.3	11.6
HW, 1740-1750	42.0	21.9
HW, 1750-1820	78.3	37.0
Lower Market, Zone 9	102.9	78.2
Lower Market, Zone 2-3	192.3	86.6
Redan, Zone 10	41.61	43.4

The Beef Market contained significantly more bone per cubic foot of soil than any other site excavated in Charleston. In some areas, the bone was ten times greater than the Charleston average. This fact alone provided an archaeological signature for the market. The same measures were applied to the Lower Market proveniences and a contemporary residential property, the Heyward-Washington House. Both bone and artifacts were relatively dense at the Lower Market. Bone averaged 103 grams per cubic foot of excavated soil, in contrast to 78 grams at the Heyward House and 224 grams at the Beef Market. Artifacts were particularly dense at the Lower Market, 78 per cubic foot. By comparison, there were 37 at the Heyward House and 60 at the Beef Market. Moreover, bone was much denser in the layers associated with the Lower Market than the deepest deposit (Zone 10) that predates the market. Though the marsh in front of the redan collected refuse from the waterfront, both artifacts and bone were much less dense than

the later market layers. Zone 10 produced only 41 grams of bone per foot of soil, and only 43 artifacts.

The Beef Market and the Lower Market

Generally, then, the density of bones and artifacts in the Lower Market layers mirrors the assemblage from the Beef Market. Further, the difference in density between the market layers and the pre-market layers on the same site suggests the differences reflect a change in site function and on-site activities. The Lower Market deposits, then, mirror those of the Beef Market, and stand in contrast to non-market sites of the same period. Further, the early 18th century deposits at South Adger's Wharf are not similar to the early deposits at the Beef Market, when that site functioned as a market location but lacked a formal market building. The early deposits at the Beef Market contained few artifacts, but a dense layer of bone (219 grams/ ft 3); the early 18th century waterfront contained only 41 grams of bone.

Having established that the market-era deposits at Tradd Street match those of the Beef Market in quantity, we can now examine the content of those assemblages for similarities or differences. The cultural material assemblages in Charleston are all quantified by function, using South's artifact categories as a guide to consistency.

The range of artifacts recovered from Charleston's Beef Market was also significantly narrower than other sites in Charleston, particularly residential ones. Artifacts of personal possession and items from furniture were rare. Clothing items were only slightly more common. There were proportionately fewer architectural items from occupation periods with standing structures. The amount of arms materials was elevated, due to the recovery of quantities of debitage from English flint. The market assemblage, then, was dominated by ceramics, bottle glass, and tobacco pipes. The assemblage was also characterized by very small artifacts, likely the result of trampling and daily foot traffic. This supported interpretation of the refuse at the market as primary, and generated on site.

The South Adger's Wharf assemblage showed some variation through superimposed strata, but overall the assemblage was remarkably homogenous. Moreover, the assemblage was unique, exhibiting artifact proportions unlike those from domestic sites in the city and throughout the lowcountry. First, the range of artifacts recovered from the site was significantly lower than from residential sites. Artifacts from groups other than kitchen and architecture were very rare. Arms materials were also rare. The activities group was also reduced in relative frequency, and dominated by barrel strap fragments. The assemblage is dominated by bottle glass, ceramics, and tobacco pipes. In this respect it is similar to the Beef Market, but also distinctive.

Table 8: Market and Residential Artifact Assemblages

	Beef Market	Lower Market	HW	CAP
Kitchen	69.3	69.7	53.2	60.3

Architecture	19.6	21.1	36.8	23.9
Arms	2.4	0	.6	.5
Clothing	.3	.1	.8	3.0
Personal	.1	0	.05	.2
Furniture	.2	0	.2	.2
Pipes	16.0	8.8	6.5	5.8
Activities	1.2	.14	1.7	1.7

The numerically larger Lower Market assemblage mirrors that of the Beef Market and contrasts with the Heyward site and with South's Carolina pattern. Kitchen wares dominate the two market assemblages, whereas architectural materials are reduced in proportion, despite the presence of structures on both sites. More significantly, items of personal adornment and possession – those artifacts that reflect household activities outside of the kitchen – are reduced in proportion or not present at all. There were virtually no clothing, personal, or furniture artifacts at the Lower Market. Pipes are less frequent at the Lower Market than at the Beef Market, but still higher than the residential average.

The kitchen group of artifacts is comprised principally of ceramic and glass vessels. Ceramics may be roughly divided into two groups, those vessels used in food preparation and storage, and those used for food service and consumption. Knowledge of the many ceramic types, as well as observation of formal attributes, may be used to ascribe the form and function of recovered vessels. Vessel form and function, in turn, informs on site activities.

At the Beef Market, the range of kitchen wares was narrower, and more stylistically conservative, than elsewhere in the city. An unusually large number of drinking vessels – drinking pots, tankards, canns – were present in the ceramic assemblage, while expensive tea wares were less common. Utilitarian cooking wares were relatively common, most of these lead-glazed earthenwares. Pots and pans were recognized. Stoneware storage vessels, including jugs and pots of brown saltglazed stoneware, were the most common. Pots or butter pots were the other prevalent vessel form.

Colono ware, though, was noticeably scarce. Researchers expected that colono ware, made by African American or Native American residents of South Carolina, might be sold in the market and that we would recover evidence of this activity. However, the amount of colono ware was smaller than any other contemporary Charleston site.

Relative proportions of the more common ceramic types are shown below in comparative format. Only those proveniences associated with the second half of the 18th century –the period of the Lower Market deposits - are shown for both the Beef Market and the Heyward House. Numbers are percentages of the total ceramic assemblage.

Table 9: Relative Frequency of Ceramic Types, Market and Residential Sites

	Beef Mkt.	Lower Mkt.	HW	Chas avg.
Lead glazed earthenware	22.6	5.9	7.6	12.5
Combed and Tr. Slipware	21.5	17.0	26.6	25.9
Colono wares	4.2	2.0	1.5	6.2
Util. stoneware	9.0	7.2	7.8	7.6
French/Spanish wares	1.1	1.0	1.2	1.3
Delft	13.7	11.0	11.7	25.0
Porcelain	6.2	10.3	12.0	6.7
Creamware	4.9	24.4	18.9	4.5

Proportions of ceramic types within the kitchen group were not as consistent between the Lower Market and the Beef Market. The Beef Market was characterized by an unusually large proportion of utilitarian ceramics. The ratio of table to utilitarian ware at the lower market, however, more closely matched the residential Heyward assemblage. While cooking vessels were somewhat less common, storage wares such as brown saltglazed stoneware, dominated the ceramic assemblage at South Adger's Wharf. Colono wares, though, were lower than the Beef Market, and far lower than the Heyward House. The paucity of colono wares at both market sites may suggest that colono ware was a household item, perhaps found only in residential kitchens, and not used in public facilities.

The Beef Market assemblage was also characterized by a large number of drinking vessels, including mugs and tankards of stoneware and earthenware, and even stemmed glassware. Tea wares, including tea bowls and teapots, were relatively scarce. This trend was not as clear in the Lower Market assemblage. There was an increased presence of tea wares here, particularly tea pot forms. Drinking vessels were proportionately less common.

As previously discussed, the South Adger's Wharf assemblage was characterized by a preponderance of olive green bottle glass. Proportions of bottle glass to ceramics were higher at the Lower Market than at either the Beef Market or the Heyward property.

Table 10: Relative Frequency of Ceramics and Glass

	Beef Mkt.	Lower Mkt.	HW
Ceramics, % of kitchen	65%	51%	58%
Glass, % of kitchen	35%	49%	42%

The aspects that define the Beef Market assemblage – tobacco pipes, drinking glasses, some tableware, and cooking vessels – suggest a public setting for social

activities. In this respect, the Beef Market assemblage was comparable to those from taverns of the 18th century. Taverns, or ordinaries, provided the most common setting for such activities. They offered food and lodging, as well as a venue for public and private meetings and entertainment (Lounsbury 1994:369). Urban markets were, of course, much more open and transient, but they served as an informal gathering place, centered around food and drink. This informality should also be reflected in lower amounts of tablewares.

The cultural signature of the Lower Market is not as distinct as that of the Beef Market. This may reflect the fact that excavation was adjacent to, rather than directly within, the market footprint. It also reflects site formation events – the layers were likely at least secondary deposits associated with demolishing the redan superstructure and filling the area for expansion of the market. It may also reflect the multiple functions and open nature of the waterfront surrounding the Lower Market; in other words, there may be artifacts from more than just the market. The large deposition of creamware, for example, is likely not part of market activity. The Lower Market assemblage also shows a somewhat higher proportion of bottle glass than the Beef Market or the urban residential sites. This may reflect increased alcohol consumption at the Lower Market or along the waterfront, or it may reflect deposition of refuse unrelated to the market.

Aspects of the archaeological assemblage discussed above underscores the challenge of urban archaeological research. The concentration of people and activity in a relatively small space results in refuse and materials from multiple activities deposited together. Even for sites with detailed documentation, sorting artifacts from various activities is challenging, and probably arbitrary. A quick view of the 1785 plat suggests that the small area excavated in front of the redan could contain artifacts from a number of activities: the market, the adjacent counting houses and waterfront offices, nearby residences, and shipping. It appears that the majority – but not all – of the materials recovered from Lower Market zones were from marketing activities.

Archaeological research is built on the premise that the archaeological record – the soils and the materials contained in those soils – reflects the human activities that resulted in those deposits. The Lower Market is described as a vibrant, bustling location, often crowded and often dirty. The market was squeezed into a narrow location, surrounded by wharves, slips, warehouses and counting houses. The curtain line and redan further constricted the activity areas. People, animals, and produce arrived by boat from surrounding plantations. The archaeological assemblage is a reflection of the dense, noisy daily affairs at the Lower Market.

By contrast, the Beef Market site served only as a market throughout the 18th century. As such, the assemblage from the site should only reflect activities that occurred at the market. The Beef Market assemblage varies significantly from the residential site profile. Though not an exact match, the Lower Market assemblage more closely resembles the Beef Market than the residential profile.

The Faunal Evidence

The faunal record from the Lower Market is similar, though not identical, to that of the Beef Market, in contrast to non-market sites. At the time of initial testing in 1984, Reitz noted that bone refuse at the Beef Market was considerably denser than any other Charleston site, and exhibited unique characteristics. The overwhelming density of bone is shown above in Table 7. Though not as dense as the Beef Market assemblage, bone at the Lower Market was considerably denser than the residential sites, and twice as dense as the earlier waterfront accumulation. This concentration of bone is a signature for marketing activities.

A surprisingly rich array of animals was consumed in the city. This array of animal products, with an emphasis on wild game and fish, was evidently sold at the Beef Market. The remains of 30 different types of animals are present in the Beef Market assemblage, which contained 30,333 individual specimens. Richness (or variety in the number of taxa) increases from 43% to 80% through the 18th century. The greatest increase in richness at the market is in fishes. By the late 1700s, over 40% of the taxa were fishes, whereas only 20% of the taxa were domestic animals. The decline is due primarily to a reduction in cattle through the century.

Reitz (2005) suggested that smaller meats were sold more frequently at the market towards the end of its operation, reflecting its central location at Broad and Meeting Streets where livestock, particularly cattle, were increasingly unwelcome. Reitz further noted that some of the changes in domestic animals appear to be between small-bodied and large-bodied animals, and this may pertain to the growing urban character of Charleston. Documents suggest the Lower Market may have provided a necessary outlet on the edge of town for the sale of larger mammals.

Figure 145: Horn cores from short-horned cattle and goat

Although individuals from numerous taxa were sold at the Lower Market, the greatest volume of meat was from domestic animals, particularly beef. The diversity of wild and domestic species sold at the market is reflected in MNI, but the calculation of biomass tells a slightly different story. Despite the fact that many of the individual animals sold at the Lower Market were wild taxa, the vast majority of the meat sold was from domestic taxa, particularly beef. The percent of beef at the Beef Market was even higher. This suggests that the Beef Market remained the city's prime source of beef, as

its late 18th century name implies. The Lower Market did not replace the Beef Market as the source for beef.

Colaninno and Reitz (this volume) note that the assemblage from the Lower Market is similar to the Beef Market. Numerous wild taxa were sold at the market in addition to domestic taxa. This includes a number of aquatic species, particularly fish and turtle. Like the Beef Market, there is a temporal decline in the frequency of pig and cow individuals through the 18th century. There is an increase in domestic birds, particularly chicken, at the Lower Market. This trend is seen in non-market sites, as well. The Lower Market supports the overall trend toward the sale of smaller domestic mammals, with a decreased sale of large mammals, particularly beef.

Butchery methods manifest in bone modification, including cut marks, hack marks, and sawing, provide information in the preparation of meats for sale and for consumption. Sawing is considered a commercial meat preparation, though the frequency of sawed specimens noted at the market sites is within the range of the non-market average. Reitz suggests that sawed bone on domestic sites reflect meats purchased at market. A preponderance of hack marks was noted at the Beef Market and was suggested as a signature for commercially-produced meat in the colonial period. The use of hack marks was not as strong at the Lower Market, and thus this association remains ambiguous. Cut marks can be from commercial butchery (carcass disarticulation) or from domestic use, including consumption.

Figure 146: Complete axis (2nd vertebra) from cow.

The dominance of beef at the Lower Market is not necessarily reflected in the scant documentation available. A summary in the 1773 South Carolina Gazette lists the "creatures killed and sold in the Lower Market for the previous year: 547 beeves, 2907 calves, 1994 sheep, 1503 lambs, 230 deer, 797 hogs, 4052 shoats" (*South Carolina Gazette*, October 10, 1773). A visitor the following year noted that the Lower Market sold "pork, veal, poultry, and greens." No mention was made of beef at the Lower Market, though the same visitor noted that beef was a seasonal product, "which on account of the hot weather is now reckoned out of season and but very indifferent can't be had under 4d per point but in winter it is much better at 2d per pound"

The waterfront location of the Lower Market likely meant that some of the remains of these butchered animals were deposited in the harbor. The central location of

the Beef Market, in contrast, likely hampered the ability of butchers there to slaughter on-site, or nearby. Legislation relating to the Charleston markets through the 18th century suggests that smaller animals were penned and slaughtered at the colonial markets throughout their history, and into the 1807 enabling legislation for the new market. These include calves, sheep, goats, and hogs. The butchering of cattle was evidently less common, and by 1783 was prohibited within the city limits (*SC Weekly Gazette*, October 4, 1783). Despite this legislation, slaughtering evidently continued on some level, as the Medical Society was recommending against it in 1795 (*City Gazette and Daily Advertiser*, May 15, 1795).

It seems likely that, in the early-18th century at least, cattle arrived in Charleston on the hoof. Slaughtering at the market site at Meeting and Broad Streets is also likely for the earliest period (1692-1739). Here, zooarchaeological data and soil chemistry profiles suggest slaughter, or at least extensive butchering, on site. Thereafter, it is more likely that cattle were slaughtered at a peripheral location, and quarters brought to the centrally-located market. Such a practice is inferred from legislation that stipulates requirement for covered wagons carrying meats. The Lower Market evidently operated in a slightly different manner; the 1774 summary from the *South Carolina Gazette* lists the "creatures killed and sold," and the list begins with "beeves." The waterfront location of the Lower Market likely meant that some remains were deposited into the harbor, even though Market Dock was "dry at low water." A high tide would be required to wash away the debris. In 1795, the Medical Society of Charleston made a series of recommendations to City Council designed to improve the public health of the town. These included "That the slaughtering of animals either in Charleston or the vicinity, for market, be prohibited, except in such places as are daily washed by the ebbing and flowing of the tide" (*City Gazette and Daily Advertiser*, May 15, 1795).

The data from the Lower Market, the Beef Market, and from dozens of residential sites suggest the markets were not the only source of meat for urban residents. This is true for both wild resources and domestic meats, including beef. Data from both types of sites suggest that some domestic meats came from the market, but others were raised and slaughtered at home. Wild resources could have come from a property owner's plantation, hunted or trapped by the owner or his resident slaves. Conversely, a household might purchase those wild resources from a market huckster. Both the zooarchaeological and documentary records suggest it was equally likely that they were purchased at the market.

The overarching result of the zooarchaeological analysis of Charleston sites – the markets, the public establishments, and the homes – is that there was no simple, unidirectional flow of meats from countryside through commercial outlets to residential ones. Instead, meats were acquired, processed, and distributed through several channels.

Though they are not identical, the assemblages from the Beef Market and the Lower Market are similar enough, when compared to non-market sites, to suggest that market assemblages are distinct from non-market sites. The distinguishing characteristics

noted at the Beef Market were largely supported by data from the Lower Market. Temporal trends at the Lower Market were hampered by a shorter period of occupation.

Despite complaints about the cleanliness, both markets were relatively free of vermin. The frequency of Old World rats declines through time at both markets. Likewise, the frequency of rodent-gnawed bone specimens is lower in both market collections, compared to other 18th century sites in Charleston. This suggests that the markets were cleaner than other locations within Charleston. It may be that open buildings, heavy human traffic, and daily cleaning did not supply rats with an ideal habitat, or that rats were kept at bay by market predators, particularly cats. Cats were recovered in the Lower Market assemblages.

Figure 147: Old World rat.

Figure 148: *Rattus* specimens from the Charleston waterfront.

The validity of a market signature, and association of the faunal remains from South Adger's Wharf with marketing activities, is supported by comparison between the materials from the market deposits, Zones 3 through 9, with those from the moat, Zone 10. The materials from the moat do not match the market pattern, and do not match the residential pattern, either. The moat assemblage is remarkable for a high proportion of commensal animals, particularly Old World rats.

Table 11: Relative Frequency of Commensal Species

South Adger's moat	23%
Atlantic Wharf	31%
Lower Market	7%
Beef Market, 1690-1739	9.1%
Residential, 1712-1750	7.l%

These were 23% of the MNI, and the assemblage is comparable to another waterfront site, the Atlantic Wharf site, where Old World rats were 31% of the assemblage. These waterfront areas, where humans were not in residence and refuse accumulated beneath the wharves and docks, were evidently ideal habitat for these vermin, and little was done to curb their presence. This assemblage reflects site function,

rather than simply location, as the proportion of rats dropped dramatically (to 7%) when the Lower Market was constructed. As discussed above, there were evidently active efforts to control rats in the markets.

The cultural assemblage from the moat was likewise distinct from the materials above. Construction, use, and filling of the moat and other waterfront activities are discussed in the following section. The third function of the South Adger's Wharf site was as an evolving waterfront landscape.

Chapter VII
Development of the Waterfront

The ongoing study of Charleston as landscape is based in the principal of a cultural landscape, the modification of land according to a set of cultural plans, embodying often inseparable technological, social, and ideological dimensions. People created and used these landscapes in a planned and orderly manner for everything from food procurement to formal design to explicit statements about their position in the world (Jackson 1984:7-8). Examination of the physical attributes of the archaeological record at South Adger's Wharf serves as a link to a broader examination of certain aspects of Charleston's evolution as an urban center, through the paradigm of site formation and landscape study.

John Stilgoe (1982) defined landscape as "that area comprehended in a single view." Dell Upton challenged that definition, however, suggesting that the landscape was meant to be experienced dynamically, that a visitor, or actor, passed from one contrived setting to another, and was meant to piece together many partial views and symbols. Further, individuals from various social situations experienced these landscapes differently. Upton further suggests that the urban landscape is more than just an amalgamation of individual landscapes. It also possesses a unique and definable character of its own, "simultaneously collective and contradictory" (Upton 1992:51). The urban environment in particular was experienced through all five senses – sight, sound, smell, taste, and touch. The commercial waterfront of a port city embodies many of these aspects of urban life.

Development of Charleston as a center of trade and commerce included manipulation of the waterfront for trade and shipping. Creation of a formal waterfront, including features for defense, for local commerce, and for transatlantic trade, and changes to this waterfront over the course of three centuries, reflects the needs and aspiration of urban residents. This study focuses on the development of filled, or artificial, land as part of the urban environment. It begins with consideration of the processes responsible for formation of the physical archaeological record.

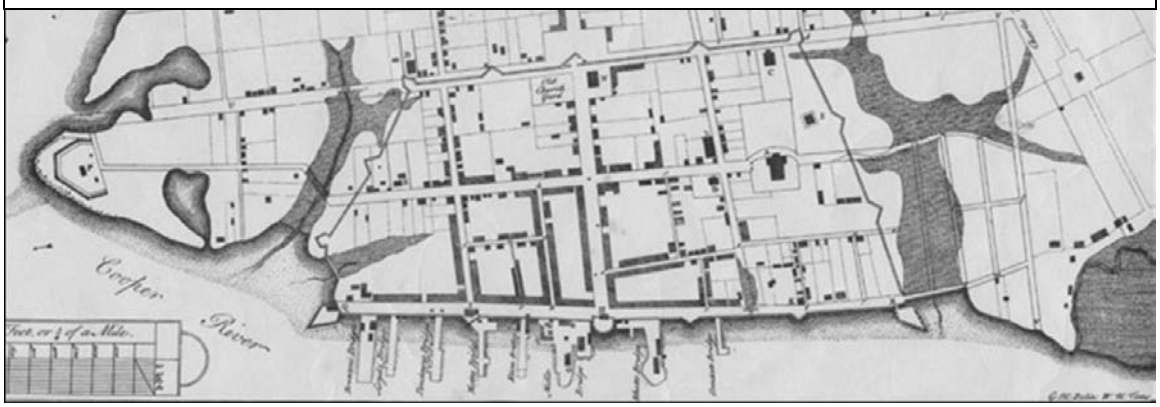
The Urban Waterfront

During the first decade of Charleston's existence, most captains of ocean-going vessels used lighters to carry their goods to the town docks. In the 1690s, however, those areas along the shoreline deep enough for large ships were converted to wharves. By the time of Crisp's map of the city in 1711, two wharves, or bridges, were shown projecting into the Cooper River from the brick curtain line.

The port was constantly expanding as new docks and wharves were built. Bishop Roberts' 1739 *Prospect* shows a city crowded behind an imposing brick seawall,

surmounted by a curtain line provisioned with cannon. The map by the same illustrator, though, shows several wharves extending beyond the wall. Each new wharf required a breach in the curtain line. A 1736 law allowed the parapet to be opened on Bay Street "for all Bridges that extended twenty Feet beyond Low Water Mark…." The openings could be "Convenient for …communication of said bridges with the said Bay Street" (Stevens 1988 in Joseph et al. 2000:5). The shift in attitude, from defensive to expansive, played out through the 18th century in an ongoing struggle between maintenance of the curtain line along the waterfront and opportunities to breach this curtain line for efficiency of transportation.

Figure 149: Portion of the 1739 *Prospect*, showing eight wharves in front of the curtain line.



A major impetus for growth and change in the city was the fire of 1740. This destroyed blocks of colonial buildings, including those in the Roberts and Toms view of 1739, and cleared the area for rebuilding in newer styles. The hurricane of 1752 damaged most of the waterfront, as well as the buildings and stores and their content. The brick seawall itself evidently suffered considerable damage (Calhoun 1983; Herold 1981). The rebuilding occurred during Charleston's economic heyday. The imposing new Exchange and Customs House was built on filled land on top of the Half Moon Battery. By 1770 there were seventeen bridges, and twenty-two by 1788. In 1786, the curtain line was demolished as East Bay Street was widened to the east to 66 feet. Wharf owners were permitted to build "convenient Brick Houses, to be covered in Tile," in return for providing the land "east of the curtain line" for the road (Stevens 1988:502 in Joseph et al. 2000). Another law in 1787 may have encouraged infill of underwater sections of the commercial waterfront.

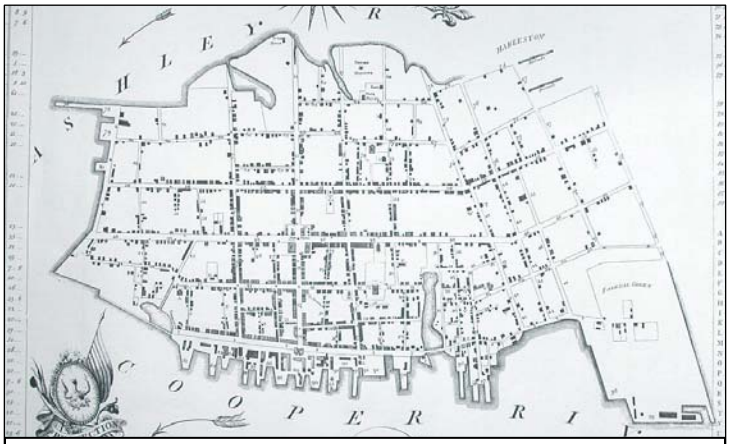
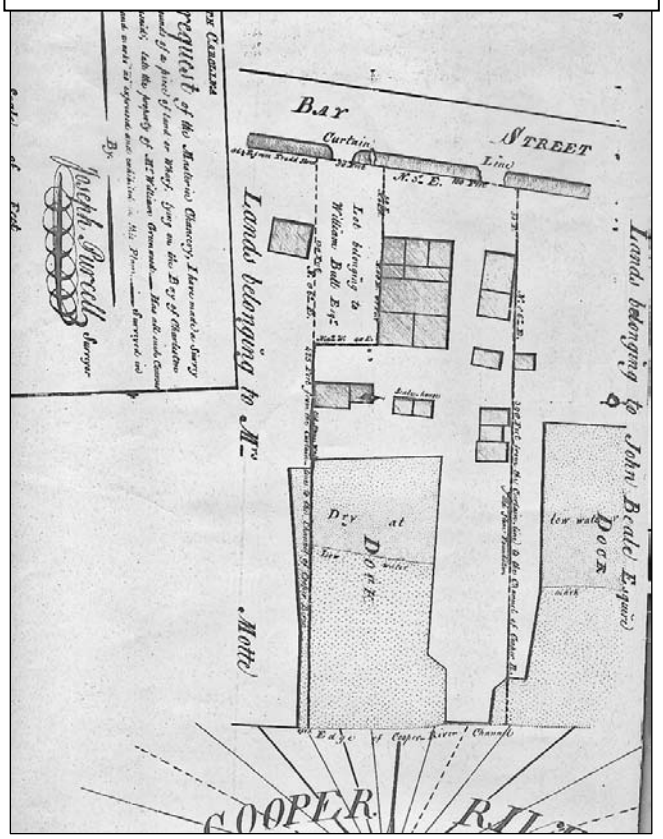


Figure 150: Twenty-two wharves are shown in 1788 (Petrie).

Figure 151: Property of William Greenwood, 1785 (McCrady plat 512, CCRMCO).



The imposition to commerce caused by the curtain line is clearly illustrated in a sample of plats prepared by surveyor Joseph Purcell. North of the Lower Market and Mrs. Motte's Wharf, the adjoining Greenwood's Wharf required two breaches in the curtain line in 1785. Mr. Purcell's detailed plat shows a carefully constructed opening to access a small lot owned by William Bull, while another, evidently hacked, opening accesses the dock proper. Demolition of the curtain line resolved these difficulties.

Eveleigh's Wharf, number 82 on the 1788 Petrie map, was located south of Tradd Street, between Stoll's Alley and Longitude Lane. A 1785 plat shows the curtain line in place, but a breach in the wall provides access to the wharf and a row of stores constructed of wood. The southern portion of the wharf contains eight stores of brick. Two years later, demolition of the wall has evidently provided an opportunity to expand his holdings. Lots have been subdivided in front of the brick stores, and two passages and an alley provide access to the eight stores. The ever-detailed Mr. Purcell recorded the

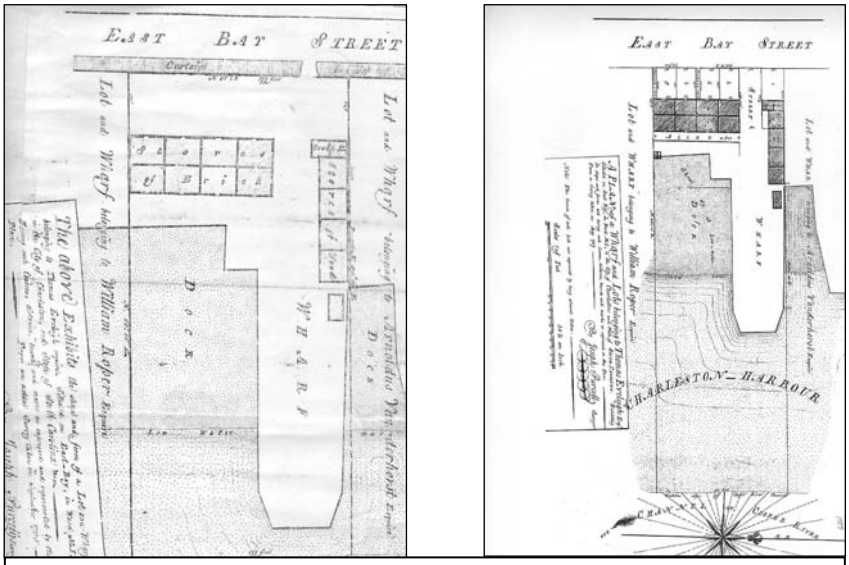


Figure 152: 1785 and 1787 plats of Thomas Eveleigh's Wharf, showing a breach in the curtain line replaced with a wide passage to the wharf (McCrady Plat 1211 CCRMCO and SCHS 32-31-15).

addition of a four-seater privy, delicately poised over the edge of the wharf, above a "shoal dry at low-water."

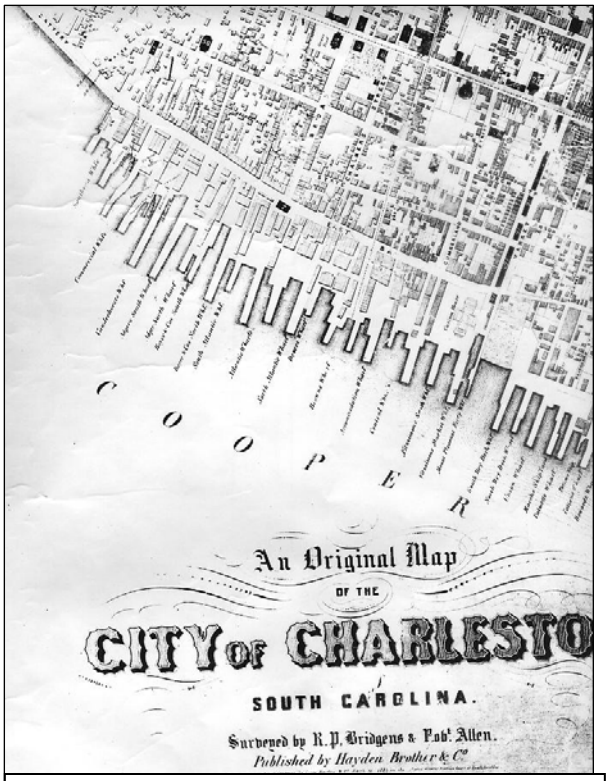


Figure 153: Portion of 1852 Bridgens and Allen map, showing expansion of the wharves and waterfront along the Cooper River (South Carolina Historical Society).

The wharves and waterfront remained a focal point of the city in the early-19th century and merchants continued to congregate near the waterfront. By the middle of the century, however, King Street had become the retail center of Charleston, and the city was somewhat realigned along a north/south axis centered on this overland thoroughfare. The new railroad terminal was built between King and Meeting Streets in 1852 (Rosengarten et al. 1987; Calhoun et al. 1984). During this time, wharf ownership was consolidated into firms owning larger pieces of real estate. Filling of land and construction of piers continued, but by the turn of the 20th century many of the wharves were abandoned and became "rotting piles of decaying timbers" (Fraser 1989:343).

Through the 1920s, the Cooper River wharves were controlled by the Terminal Company, a railroad company. They neglected the waterfront, and Mayor Grace campaigned to bring the property under municipal control. He created the Ports Utility Commission Authority, the local precursor to the South Carolina Ports Authority. The Authority has greatly enlarged and modernized the port of Charleston, and it remains the nation's fourth busiest container port (Rosen 1992:141; Joseph et al. 2000:8). The locus of the commercial waterfront activity has shifted north, however, and is now centered on the Cooper River between Calhoun Street and the Ravenel Bridge. Mayor Riley has continued the city's effort to revitalize the waterfront. The areas between Market and Water Streets still controlled by the City have been revitalized for public and visitor use.

Anatomy of a Wharf

Standing within the footprint of the redan at Tradd Street, it is difficult to imagine the water lapping at the base of that triangular feature. The Cooper River waterfront is now nearly 1,000 feet to the west. There is little to no description of the filling process,

but inferences can be drawn from maps and plats of the waterfront. Based on cartographic evidence, Joseph et al. (2000) suggest that the infill process began in the 1780s, when it became legal. A century later, significant infill had occurred, though small portions of the area remained open until the 20th century. Complete infill of the Cooper Riverfront occurred in the early-20th century.

Growth of the filled land occurred gradually, much of it the result of wharf construction. Colonial wharves were not constructed on pilings, but were instead solid log or wood cribs, filled with stone or other heavy material to sink to the bottom. Silting then occurred around these structures, necessitating longer structures to reach the water. Building on the work of Joseph Norman (1987), Joseph, Hamby, and Langdale (2000) describe wharf construction techniques in the 18th century. They have conducted the most detailed archaeological work to date on wharves of the Cooper River, in their study of the Vendue-Prioleau tract. This tract is located on the south side of Vendue Range, the extension of Queen Street, and a full block east of East Bay Street. Here, with the aid of a backhoe and water jet, archaeologists were able to expose and record the foundations of wharves constructed in the 18th and 19th centuries, particularly Samuel Prioleau's Wharf of 1774 and, later, Magwood's Wharf. Joseph and his colleagues uncovered evidence of cobb construction in the late 18th century, and concurrent filling and construction through the 19th centuries.

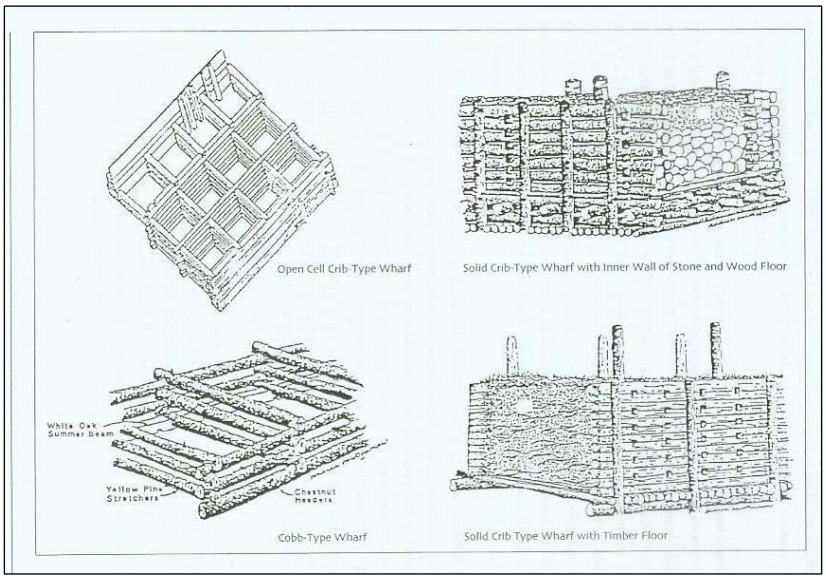


Figure 154: Various forms of Crib and Cobb Wharf Architecture (from Joseph, Hamby, and Langdale 2000:23; used with permission).

Colonial wharves were either marginal, constructed along a shoreline and utilizing a fill retaining wall, or projecting. "Dock" is the navigable water next to the wharf; a narrow dock between two projecting wharves is a slip. Wharves were not constructed on pilings, as they are today, but instead resembled stone breakwaters. Cribs of palmetto logs, resembling log cabins, were built on shore and floated to their desired location. Several were placed in a line running toward land, and then were filled with stones, usually ship's ballast, until they sank (Coker 1987:42). The line of sunken cribs was connected on the surface by a wooden walkway. Some wharves, like Adger's Wharf, were further protected by granite stones placed in a curtain around the cribs.

Solid filled wharves were usually constructed with cribs, or box-shaped frames of rough hewn timbers, notched and fitted together. The resulting spaces were filled with mud, clay, stones, or cord wood. Fill was often dredged directly adjacent to the dock or slip area.

Norman (1987) lists six steps to build a wharf: measure the bottom depth, construct the crib or cobb of logs, sink the cribbing, fill the interior, and top the structure. Once measurements were complete, construction usually began on the shore near the final location of the wharf. Early wharves did not conform to particular measurements, but eventually construction details became more stringent. The crib was launched after several courses of timbers had been laid, and was roughly positioned into the bottom with temporary anchor piles.

Figure 155: Early- 20th century photo of fishing vessel. Note the dock is supported with cribbing, rather than piles (Collections of The Charleston Museum).

Final positioning and sinking of the crib occurred in concert. Additional courses were added, and the growing height and weight caused the crib to sink and settle to the floor. Filling began once the cribs were built to the height of a common tide. After this was complete, the topping logs were placed to be above water. Crib fill was as variable as the cribs themselves, with stone, mud, and gravel the most common material.

Because it was visible above the water line, the wharf toppings were often more finished. But because of their location within a fluctuating waterline, the timbers often decayed. Deterioration of the timbers eventually allowed the fill to leak out (Norman 1987:44; Joseph et al. 2000:25).

Buildings were also constructed on wharves. They mostly consisted of storehouses where goods could be counted, shipped, purchased, and kept dry. The House of Assembly regulated buildings constructed on the wharves. Laws preventing the construction of buildings on wharves was laid aside in 1725, giving "Persons having right to any of the Lots to the Eastward of the Front Wall" to build "Cranes, Crane Houses, and Ware Houses not exceeding ten feet in height" (Lipscomb and Olsberg 1977:53; Joseph et al. 2000). A law in 1736 raised the height of permitted structures from ten to sixteen feet. This law also, for the first time, allowed the parapet to be opened on Bay Street, "convenient Openings left for the communication of said Bridges with the said Bay Street" (Lipscomb and Olsberg 1977:53).

Joseph's excavations at Vendue Range uncovered evidence of three wharves, constructed during the mid- to late-18th century. Most of the block was underwater throughout the 18th century. The land was gradually filled during the 19th century, and

was above the water line by 1900. The wharves of the late-18th and early-19th centuries contained warehouses and storehouses, shops and offices related to the shipping industry, and maritime crafts. By the late-19th century, the block was covered with large warehouses. Many of those were demolished with construction of the rail lines in the early- 20th century.

The three wharf structures encountered at Vendue-Prioleau included two cribs of palmetto log construction and one of red cedar beams and planks. The first palmetto structure was connected with pegs, and filled with substantial amounts of clay and other material. The second was notched, and contained primarily ballast stone fill. The cedar crib was fitted more tightly and supported by a series of vertical pilings. Joseph et al. suggests the tight construction indicates a crib-style wharf meant to hold earth. This was also the earliest structure. The researchers suggest the shift to the more expedient cobb wharves of palmetto log occurred when demand for waterfront construction was greater, and increased shipping made ballast stone more available. This study provided important baseline information on the physical and commercial development of the Cooper River waterfront.

Archaeology of the Waterfront

The Vendue-Prioleau project conducted by Joseph, Hamby and Landgale used mechanical equipment to open up large areas and expose large site features, within a relatively limited time frame. This approach provided data on the appearance and form of early wharves, the processes and material used in land filling, and the architectural adaptations used for building on fill (Joseph et al. 2000:1). With this approach, relatively few cultural materials were retrieved. A small project by The Charleston Museum at North Atlantic Wharf complemented the Vendue-Prioleau project, in that the focus of the research was the fill materials, with lesser attention paid to the architecture of the wharf.

The fill deposits at Atlantic Wharf were used to consider three aspects of urban life. First is the analysis of refuse disposal practices by city residents as exhibited in communal dumps. Second, and most germane to analysis of the Adger's Wharf deposits, is consideration of the unique aspects of the assemblage relative to the waterfront location; in the case of Atlantic Wharf this was manifest in the retrieval of exotic (Spanish, French, Caribbean) artifacts and ecofacts in proportions not seen elsewhere in the city. Third is a consideration of urban health and sanitation, particularly the presence and control of vermin, as reflected in this assemblage.

The South Adger's Wharf assemblage provides a third sample from Charleston's waterfront. Moreover, the excavations here are more extensive than those of Vendue-Prioleau site, and the sample of cultural materials is much larger than that from Atlantic Wharf. This provides a broader data base to consider the issues discussed above.

Site Formation Processes

A basic question guiding archaeological analysis is, simply put, "how did these artifacts get here?" An often unarticulated assumption prefacing archaeological studies is that the artifacts were discarded, or otherwise left behind, by previous site residents – and them only. On an isolated, rural, residential site, this is a fairly safe assumption. On congested urban sites, where physical restrictions are somewhat in conflict with the cultural and physical requirements for a healthy and organized living space, this assumption is tenuous. Urban residents clearly moved great quantities of earth, and its contents, for various reasons. Excavations at the Miles Brewton House on King Street and the adjoining house on 14 Legare Street, for example, documented refuse (artifacts bearing the owner's name) from one household deposited in the middle of the yard of another (Zierden 2002; 2001a; 2001b). Therefore it is critical to examine the source of archaeological deposits in order to analyze them in proper context.

In his path-breaking articles, Michael Schiffer has suggested that cultural materials enter the archaeological record by four basic methods: discard, loss, destruction, or abandonment (Schiffer 1977). Discard, the throwing away of refuse, is the most common form of archaeological site formation. Artifacts and other debris are either broadcast on the ground surface, gradually forming zone deposits, or placed in newly dug (trash pit) or previously existing holes (such as abandoned wells, privy pits, etc.), called features. Items deposited due to loss are usually small, such as buttons, coins, toys, bits of jewelry, etc. Archaeologists often discover lost items in wells and drains, or soil lenses that collect beneath wooden floors. Abandonment of material culture may follow a disaster, such as fire or storm, or may occur when residents leave a property for some reason. In some cases it is possible to distinguish entire proveniences (the defined archaeological boundaries of single behaviors) resulting from specific depositional processes. A destruction deposit may be reflected in artifacts that are burned from a fire. More often, a provenience contains artifacts from a combination of events; a lost button may be included in a pile of deliberately discarded kitchen refuse. All of the above events can result in actively-used material items becoming archaeological.

Once in the ground, artifacts can be redistributed, or they can be removed (Ascher 1968; Honerkamp and Fairbanks 1984; Schiffer 1983). Redistributed deposits have been described by Schiffer as secondary, those that have been removed from their original placement in the ground. Nearly all of the urban deposits are secondary, if not tertiary. Archaeological deposits can also be removed, as when an area of soil or refuse is loaded up in a wagon and deposited elsewhere. Modern construction in Charleston entails a good deal of removal of old (archaeological) soil and replacement with new (sterile) soil. Such movement occurred in the 18th and 19th century, as well. Usually the archaeological record is a combination of all three events – introduction, redistribution, removal.

Archaeologists have traditionally concentrated their research efforts on primary deposits, or those that have remained in place since they were originally discarded. Secondary, or fill, deposits, removed from their original location, were considered 'disturbed,' and thus incapable of providing reliable information on past behaviors.

Archaeologists working in urban areas, however, have found that such reorganization is actually a true reflection of urban behavior (Honerkamp et al. 1983). These scholars have convincingly argued that fill is in fact an artifact of the urban landscape and as such is an important source of data (for this discussion, see Honerkamp and Fairbanks 1984). They further charge archaeologists with developing analytic techniques appropriate to the resource, such as an expanded scale of study (Honerkamp 1987; Rothschild 1985; Zierden and Calhoun 1987).

Much of the materials from South Adger's Wharf, however, appears to have been generated from on-site activities, and therefore can be correlated with site-specific events. The soil layers in front of, and over, the redan at Tradd Street, are likely redistributed, some of it as fill. Fill is the deliberate introduction of soils, and their contents, to produce a more desirable ground surface. Materials from other waterfront sites were clearly generated from other, unknown locations. However, as we have seen in Chapter VI, most of the materials excavated from the Lower Market area appear to have been generated on site. Other materials may also be from docked ships, waterfront workers, or other activities on the adjoining wharves. This deposition could be casual, and not deliberately part of a fill enterprise. As seen in Figures 151 and152, the mud banks between the wharves, exposed at low tide, could have received a considerable amount of casual debris.

Waterfront Refuse

Materials from Zone 10 date to the first half of the 18th century, and are associated with the moat that faced the redan when the waterfront was relatively open. Artifacts and other refuse likely accumulated as generalized debris from waterfront activities.

The moat assemblage is shown below in comparison to the earlier layers at the Beef Market (1690-1739) and at the contemporary Heyward-Washington House (1730-1740). The later 18th century assemblages from the Lower Market (the same site) and the Atlantic Wharf from the same period (1800s) are also shown in comparison.

Table 12: Comparison of Waterfront Assemblages

	S. Adger's Moat	Beef Mkt.	HW	Lower Mkt.	Atl. Wharf
Ceramics, % kitchen	16%	61%	55%	51%	60%
Glass, % kitchen	83%	38%	45%	48%	39%
Kitchen	89	53	47	69	65
Architecture	6.9	26	37	21	29
Arms	.04	1.7	.6	0	.2

Clothing	.06	.3	0	.1	.9
Personal	0	0	0	0	.1
Furniture	0	0	0	0	.01
Pipes	3.5	13.2	11.7	8.8	4.5
Activities	.2	1.6	1.6	.14	1.3

The Zone 10 deposit at South Adger's Wharf is composed almost entirely of olive green bottle glass. There is very little architectural material and virtually no personal/household items. The fact that the assemblages from the moat and the lower market levels vary from each other, and from the Charleston residential average, suggest the bulk of the artifacts recovered at Tradd Street were generated from on-site activities and that varied activities are reflected in the proportions of artifacts recovered. The moat fill appears to be casual discard.

Figure 156: Artifact assemblage from Zone 10, showing preponderance of green bottle glass; soil profile showing Zone 10 as waterfront/marsh soil.

The Adger's Wharf moat is in contrast to the organic layer of debris from Atlantic Wharf. The Atlantic Wharf dig was very limited in scope, confined to two 5-foot squares. The units were further truncated by a number of structural foundations within the units. It appears, however, that the artifacts were retrieved from fill, possibly inside cribbing for a wharf. It is therefore equally possible that the materials came from elsewhere in the city, likely as fill. As we have seen with the two market assemblages, the presence of personal, clothing, and furniture items appears to be a signature of a

domestic assemblage, and these were lacking at the public sites – both markets, and the South Adger's waterfront.

Comparison of the moat and market assemblages, with assemblages from public and residential properties of the 18th century, suggests that there is measurable variation in artifact assemblages in the colonial city. Further, these variations reflect real differences in site-specific activities and differences in the development of filled land. Unlike the Atlantic Wharf assemblage, all of the materials recovered at South Adger's Wharf appear to have been generated on site, and deposited in subsequent fill episodes. The market layers are evidently secondary, the result of filling the area in front of the redan after the 1785 demolition, but the soils were likely redeposited from the immediate area.

The dramatic variation between the early wharf assemblage and the later market assemblage are strong evidence for on-site deposition. There are comparable differences in the faunal assemblages of the two. This is further evidence for on-site deposition.

Figure 157: 1872 "Bird's Eye" map by C. Drie, showing extensive filling of the waterfront beyond East Bay Street and consolidation of the wharves (Library of Congress).

The Waterfront and Sanitation

Residents of the city generated great quantities of refuse in limited spaces. Wealthy urban residents arranged their large lots in a manner that segregated noxious chores and, to some extent, the resulting byproducts of those efforts. Those on less spacious lots had fewer options. Archaeological study has revealed that the problems attendant with increased population escalated as the 18th century progressed. The deliberate placement of specialized service buildings, separation of work yards and

gardens, and specific locations for refuse disposal were, by the early-19th century, conscious attempts to mold an urban landscape suitable to the social values and physical needs of urban residents.

Poor sanitation practices, ranging from open privies to rotting carrion in the streets, nurtured a wide range of diseases; these were battled by citizen complaints and ordinances throughout Charleston's history. As scientists and citizens began to link cause and effect in the 19th century, they attempted, on both individual and municipal levels, to ameliorate the situation. Both archaeology and documents reflect the widespread addition of paved work yards, cisterns, drains, and brick walls in the early-19th century. Many of the changes were aimed at reducing stagnant groundwater, removing wastewater, and obtaining clean water for consumption. The filling of low, swampy lands was part of the first effort.

Analysis of the faunal remains from residential sites, particularly from drain fill, trash pits, and work yard midden proveniences has provided information urban sanitation and the relative success of those efforts. Elizabeth Reitz (1997, 2000, 2002) has determined that such animals as rats, mice, toads, cats, and dogs comprise 10.6% of the urban faunal assemblages. These likely non-food animals are only 4.3% of contemporary rural faunal assemblages (Reitz 1986). This suggests that the crowded conditions of the city and resulting sanitation problems bred and increased level of the vermin associated with human activity. It is interesting to note that this presence is reduced on the elite sites, to 7.75% of the faunal assemblages. Evidently, efforts of the wealthy to segregate refuse, pave work areas, and remove waste water were somewhat successful (see Table 11).

The overwhelming number of rat remains (31% of the individuals) in the Atlantic Wharf faunal assemblage provides rather graphic evidence of the conditions of the early-19th century waterfront. The fill beneath the wharves and dark corners in the storage buildings on the waterfront were evidently teeming with vermin. Reitz suggested that the movement of refuse from domestic properties to the water's edge attracted the vermin, as well. Further, Reitz found no physical evidence of efforts aimed at controlling the waterfront rats during the deposition of refuse. It is likely that this was accomplished only when the refuse was covered by additional layers of fill. Cumulative data from Charleston sites suggest that the rodent problem worsened as the 19th century progressed. Rodent populations were particularly prevalent in areas that were dark and quiet, such as stables on residential properties.

It is interesting to note, then, a comparably high percentage of vermin in the early-18th century deposits at South Adger's Wharf. Colaninno (this volume) found that the faunal assemblage from this level was most similar to that from the Atlantic Wharf site. Though one is nearly a century older, both the Tradd Street site and Atlantic Wharf have a remarkably high frequency of Old World rat individuals. The high frequency of Old World rat suggests that areas around the Charleston harbor were used for trash disposal, and provided many dark and undisturbed nesting places, and was thus a prime habitat for rats. The frequency of Old World rats drops with the establishment of the Lower Market,

suggesting that either the market was intentionally kept clean of trash and debris, or the hustle and openness of the market did not provide an ideal habitat for rats, or both.

Zooarchaeological data from the Lower Market, the Beef Market, and some residential sites reflect efforts to control vermin and maintain a healthy urban environment. Data from the early-18th century waterfront at Tradd Street and the early-19th century wharves at Atlantic Wharf suggest these efforts did not extend to the areas in front of the seawall and around the wharves. As wharves were expanded to the east, it is likely that the vermin simply moved, and did not disappear. The waterfront data provide graphic evidence of failure to control refuse and associated vermin in the city.

Chapter VIII
Conclusion

The Tradd Street Redan and the Walled City Task Force

The project at South Adger's Wharf was the city's most public archaeological dig. It was also a cornerstone of the efforts by the Mayor's Walled City Task Force. The goals of the Task Force are to "research, identify, protect, and interpret the Walled City of Charleston." The project advanced each of these goals.

Figure 158: Visitors observe excavations in 2008; a fence adjacent to the excavation units in 2009 provided an ideal vantage.

The initial goal of the project at Tradd Street was to identify another component of the brick seawall. Prior to this project, only the Granville Bastion and the Half Moon Battery had been exposed and identified. Total station mapping of the redan, and of newly-exposed sections of Granville Bastion and the southern wall provided new information on the exact location of the fortifications. GIS mapping of these locations, in combination with historic maps, has advanced our understanding of the exact location of the wall, though our knowledge is still far from complete. At this point, we have a fairly good understanding of the location of the brick wall from the Half Moon Battery to Granville Bastion. A combination of plats, historic maps, remote sensing, and small and large excavations have revealed much of the Granville Bastion, and the brick wall beyond. Each newly-mapped section of the wall improves the overall 'fit' of historic maps to the modern landscape.

The research on the project was a joint effort by scholars from a number of institutions. Documentary research by Nic Butler and Katherine Saunders Pemberton involved a detailed perusal of legislation, court cases, and journal entries regarding the planning, construction, maintenance, repair, and demolition of the wall, with a focus on the Tradd Street area. New information was uncovered, and previous research was compiled.

Exposure of the redan in the archaeological dig provided new information on the physical attributes of the wall, including source of the brick, design of the protective features, and masonry style employed. Denis Brosnan's analysis laid to rest the issue of local versus imported brick. His analysis demonstrates that the brick is not only local, but probably produced nearby. Doug Scott's examination of the masonry provided details on construction style and the skills of individual masons. The ability to excavate to the base of the redan allowed a rare glimpse of the foundation of the seawall and retrieval of important wooden elements. Conservation of these allowed us to place them on permanent exhibit.

Figure 159: Conservation of wood pales at Maryland Archaeological Conservation Lab; mason Doug Scott prepares the brick for exhibition.

We also learned that demolition of the wall, at the time of abandonment in 1784, was minimal. The superstructure was pushed forward into the harbor, but the foundation was simply paved over and left intact. The top of the redan was discovered intact, about a foot below present ground surface. This matches the vertical location of the Half Moon Battery, in the basement of the Exchange and the Granville Bastion, as it was encountered by Simons and Lapham in the 1920s. Together, these discoveries suggest the sea wall is likely intact in most locations, lurking about one foot below present grade. Future excavations could be very shallow and succeed in locating and documenting the wall.

As a result of the excellent cooperation among agencies during the present project, we have made significant progress in protecting the wall. As stated at the first meeting of the Task Force, an immediate goal was to simply help those public agencies responsible for the city's streets and sidewalks recognize the wall when it is encountered. This problem was illustrated by the water pipe exposed in 2008. It was installed along the top

Figure 160: Repairs by Charleston Water Systems guide archaeologists to newly-discovered portions of the wall.

of the redan just five years ago by the same crew assisting in the dig. Now that we all can recognize the massive scale, the orange brick, and the white mortar of the early 18th century feature, we will be better prepared to avoid it during construction, and document it when it is exposed.

As noted throughout this report, the landward wall has been much more difficult to recognize and document. The filled moat and wooden elements encountered at the Charleston Judicial Center were exposed in large-scale construction excavations. The elements were preserved below the water table, in soils that were too unstable for long-term exposure. It is likely that positive identification of the landward walls will require broad-scale, deep excavation in areas of town where open land is limited. The landward walls remain frustratingly elusive. Protection of these features will be difficult without physical description and positive locations.

The excavations at South Adger's Wharf provided many opportunities for interpretation, both during and after the dig. The open excavations on a busy street attracted both visitors and local residents. Soon, Charleston tour guides were describing the dig to visitors. Their tours were updated often, thanks to the blog site maintained by Nic Butler (www.walledcitytaskforce.org). Project research was added to the updated Charleston Tourguide Manual, published in 2011 (Pemberton 2011).

Figure 161: On-site exhibit at South Adger's Wharf; visitors use the link to digital data

Many visitors to the dig expressed disappointment that the excavations were backfilled and the redan covered over. At that time, the Task Force began planning for on-site interpretation, but these efforts lagged for lack of funding. Impetus to complete the interpretive signage came with receipt of the Southeastern Archaeological Conference Public Outreach Grant in March 2012. Bolstered by these funds and a number of generous private donations, the footprint of the redan was marked on the present ground surface. Two waysides and a portion of the parapet were placed at the site in August 2012. Concurrently, the conserved pales and another section of the brick parapet, along with photographs and interpretive labels, were placed on permanent exhibit at The Charleston Museum in June 2012. These are enhanced by a large selection of photographs, available web pages maintained by The Charleston Museum and Historic

Charleston Foundation (www.charlestonmuseum.org/walledcity; www.historiccharleston.org). Finally, the results of the present project have been presented in a number of professional papers, public lectures, and – our favorite – *Walk the Wall* events sponsored by Historic Charleston Foundation. Data from the dig is featured in the *Walk the Wall* brochure, now in its third printing.

Figure 162: New exhibit of portions of the wall in the Lowcountry Gallery, Charleston Museum; guests enjoy a *Walk the Wall* event.

South Adger's Wharf and Urban Archaeology in Charleston

The archaeological excavations at South Adger's Wharf succeeded as a research project as well as a public project. Urban sites are characterized by dense, complex deposits; the section of street and parking lot explored by the Task Force was unusual in the concentration of significant features and activities in a relatively small space. The juxtaposition of the early colonial fortifications and the late colonial market led to description of the project as "two for the price of one." Indeed, each of the features was worthy of a large project on its own; together they produced a complex site that yielded data on evolution of the urban waterfront.

The project was successful in locating, exposing, and documenting the construction, maintenance, and abandonment of the colonial seawall through the 18th century. Associated layers of fill gradually created 'made land' east of the original high water line, and informed on evolution of the waterfront. Evidence of the Lower Market was contained in the fill layers, as well as in architectural features associated with expansion of the market after abandonment of the redan.

The fill layers contained faunal remains from marketing activities that inform on the distribution of food resources in the city. The faunal assemblage was similar, but not identical, to the assemblage retrieved from the Beef Market at Meeting and Broad Streets. The assemblage also exhibited change in animal use through the latter half of the 18th century. There was also quantifiable difference between the deposits associated with the market and those that pre-date the market.

While the majority of the superimposed zone deposits were associated with demolition of the redan and occupation of the Lower Market, the deepest deposit represented the open waterfront and gradual silting of the harbor and the construction of additional defensive features by the middle of the century, prior to construction of the market. Differences in the faunal assemblages between the pre-market and market deposits confirmed that the majority of the refuse was generated on site or nearby, and reflects specific activities that occurred here. While it was not possible to firmly quantify, it appears that relatively little of the cultural material retrieved here was brought in as fill from other locations. The assemblage is not a 'generalized' city deposit.

A combination of documentary data and clearly defined archaeological strata helped associate the recovered cultural materials with these events, as well. The layers associated with the market contained a cultural assemblage that was, again, similar but not identical to the distinct assemblage recovered at the Beef Market. Like other public sites, the South Adger's Wharf assemblage lacked the personal and furnishing items recovered on domestic sites in Charleston. The assemblage was dominated by materials that reflect public socializing – kitchen wares, wine bottle glass, and tobacco pipes. The assemblage, though, also contained a large number of more decorative creamwares and tea wares in stoneware and porcelain. These may reflect casual discard from nearby households, or may reflect disposal of newly imported, but damaged, wares.

The cultural assemblage from South Adger's Wharf was very large, and contained a number of ceramic types and forms not normally recovered in Charleston. These provided new information on wares imported to the seaport city, and are a welcome addition to the growing database for Charleston.

Figure 163: Crew for the 2008 dig; Field School students from the 2009 project pose with Mayor Riley.

The team project at South Adger's Wharf was successful on many fronts. It provided an opportunity for multiple agencies – private, public, and municipal – to work together and share information. The project benefitted from volunteers throughout the community, who brought a range of skills and perspectives to the dig. The project

generated a material assemblage that contained new and unusual artifacts, as well as an overall material assemblage that informed on marketing and public activities. For only the third time, a portion of the colonial seawall was exposed and recorded. Despite two subsequent centuries of construction and occupation, the wall appears to be intact and well preserved, a foot below our living city.

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Appendix I

Timeline of Events for the Walled City

In an effort to provide a synoptic overview of the fortifications that surrounded colonial Charleston, South Carolina, I have constructed a time line of the most significant developments in the history of this "walled city." This time line is a work in progress.

Nicholas Butler, Ph.D., historian of the Mayor's Walled City Task Force

Last updated on 9 February 2010

PART I: THE PROPRIETARY ERA, 1663–1719

1663: As a reward for supporting his return to the English throne, Charles II grants the land between the English colony of Virginia and Spanish-held Florida to a group of eight noblemen, who are styled the "Lords Proprietors" of the new province of Carolina.

1670: Colonists from England and the West Indies arrive in Carolina and establish Charles Town at Albemarle Point, on the west bank of the Ashley River. During their first months in Carolina, the settlers begin building earthwork entrenchments and a wooden palisade wall to surround their small town.

1680: The capital of the young Carolina colony is transferred to Oyster Point, a nascent town on the peninsula between the Ashley and Cooper Rivers, which is renamed Charles Town. Soon afterward, the colonists began building some sort of fortifications to protect the eastern part of the town, along the Cooper River, but no documentary descriptions of this work have been found.

1686: The earliest known map of Charles Town, the hand-drawn Jean Boyd map, depicts two "forts" on the town's eastern waterfront connected by a linear "tranchée" or entrenchment. Due to the loss of the legislative records of the 1680s, it is not known when or with what materials these forts were built.

1694: The South Carolina legislature passes an act appropriating money for the construction of a brick wall along Charles Town's eastern edge (the eastern side of the present East Bay Street) "to prevent the sea's further encroachment."

1696: In March the South Carolina legislature passes a second act appropriating money for the construction of a brick wall along Charles Town's eastern edge, stating that little work had been done on this project since 1694. This brick wall becomes known as the "wharf wall," or the "curtain line upon the Bay." Later in the year the legislature also considers plans for building a brick "fort" at the east end of Broad Street. After some deliberation and ground testing at that site, however, they decide to locate the fort a small

distance further south. In December the legislature ratifies an act to appropriate money for the construction of a "fortress Battery or ffortification . . . at ye Point of Sand to ye Northward of ye Creek commonly called Collins his Creek." This structure, located slightly north of the eastern end of modern Water Street, was named Granville's Bastion in honor of John Granville, First Earl of Bath, who in 1697 became the fourth Palatine of the province of South Carolina.

1698: A few weeks after an earthquake rocks the Carolina colony, a fire burns approximately one third of the buildings in Charles Town.

1700: A severe hurricane hits Charles Town and causes extensive damage to its waterfront fortifications.

1701: The South Carolina legislature discusses the completion of the brick Half-Moon Battery, a semi-circular fortification, at the east end of Broad Street in Charles Town. The date on which this project began is not clear in the surviving records.

1702: South Carolina Governor James Moore leads a raid on St. Augustine, the capital of Spanish Florida. After Moore burns the town, its inhabitants retreat into the Castillo de San Marcos. Lacking sufficient artillery to batter the fortress, Moore abandons the siege and retreats to Charles Town.

1703: South Carolina learns that England has declared war on Spain ("Queen Anne's War" or the "War of Spanish Succession"), and rumors surface that the Spanish at St. Augustine are preparing to attack Charles Town. At the urging of newly-appointed governor Sir Nathaniel Johnson, the S.C. legislature passes an act for repairing the existing fortifications and building new works to surround the town. This law specifies that "the severall forts, halfe moons, platforms, batterys and flankers, built . . . on the front wall [i.e., East Bay Street], shall have gabions fixed upon them, and shall also be well piled, [for] their preservation against the sea," while the fortifications to be built along modern Water, Meeting, and Cumberland Streets "shall be [made] by intrenchments, flankers and parapets, sally ports, a gate, drawbridge and blind necessary for the same." This plan created an *enceinte* or ring of fortification that included four corner bastions linked by a curtain walls and punctuated by eight redansand one ravelin, surrounding sixty-two acres of high land.

1704: Near the end of the year, Governor Nathaniel Johnson report to the Lords Proprietors in England that the earthwork entrenchments around Charles Town are "in a great measure perfected," while the works along the waterfront have been "retarded for the want of bricks."

1706: Governor Nathaniel Johnson and Lieutenant Colonel William Rhett lead the successful defense of Charles Town against a combined force of Spanish, French, and Native American combatants who sailed into Charleston harbor from St. Augustine.

1707: The South Carolina legislature passes an act "for Repairing and Expeditious Finishing the Fortifications" in Charles Town, which have suffered breaches and other damages. Parts of the brick wall along the waterfront are apparently still incomplete.

1708: In order prevent enemy warships from sailing into Charles Town harbor uncontested, the S.C. legislature passes an act to build a fortification, later called Fort Johnson, at "Windmill Point" on James Island.

1712: The South Carolina legislature passes an act to build a powder magazine "within Twenty yards of the Redoubt [redan] on the North part of Charles Town." This powder magazine still stands on the south side of modern Cumberland Street in downtown Charleston.

1713: Mid-way through the year the citizens of Charles Town learn that Britain has signed the Treaty of Utrecht, ending Queen Anne's War (the War of the Spanish Succession). A few months later, a severe hurricane causes severe damages to the fortifications surrounding the town. Governor Charles Craven urges the legislature to appropriate sufficient funds for making the necessary repairs.

1714: In September another powerful hurricane strikes Charles Town and causes extensive damages to the town's fortifications. In December the South Carolina legislature passes an additional act "for preventing the Sea's further Encroachment on the Wharfe of Charles Town, and for repairing the Bastions, Half Moon and Redoubts on the same." According to this act, the waterfront fortifications have proved "not sufficient to secure Charles Town, especially the front thereof, against the violent storms and hurricanes, that for these two years last past hath been upon us, to the undermining and ruining great parts of the fortifications and front wall before Charles Town."

1715–1717: The Yemassee War draws the attention of the South Carolina legislature away from the threat of invasion by European forces toward internal conflict with the Native American population. The high cost of this war, added to the large expenses incurred in fortifying Charles Town, cause the legislature to grow impatient with the frugal government of the Lords Proprietors. The assembly draws up an address to King George of Britain, pleading that without his intervention the "miserable situation" of South Carolina will fail and Britain's southernmost colony will be lost to the French and Spanish.

1719: The South Carolina legislature passes an act "for the more speedy putting the bastions of the Fortification of Charles Town in a posture of defence" by repairing the existing fortifications. In a bloodless revolution at the end of this year, the legislature denounces the rule of the Lords Proprietors and petitions King George I to purchase the Carolina colony from the Proprietors. Among the colonists' chief complaints is the Proprietors' unwillingness to provide sufficient funds for the construction of proper defensive fortifications.

PART II: THE INTERREGNUM ERA, 1720–1729

1721: Newly-appointed Governor Francis Nicholson arrives in Charles Town in May and orders the South Carolina legislature to attend to the maintenance of the fortifications. In October, John Herbert draws a plan of the town's defensive walls, enclosing sixty-two acres, for colonial officials back in London. This important document is now housed at

the National Archive of the United Kingdom under the title "The Ichnography or Plann of the Fortification of Charlestown and the Streets, with the names of the Bastions, quantity of acres of Land, number of Gunns and weight of their shott."

1722: In November Governor Francis Nicholson reminds the South Carolina legislature that the fortifications of Charles Town require further repairs and maintenance, especially since recent storms have caused damages. Reflecting on the importance of the town's defences, Nicholson tells them "I think every body ought to own [i.e., acknowledge], that the fortifying [of] this Place was a great work in all respects, but time (the devourer of all things) hath much damnifed the same, and what shall be done in these affairs I leave it wholly to the Assembly."

1723: Governor Francis Nicholson continues to pressure the legislature to maintain Charleston's fortifications, and a legislative committee ordered to investigate the matter admits that the works "are greatly decayed, and must inevitably fall, unless due care be taken to repair the same." Owing to a scarcity of public funds, however, they ultimately agree to appropriate funds for the repair of the damaged brickwork on the town's waterfront curtain line, but not for the entrenchments on the "back" side of town.

1724: The South Carolina legislature continues to drag its feet on the repairs to Charleston's brick fortifications along the waterfront. Meanwhile, Governor Francis Nicholson orders "that no person in this Province at their utmost Peril do presume to Wheel Cart or by any other means or ways Carry away any Earth or Lands from any of the Banks which were late the Fortifications Round Charles Town, or from any Street or Publick Lott or place in the Said Town for any use or Purpose Whatsoever."

1725: The South Carolina legislature passes another act "for preventing the Sea's further encroachment upon the Wharfe or street commonly called the Bay, in Charlestown, and for the expeditious repairing and finishing the Front Wall thereof." The preamble to this law states that several hurricanes in the past few years have "undermined and broken down more of the said Wharfe and Wall than is now standing." It also acknowledges that recent efforts to repair the front wall have been impeded "by reason of the different Interests of the persons claiming Lotts on the said Wharfe or Bay and those who Claim the Lotts or Flatts from High to Low water mark fronting to the said Lotts on the Bay."

PART III: THE ROYAL ERA, 1730–1775

1736–37: Under the direction of chief enginner Gabriel Bernard (d. 1737), the uncle of Swiss philosopher Jean-Jacques Rousseau, work commences on a triple row of cedar piles and palisades around the southern and southwestern edge of the peninsula and a large gun battery at White Point. Following the death of Lieutenant Governor Thomas Broughton in November 1737, the battery is named Broughton's Battery. Following Bernard's death in July 1737, Col. Othniel Beale begins to act as the unofficial chief engineer of Charleston's fortifications.

1738: The South Carolina legislature passes an act to build three new bastions linked by a curtain line on the southwest side of the peninsula, along what is now South Battery

Street between King Street and Council Streets. Later evidince demonstrates that these bastions were built of earth, wood, and brick.

1739: After several years of tension, Britain declares war on Spain (the "War of Jenkins' Ear").

1740: Troops from South Carolina join forces with Gen. James Oglethorpe and his troops from the infant colony of Georgia to launch a large-scale attack on St. Augustine, the capital of Spanish Florida. The disastrous outcome of the plan puts South Carolina deeply in debt and leads to a legislative investigation.

1742: When a large force of Spanish soldiers invade St. Simon's Island, Georgia, in late June, the government of South Carolina sends ships and troops to help reinforce the soldiers and militia in Georgia. The Spanish retreat only a few weeks later, but everyone in South Carolina fears that the enemy will return with a larger force to invade Port Royal or Charleston. The South Carolina legislature formally commissions Col. Othniel Beale to be chief engineer of Charleston's fortifications. Beale quickly drafts a plan for further defensive works around the southern tip of the peninsula, from Broughton's Battery to Conseiller's Creek, and along the town's northeastern line, from Craven's Bastion to Rhett's Point (near the modern intersection of Market and Meeting Streets). Two of the new gun batteries on the southwestern tip of the peninsula, facing the Ashley River, are named Counseiller's Bastion (after property owner Benjamin De la Conseiller) and Tipper's Fort or Bastion (after property owner John Tipper).

1743: At the beginning of the year, the long-awaited Armory is completed near the southwest corner of Meeting and Broad Streets. This building serves as the central repository for the town's small arms, artillery and other "warlike stores" into the early nineteenth century. Also in 1743 workers under the supervision of Othniel Beale construct a breastwork consisting of a double row of cedar palisades, earth, and ballast stones, from Granville's Bastion to Broughton's Battery (where modern East Battery Street stands today). In order to maximize the defense of this line with cannon, a salient angle or redan is also built at its midpoint. At the same time, Lt. Gov. William Bull advises the legislature to consider creating new defensive line to enclose the northern and western parts of the town. The legislature debates this proposal for nearly two years (see 1745 below).

1744: France allies itself with Spain in the War with Britain, expanding the War of Austrian Succession (King George's War). Over the next several years, French and Spanish privateer ships are continually attacking the British ships sailing in and out of Charles Town harbor and all along the Carolina coastline.

1745: The South Carolina legislature orders the construction of a new earth and timber wall with several gun batteries and a moat to protect the town's northern edge (modern Beaufain and Hasell Streets). This wall began at the head of Daniel's Creek, at what is now the intersection of Market and Meeting Streets, and continued westward along the present course of Market Street. Midway between present Archdale and Mazyck (Logan) Streets, the wall turned to the southwest until the intersection of modern Magazine and

Franklin Streets, where it turned to the south and continued along what is now Franklin Street until it reached Broad Street. This new wall was fronted by a moat approximately thirty-six feet wide. A new town gate, complete with a ravelin and drawbridge, was erected of brick, earth, and timber at the modern intersection of Market and King Streets. At the same time, the legislature orders a ditch or moat, twelve feet in width, to be dug on the east side of the brick wall on the east side of East Bay Street.

1748: Britain signs the Treaty of Aix la Chapelle with Spain and France, ending King George's War (the War of Austrian Succession). Following this development, the public officials in Charles Town briefly relax their concerns about the town's urban fortifications.

1750: Feeling secure in an era of peace, the South Carolina legislature orders the dismantling of the ravelin and drawbridge in front of the town gate (located at the modern intersection of Market and King Streets). In place of these features, they order a causeway and brick arched bridge to be built through the moat in front of the town gate. The earthwork wall protecting the town's northern boundary, erected in 1745, is allowed to remain.

1752–1755: A major hurricane in September 1752 causes significant damage to the town's fortifications, especially those on the east side of the peninsula. Over then next several years the various walls, bastions, and batteries are either repaired or rebuilt. After several years of rising tensions, Britain declares war on France in 1755, initiating what was known as the "Seven Years' War" in Europe or the "French and Indian War" in the North American colonies.

1755–1757: Governor James Glen hires German-born engineer William Gerard De Brahm to design and execute a large-scale plan for the fortification of Charleston. Due to the outrageous cost of his plan and political conflicts with the Commissioners of the Fortifications and the Commons House of Assembly, only a fraction of De Brahm's design is completed. De Brahm's principal accomplishments during this period include the reconstruction of Broughton's Battery and the creation of a new "Middle Bastion," named Lyttleton's Battery in honor of newly-appointed governor William Henry Lyttleton, on the site of the redan built in 1743 midway between Granville's Bastion and Broughton's Battery.

1757–1759: The Commissioners of the Fortifications oversee the construction of a large earth and tabby "Horn Work" beyond the northern edge of Charleston, just north of the modern intersection of King and Calhoun Streets. A small fragment of the Hork Work, which mounted eighteen cannon along its northern side, is still present in Marion Square to this day. Because the Horn Work straddled "the Broad Path" (modern King Street), it included a gate and drawbridge that formed the new town entrance over a dry ditch or moat approximately thirty feet wide.

1763: On 10 February the "Treaty of Paris" between Britain, France, Spain, and Portugal formally ends the conflict known as the "Seven Years War" (or the "French and Indian War" in North America). As part of their concessions , Spain ceded the colony of Florida

and its capital, St. Augustine, to Britain. This change effectively removed the long-standing threat that this Spanish garrison posed to the safety to Charleston. Official news of this treaty reaches Charleston in mid-May.

1764–1767: As the South Carolina legislature gains confidence in the reality of peace with France and Spain, it relaxes its concerns about protecting the town from enemy attack. In 1764 the legislature orders the moat in front of the eastern curtain line to be filled in with earth. In 1766 the earthwork wall erected in 1745 along the town's old northern line was pushed into the moat in front of it. The Horn Work straddling the new town gate a little farther north is left standing, but it is essentially abandoned.

1768: Early this year the old Watch House and Half-Moon Battery, both located at the east end of Broad Street, are razed to make room for the construction of a new Exchange Building. The substantial brick foundation of the Half-Moon Battery, built ca. 1700–1701, is still visible today in the basement of the Exchange, which was completed in 1771.

PART IV: THE REVOLUTIONARY ERA, 1776–1782

1776–1778: The newly-formed South Carolina Provincial Assembly orders the fortifications around Charleston to be repaired and strengthened. A tall breastwork made of palmetto logs and sand, similar to that used to build Fort Sullivan (now Fort Moultrie) is erected around the eastern and southern parts of the peninsula, and the colonial-era fortifications are improved.

1779–1780: As Charleston prepares for a siege by the British Army and Navy, the rear or southern side of the large Horn Work is enclosed to create a sort of citadel. In front of this work is also built a new wall made of earth and timber and a defensive ditch, both stretching between the Ashley and Cooper Rivers. Despite these efforts, the two-month siege ends with the surrender of Charleston on 12 May 1780.

PART V: THE POST-REVOLUTIONARY ERA, 1783–1790s

1783: On August 13th the South Carolina General Assembly ratifies an act to incorporate the City of Charleston. This act officially replaces the older spellings "Charles Town" and "Charlestown" with the modern spelling "Charleston." Furthermore, it transfers ownership to the new City Council of some of the land on which the colonial fortification were built, including the Horn Work on the north side of city, the brick curtain line along the eastern waterfront, and the land on the west side of King Street occupied by an earthen curtain line between 1745 and 1765.

1784: The City Council of Charleston orders the demolition of the urban fortifications under its jurisdiction. At the same time, after a year of debate, the South Carolina legislature passes a law ordering the removal of the remaining state-owned fortifications standing in Charleston. Although it took several years to complete the work, these orders effectively end Charleston's century-long existence as a walled city.

1787: After numerous petitions from Charleston's maritime merchants, the South Carolina Legislature finally repeals an ancient law prohibiting the erection of any buildings within fifty feet of the east side of the curtain wall on the east side of East Bay Street. In the years after this change, the low, slightly-built warehouses on Charleston's wharves projecting into the Cooper River were gradually replaced with larger, more substantial stores, residences, and even streets.

Part VI: Rediscovering Charleston's Colonial Fortifications

1853–1859: During the construction of the new U.S. Custom House in Charleston, workers encounter, and presumably demolish, the brick foundations of Craven's Bastion. The Custom House was finally completed in 1879, and the large paved courtyard leading to its west portico now cover the site of the colonial bastion.

1911: While digging a trench on the east side of East Bay Street in order to install part of Charleston's "modern" sewer system, city workers encounter part of the colonial curtain line near the east end of Cumberland Street. A newspaper article from that time describes the find as "a solid wall of masonry, put together with old-time shell lime and red bricks, so hard as to require each brick to be picked out separately."

1925: The architectural firm of Albert Simons and Samuel Lapham are hired to enlarge the old Missroon House at 40 East Bay Street. While excavating the earth on the north, east, and south sides of the house in order to lay an expanded foundation, they encounter the large, intact brickwork of the lower levels of Granville's Bastion. They publish a description of their findings (see the Selected Bibliography), and photograph the remains of the colonial walls.

1940: The Historical Commission of the City of Charleston places bronze tablets at four sites commemorating the four corner bastions of the early "walled city." These tablets can be seen at the Missroon House, 40 East Bay Street (site of Granville Bastion), the entrance gate of the Nathaniel Russell House, 51 Meeting Street (Colleton Bastion), the northwest corner of Meeting Street and Horlbeck Alley (Carteret Bastion), and at the steps in front of the plaza leading to the U.S. Custom House, 200 East Bay Street (Craven Bastion).

1965: Renovations of the basement of the Exchange Building at the east end of Broad Street uncover the intact brickwork of the colonial Half-Moon Battery. The upper walls of this battery were demolished in 1768 during the construction of the present Exchange, but the below-ground portion of the semi-circular brick seawall is now clearly visible. This site is the only public place where Charleston's colonial seawall can be viewed.

2005: Charleston's Mayor, Joseph P. Riley Jr., appoints a number of local citizens to serve on the "Mayor's Walled City Task Force."

2008: The Mayor's Walled City Task Force initiates an archaeological dig at South Adger's Wharf to find the remains of the colonial redan that once stood at the east end of Tradd Street (see the blog). During this ten-day dig in January, About twenty-four feet of

the redan's north flank are exposed, studied, measured, mapped, photographed, and reburied.

2009: The Mayor's Walled City Task Force, in conjunction with a College of Charleston Field School in Archaeology, conducts a four-week excavation of the remnants of the south flank of the colonial redan that once stood at the east end of Tradd Street. During the month of June, students uncover the tip of the redan and about twenty feet of the south wall, which is studied, measured, mapped, and photographed from its top, about 2.5 feet below modern ground level, to its foundation 8.5 feet further down in the mud.

Forensic Evaluation of Bricks and Mortar
17th Century Charleston Fortified Wall

by

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Work under the Piedmont – South Atlantic Coast Cooperative Ecosystem Studies Unit
Task Agreement J5430090029, Modification 2

August 16, 2011 (Revised May 9, 2012)

Introduction

Archaeological investigations were conducted in June 2009 in the South Adger's Wharf area of the Charleston (SC) peninsula in a city-owned surface parking lot. The excavations were overseen by the Charleston Museum in cooperation with the College of Charleston with support from the Mayor's Walled City Task Force and Historic Charleston Foundation[1].

Fort Sumter National Monument (FSNM) provided observers from the National Park Service (NPS) during parts of the archaeological dig. Two brick specimens and one mortar specimen were provided to Mr. Rick Dorrance of the NPS. These specimens were examined for characterization purposes and for observation of environmental interactions in ongoing efforts to develop preservation strategies for FSNM and for the greater Charleston preservation community.

Similar analytical techniques were used in characterization of the specimens that have been used in analysis of masonry materials at FSNM[2]. These techniques included chemical and physical characterizations using facilities at Clemson University and at the National Brick Research Center (a component of Clemson University).

Findings

The specimens were a red brick (Figure 1) and a salmon-colored or "orange" brick (Figure 2). These specimens were pieces of whole bricks that were recovered in the excavations. They were hand molded bricks fired in a field kiln or "clamp", a wood fired kiln used throughout brickmaking history until the late 19th century. Such kilns were of the "updraft" type meaning that the hot gases exited the top of the kiln (the 19th century Horlbeck brick plant has been recently shown to be a "downdraft kiln"). It is well known that these kilns had significant non-

[1] See http://www.historiccharleston.org/news_events/newsroom.html?id=81.
[2] D. Brosnan, Characterization and Forensic Studies of Construction Materials from Fort Sumter National Monument, January 11, 2010 (A Report for the National Park Service).

uniformity of temperature producing some "mature" red bricks from areas of high heat and others that were light colored as "orange" in areas of lesser heat exposure. In masonry construction, the darker bricks were used on exterior walls because they were known to exhibit higher durability than the lighter colored bricks. The lighter colored bricks were called "commons" in pre-World War II construction, and they were used in inner wythes in load bearing walls. The builders of the Charleston Fortified Wall likely were more concerned with immediate defense than durability and used all of the bricks at their disposal for the Wall construction.

Chemical analysis of the bricks obtained using X-ray fluorescent spectroscopy (XRF) is presented in Table 1. Several observations are:

- The chemical analyses of both bricks are remarkably similar indicating they are from the same source (mine/plant).

- The analysis suggests used of coastal marl (calcareous clay) that is common to the Charleston peninsula and both the lower Wando and lower Ashley River estuaries. This is specifically revealed by the calcium oxide or "CaO" content of the clays.

- The bricks both contain similar quartz (sand) contents at a level that is usual in early bricks made along the coast. Since bricks made in England usually did not contain such high levels of quartz, it is likely that the bricks were made on the peninsula – a practice common in colonial America because of the weight of the bricks and the limited capacity to import bricks on sailing ships.

- The bricks exhibited a "sulfur smell" on receipt, and sulfur was detected by XRF in the bulk composition. Soluble sulfur was also detected by Ion Chromatography (IC) suggesting that the sulfate is a consequence of exposure to ground water.

The bricks were further characterized by X-ray diffraction (XRD), a technique used to evaluate the mineralogy or mineral content of the bricks. By way of explanation, societies learned about 3500 years ago to use fire/heat to cause partial melting or vitrification within clay shapes to impart durability and strength to bricks[3].

A brick is essentially a mineral mass containing a small percentage of crude glass. The mineral matter includes minerals from the clay that persisted during firing (such as quartz) and minerals formed by reactions caused by the heat. The XRD data is presented in Table 1 (in summary) and the XRD results are provided in Figures 3 and 4. The mineral constituents are briefly explained as follows:

Quartz – a form of crystalline silica (SiO_2) common to the earth's surface. It is the primary constituent of beach sand and is used as filler in mortar and concrete.

[3] James W. P. Campbell, Brick – A World History, W. W. Norton & Company, ISBN 0500341958 (2003).

Calcite – the mineral calcium carbonate or $CaCO_3$ that is a primary constituent of masonry mortars constituted of lime and sand. It is not present in fired clay bricks as-manufactured, and it originated in partial solution of the mortar in the wall with the liquid penetrating the bricks. Note that both brick specimens contain substantial soluble calcium.

Iron Oxide Minerals Hematite and Wűstite – hematite (Fe_2O_3) is a normal constituent of red bricks that have reached a substantial maturity/durability state in firing, whereas wűstite (FeO) indicates a lower firing temperature and/or reducing conditions (lack of oxygen).

Higher Forms of Silica as Cristobalite and Opal-A – on heating quartz slowly is converted to other mineral phases once a temperature of about 1200°C is reached. The presence of cristobalite strongly suggests as firing temperature of at least 1200°C. Cristobalite and Opal-A are, however, found in coastal sand.

Sillimanite – an alumino silicate mineral formed above about 950°C in firing of clay minerals.

Microcline – a potassium alumino-silicate of formula $K_2O \cdot Al_2O_3 \cdot 6SiO_2$ formed during firing of bricks. Its presence as a distinct phase in the orange brick is evidence of "underfiring", as bricks exposed to higher temperature do not exhibit this phase (all potassium enters the vitreous phase).

Marialite – a sodium alumino-silicate containing chloride. It can have a formula similar to $Na_4(AlSi_3O_8)_3(Cl_2,CO_3,SO_4)$. It is not found in fired bricks and therefore represents a product of a reaction between the bricks and environmental agents/groundwater. Reactions of this type are not reported in technical literature, so this result represents a new finding.

The XRD results indicate that the orange brick is underfired or "immature" as compared to the red brick, the latter exhibiting normal mineral phases of a brick fired to achieve optimal strength and durability. The presence of the marialite in the orange brick strongly suggests a corrosion or reaction of the bricks in the ground water.

The bricks wee further characterized using Simultaneous Thermal Analysis (STA) with results in Figures 5 and 6. These complex graphs show weight losses (as TG%/thermogravimetric weight loss %), heat evolution or consumption (as DSC/differential scanning calorimetry) and gaseous evolutions (as carbon dioxide/CO_2 or water vapor/H_2O) on heating of the specimens[4]. Some general features of the thermal analysis results are as follows:

- Both bricks exhibit weight losses and CO_2 evolutions below 500°C indicating that they have been impregnated with organic matter that oxidizes/burns off on heating. Just above 600°C, the calcium carbonate from permeation of mortar materials decomposes with a major CO_2 evolution.

[4] See Denis A. Brosnan, John P. Sanders, and Stephanie A. Hart, Application of Thermal Analysis in Preservation and Restoration of Historic Masonry Materials; Part A Characterization of Materials, Journal of Thermal Analysis and Calorimetry, DOI 10.1007/s10973-01 1-422-z, (2011 – online edition).

- The DSC trace (blue line) shows endothermic/heat consuming reactions at about 575°C reflecting the alpha to beta quartz inversion reflecting the sand content of the bricks.

- Above 800°C, the broad endotherm suggests additional melting or vitrification on reheating.

- The slight water vapor evolution in the red brick at about 275°C may reflect decomposition of marialite, as a decomposition in this range is suggested in technical literature[5].

Clay bricks are usually characterized by their water absorption properties. Water is absorbed in fired ceramics by capillary suction into pores. The quantity of porosity is expressed as a percentage by volume. The porosity is further characterized by the size of pores as measured by mercury intrusion porosimetry (MIP).

The brick specimens were irregular pieces, and standard water absorption tests were not possible. Data on porosity was developed using water displacement/Archimedean techniques and MIP (Table 2 and Figures 8 and 9). Several observations are as follows:

- Both red and orange bricks are of similar density and porosity despite large differences suspected in firing temperatures. This result was probably influenced by the high quartz content of the bricks, a mineralogical feature that retarded normal densification on firing.

- The orange bricks exhibited a fraction of pores less than one micron in size of about 34% higher than the red bricks. Since this fraction is very dependent on firing temperature, the MIP data further suggests a lower firing temperature for the orange bricks.

Thermal expansion/thermal dilatometry tests are often used to estimate the firing temperature of historic bricks. In figures 10 and 11 for the red and orange bricks respectively, a large expansion is seen at about 550°C as a consequence of the alpha to beta quartz inversion, a result of the high silica sand content of the bricks. Above 600°C, the dilation behavior of the two bricks is significantly different:

- The red brick exhibits a step wise shrinkage starting at 819°C with a major shrinkage onset at 1137°C. The step at 819°C is due to the melting of calcareous mineral phases (calcium alumino-silicates) that were well-formed in the initial firing of the brick. The onset of shrinkage at 1137°C suggests a firing temperature in the area of 1100-1200°C.

[5] J. Benavides, T. Kyser, A. Clark, C. Oates, R. Zamora, R. Tarnovschi, and B. Castillo, The Mantoverde iron oxide-copper-gold district, III Region, Chile: The role of regionally derived, nonmagnetic fluids in Chalcopyrite mineralization, Economic Geology (2007) 415-440.

- The orange brick, despite similar CaO content as the red brick, does not exhibit melting of calcareous phases reflecting the fact that this brick had not reached chemical equilibrium in its initial firing. The brick exhibits an onset of shrinkage at 1005°C reflecting its lower firing temperature as compared to the red brick.

The as-received mortar specimen is shown in Figure 12. It was characterized in much of the same manner as the bricks. A few tests were employed that were specifically of interest to mortars.

The chemical analysis of the mortar is provided in Table 2 reflecting a composition based on burnt oyster lime and silica sand. The (acid) insoluble residue is assumed to be the sand content of the mortar at 55% by weight, and the XRF analysis of the insoluble residue exhibits 93% SiO_2, a typical value for coastal sand. The mortar was produced before the invention of natural cement in the United States (and well before Portland cement). The lime was likely burnt oyster shells, i.e. oyster lime (suggested by the trace of MgO in the mortar), as some information provides dates for rock lime production on the upper reaches of the Cooper River in the mid 1800's[6].

The XRD of the mortar shows that calcium carbonate/calcite and quartz are major constituents with the calcite being a part of the atmospheric carbonation of the lime in the mortar as it achieved a "set" condition. Minor phases are sylvite/KCl and microcline. The sylvite is present as a result of groundwater salt exposure. The microcline may be a consequence of contamination of the specimens by adherent dust from bricks.

The thermal analysis (Figure 14) only reveals the decomposition of the calcite (peak at 802°C) and the quartz inversion (575°C).The weight loss due to carbon dioxide release is 12.5% suggesting a minimum hydrated lime content of about 38% in the original mortar mix, and the insoluble residue was 55% (Table 2). Because of the possibility of oyster shells as aggregate in the mortar, volumetric proportions in the mortar cannot be determined in the absence of petrographic/microscopic analysis. The mortar was likely lime rich with volumetric proportions between 2:1 to 1:1 hydrated lime to sand.

The lime based mortar exhibited a bulk density of 1.46 g/cm^2 and a porosity of 43.0% by MIP. The fraction of pores less than one micron was 59.3% suggesting that the mortar had high capillary suction or that corrosion of the mortar had taken place due to environmental exposure. The pore size distribution of the mortar is shown in Figure 15.

Like the bricks, the mortar specimen exhibited detectable soluble sulfate (Table 2, See SO_4). The mortar only exhibited 0.04 ppm of soluble sodium/Na. Since sodium is known to attach masonry mortars, it is fortunate that this low level was found in a below-ground specimen allowing it to remain intact after years of exposure.

[6] Limestone was burnt locally for the Santee Canal that opened in 1800. It is likely that after construction of the Canal, burnt lime was shipped downriver to Charleston.

Conclusions

1. The bricks examined in this study were hand molded from local Charleston area clays, and they were fired in field kilns/clamps probably near the location of construction of the wall. One brick was well fired while the other was "underfired" – a consequence of the uneven heat distribution in the updraft kilns of the period. The bricks were not imported from overseas.

2. The underfired brick in this study exhibited a mineral phase formed by reaction of environmental agents over a long period of time with the brick. This mineral phase, marialite, has not been reported in the technical literature. While it occurs in nature, its role as a destructive factor in brick masonry preservation is unknown. The process of forming new minerals within historic ceramics has been called *diagenesis*,

3. The mortar used in construction was based on burnt oyster lime and sand. The volumetric proportions of hydrated lime to sand may have been on the order of one to one.

Note

An Appendix to this report was prepared on March 26, 2012, to include a petrographic examination of the mortar used in the masonry construction. The Appendix is attached to this report. The Appendix was revised on May 9, 2012.

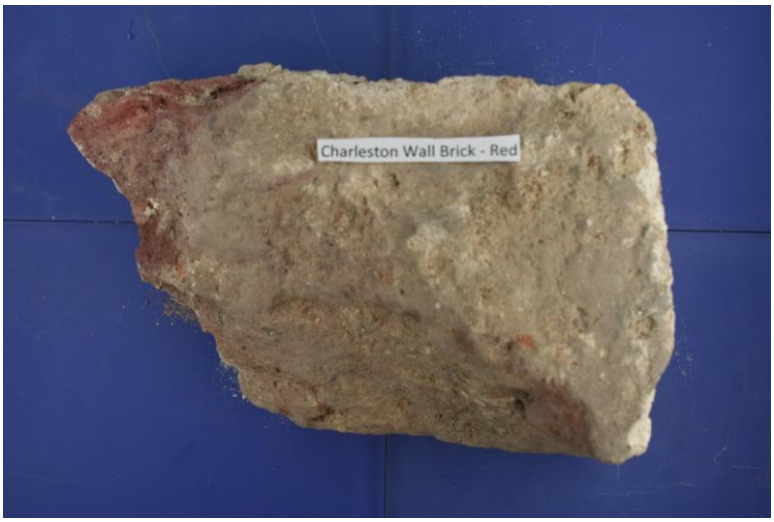

Figure 1: Red Brick Specimen

Figure 2: Orange Brick Specimen

Table 1: Chemical and Physical Properties, Charleston Wall Bricks and Mortar

SAMPLE	Wall Red	Wall Orange	Mortar	Mortar Insoluble Residue (Sand)
XRF weight %				
Al_2O_3	11.75	10.94	6.28	3.77
SiO_2	76.03	77.50	69.12	93.08
Fe_2O_3	5.27	4.11	2.42	1.34
TiO_2	0.76	0.99	0.52	0.53
MgO	0.39	0.41	0.25	<0.02
CaO	4.21	3.82	19.88	0.10
Na_2O	<0.5	0.54	<0.5	<0.5
K_2O	1.00	1.38	0.69	0.62
LOI, % (Loss on Ignition @ 1000°C)	NA (ignited basis)	NA (ignited basis)	13.97	NA
Other	S: 0.09 (S = sulfur)	S: <0.05	S: 0.21	S:<0.05
Insoluble Residue, %	NA	NA	55.11	NA
XRD	Major: Quartz, Calcite, Hematite, Cristobalite, Opal A Minor: Sillimanite	Major: Quartz Calcite Wustite Minor: Microcline Marialite	Major: Calcite Sylvite (KCl) Qaurtz Tridymite Minor: Microcline	
Quartz Content % (XRD)	33.9	35.4		

Table 1: Continued

SAMPLE	Wall Red	Wall Orange	Mortar	Mortar Insoluble Residue (Sand)
Bulk Density, g/cm^3 (Water Displacement)	1.73	1.69		
Apparent Density, g/cm^3	2.63	2.54		
Porosity, %	34.1	33.3		
SOLUBLE SALTS by IC, ppm.				
Na	8.7	3.7	0.04	
K	3.2	1.0	1.15	
Mg	13.8	12.5	8.98	
Ca	379.8	207.7	672.6	
CI	8.5	2.8	5.4	
NO_3	-			
P_2O_5	-	98.8	88.2	
SO_4	72.3	44.6	49.0	
NH_4	-			
F	-		4.4	
MIP				
Fraction of pores <1μ	12.0	16.1	59.3	
Apparent Density, g/cm^3	2.05	1.86	1.60	
Bulk Density g/cm^3	1.78	1.58	1.46	
Porosity, %	30.0	39.0	43.0	

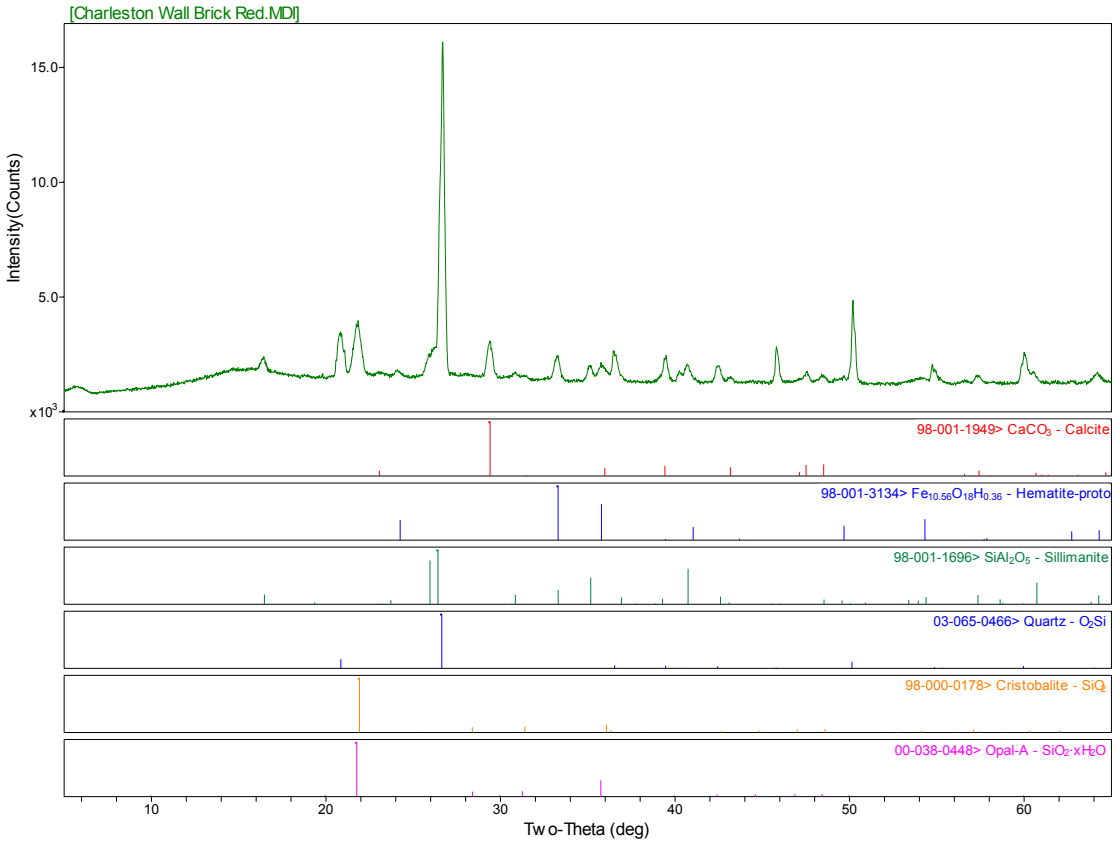

Figure 3: Charleston Wall Red Brick

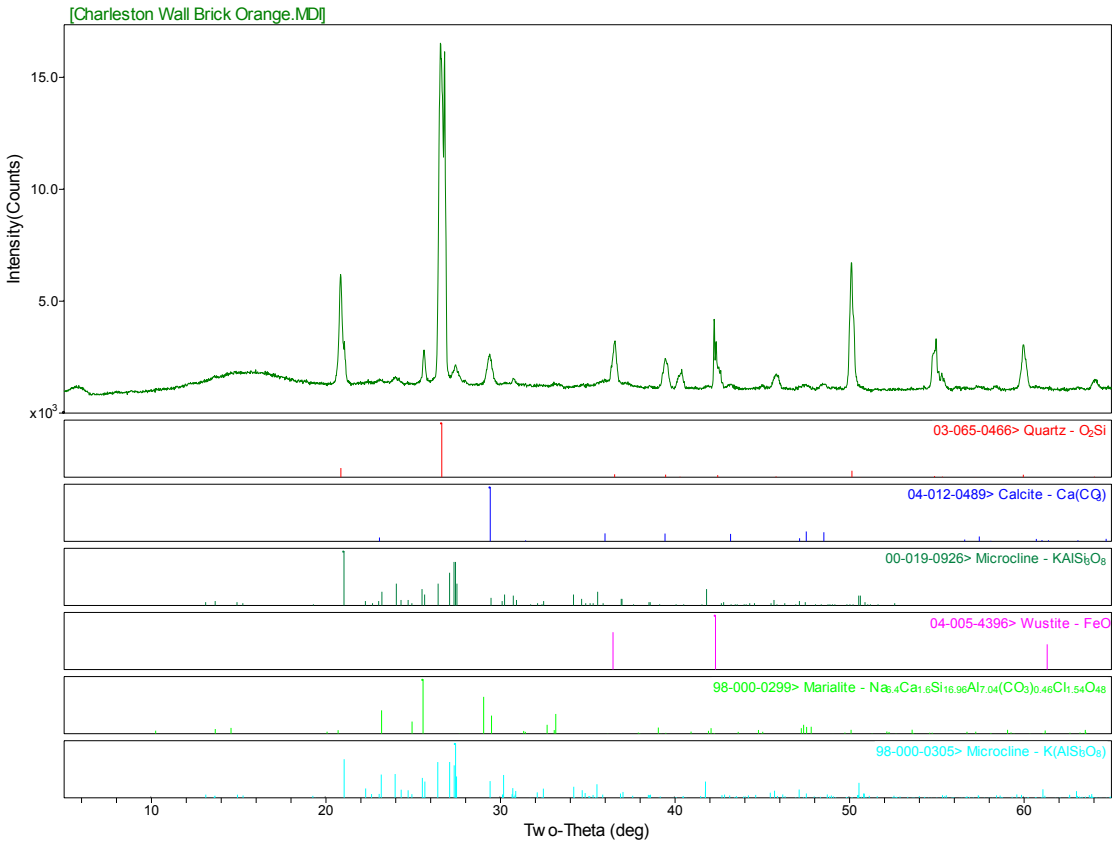

Figure 4: Charleston Wall Orange Brick

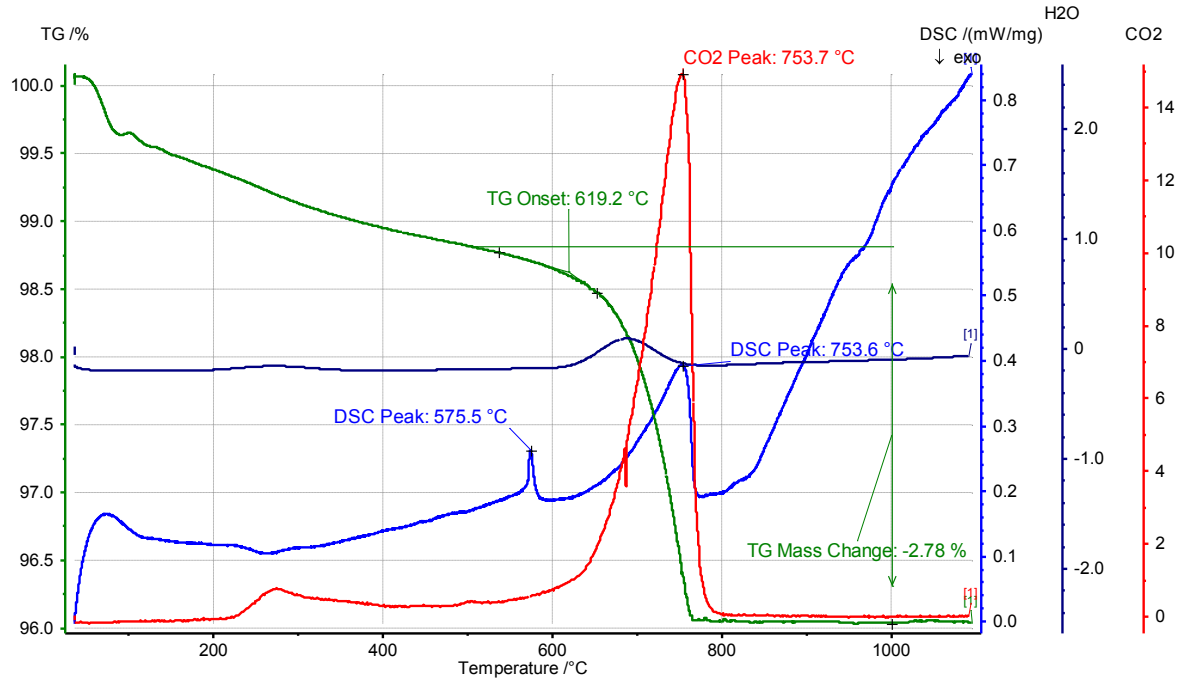

Figure 5: Simultaneous Thermal Analysis – Red Brick

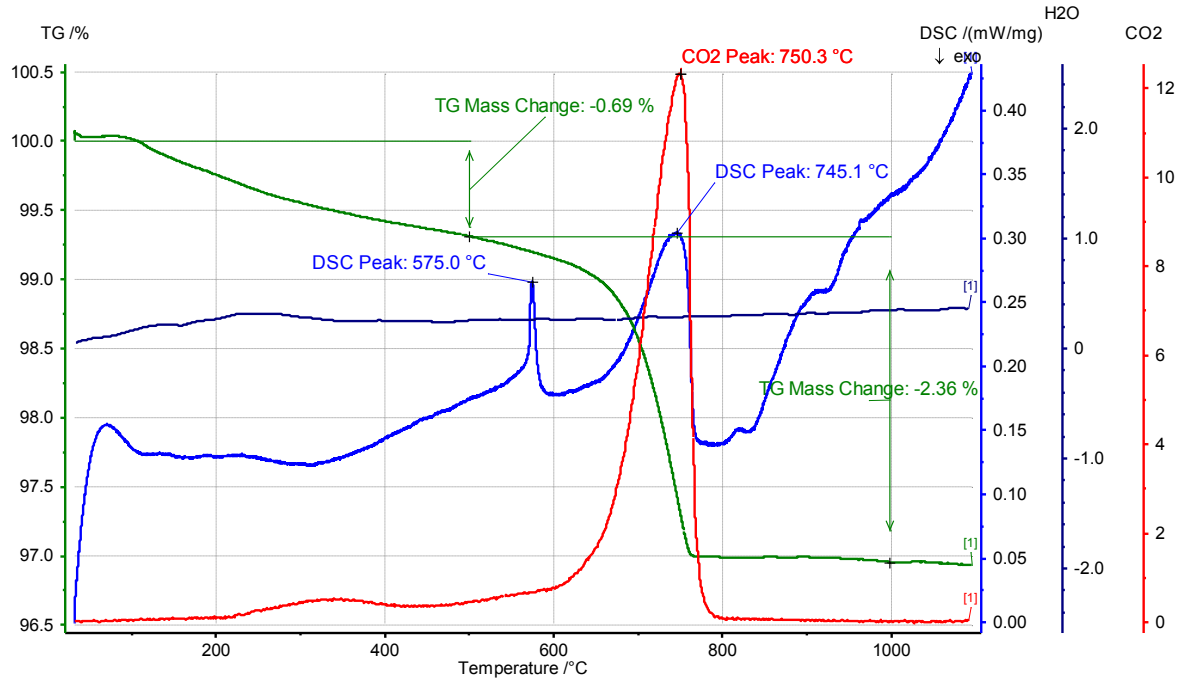

Figure 6: Simultaneous Thermal Analysis – Orange Brick

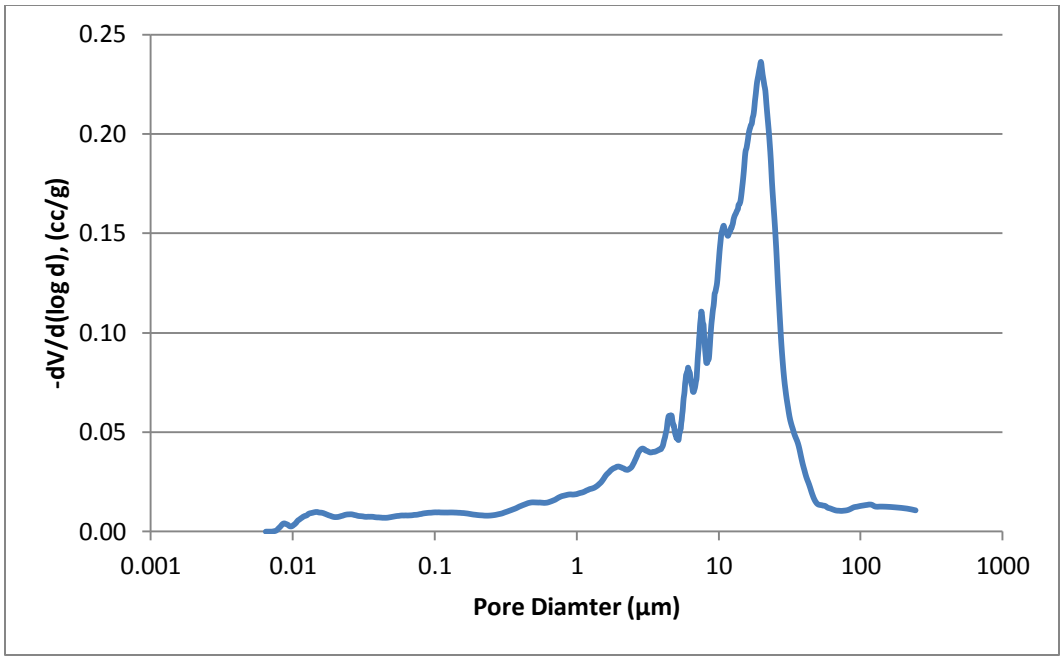

Figure 8: Pore Size Distribution – Red Brick

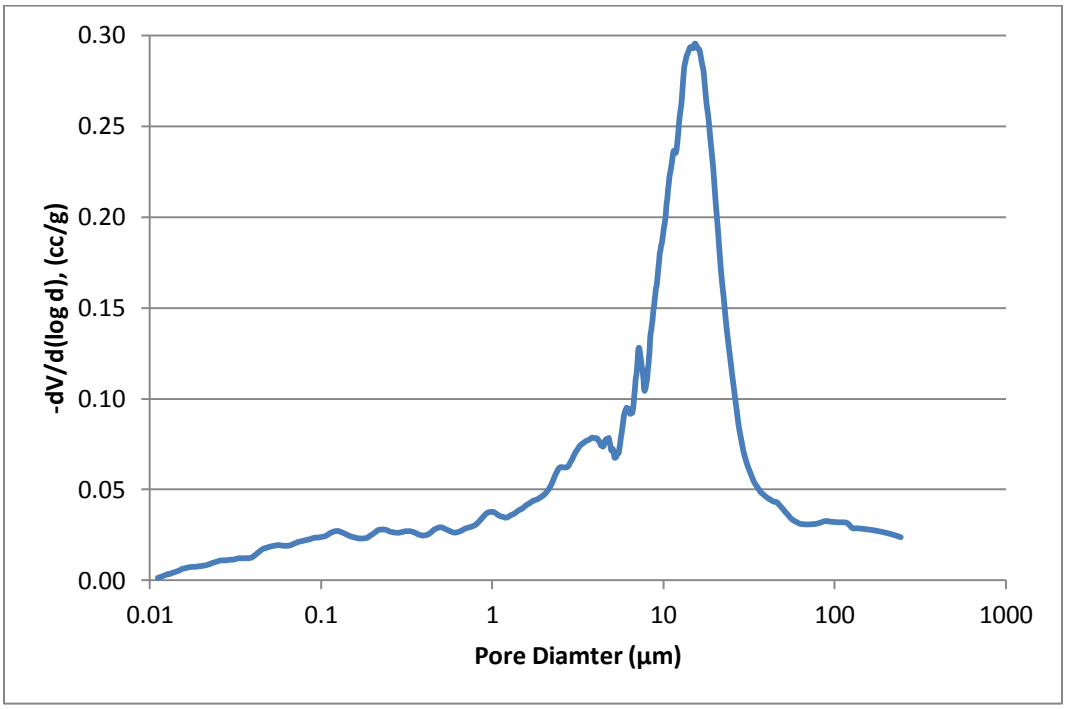

Figure 9: Pore Size Distribution – Orange Brick

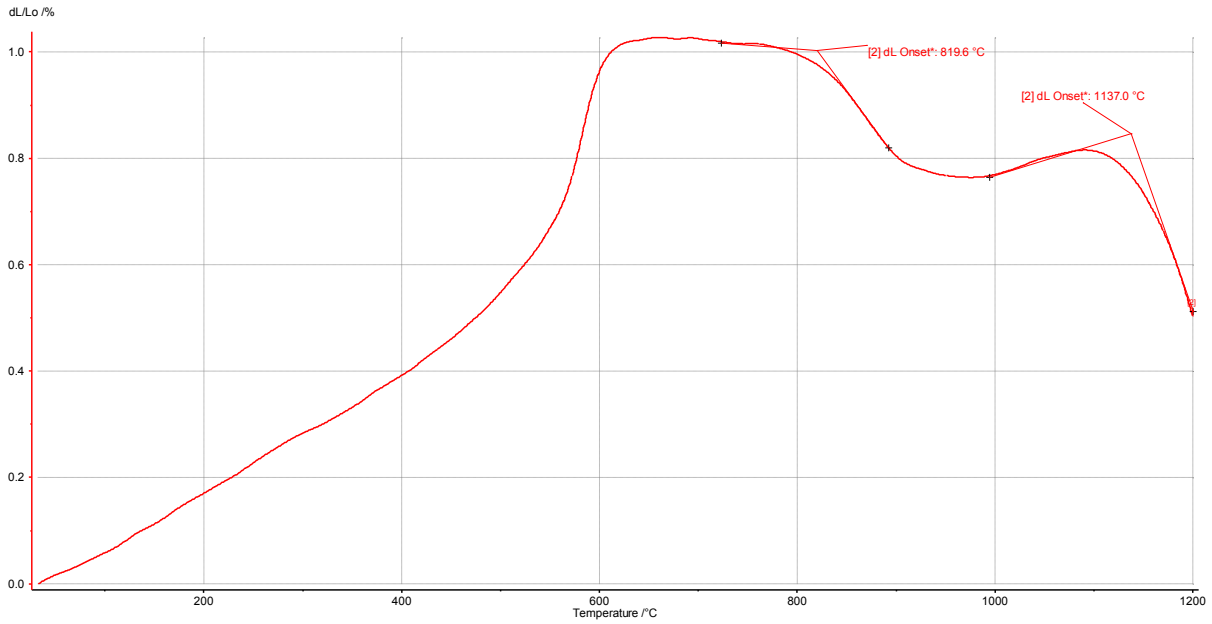

Figure 10: Thermal Expansion – Red Brick

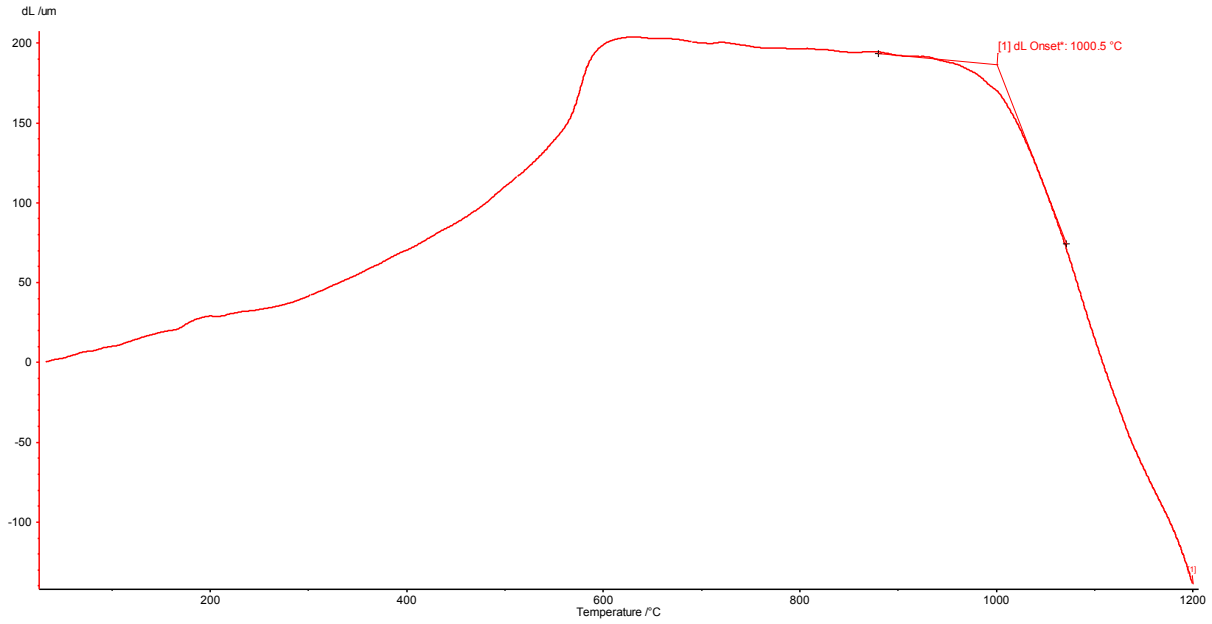

Figure 11: Thermal Expansion – Orange Brick

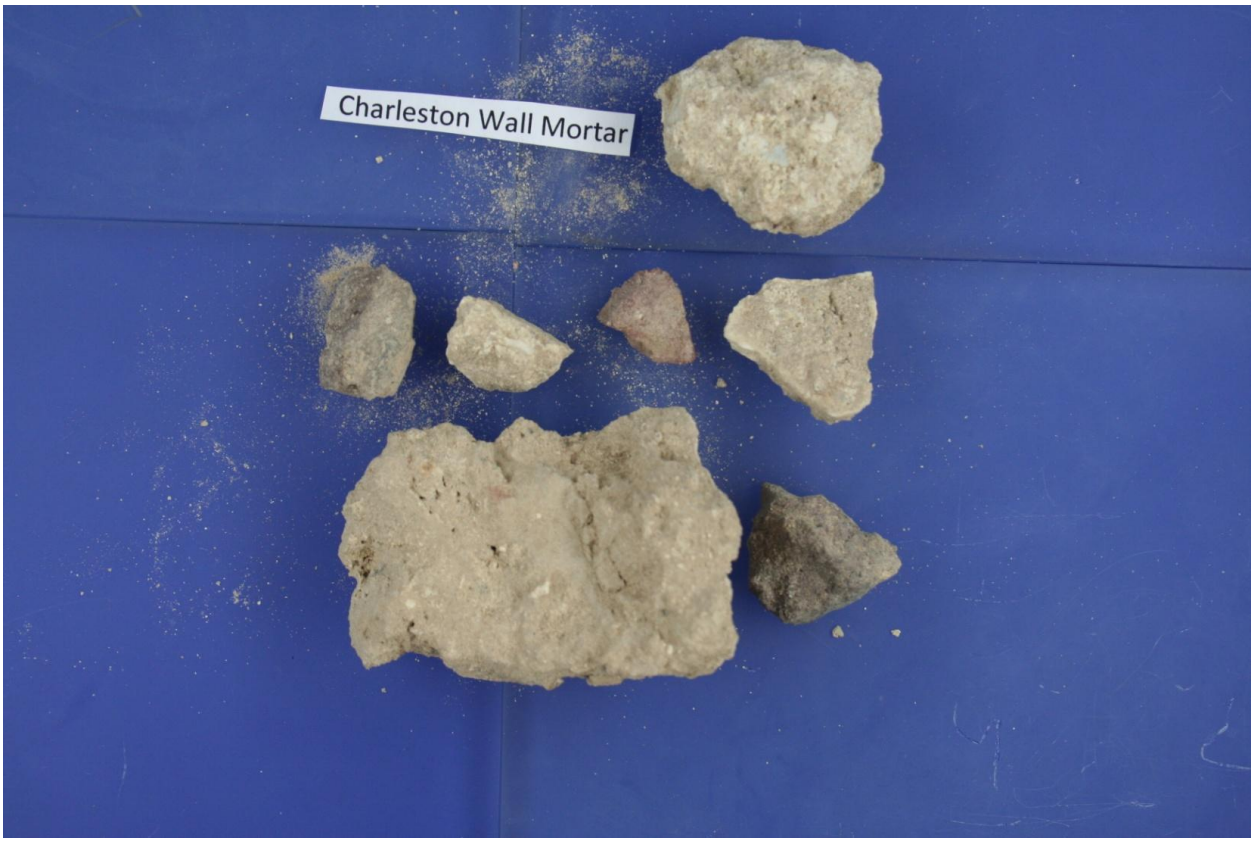

Figure 12: Mortar – Charleston Wall

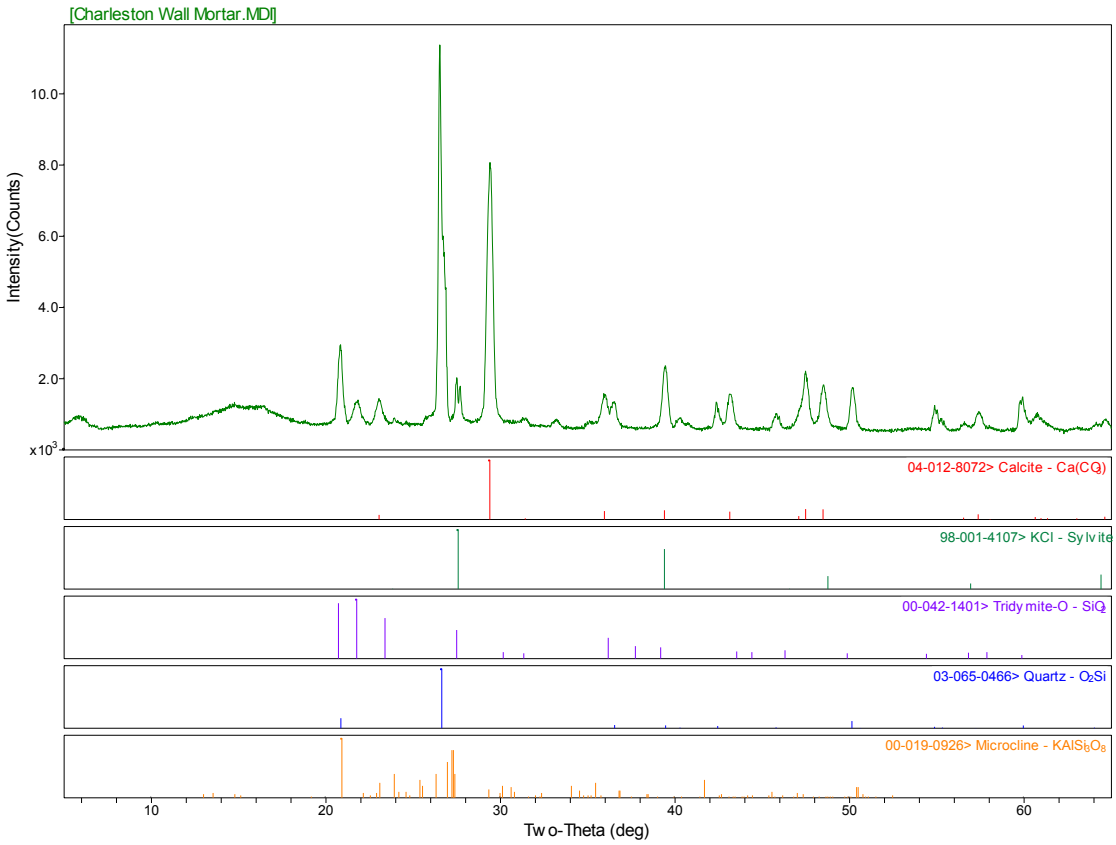

Figure 13: Charleston Wall Mortar XRD

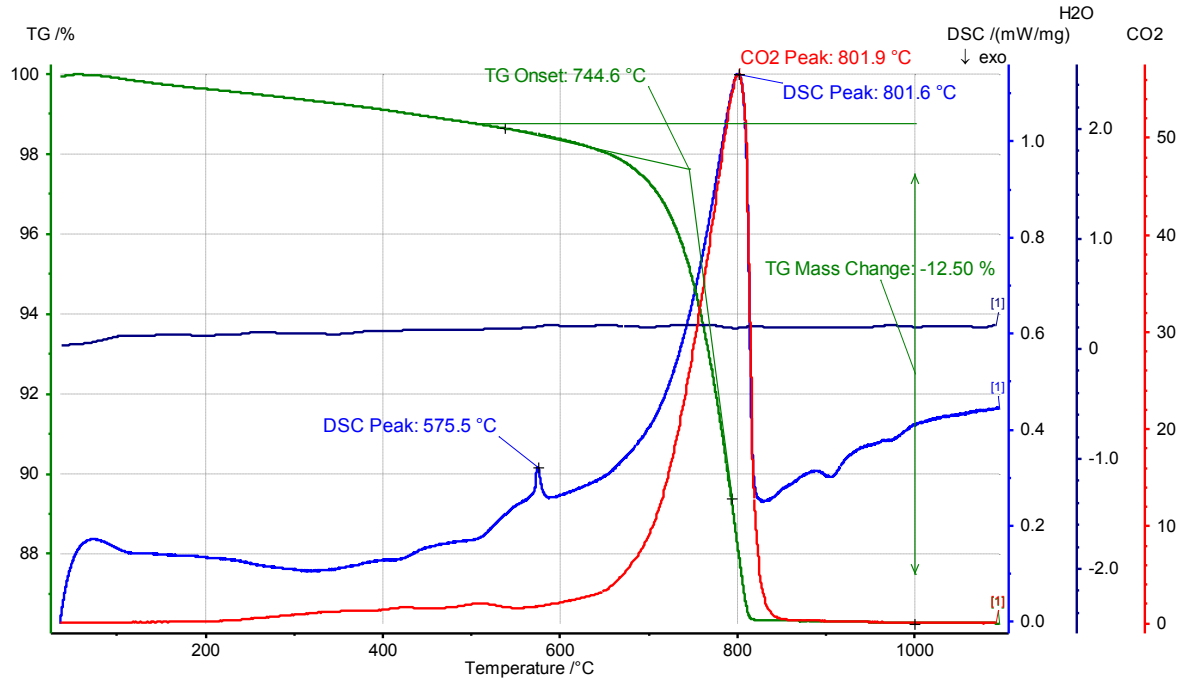

Figure 14: Charleston Wall Mortar Thermal Analysis

Table 2: Insoluble Residue – Charleston Wall Mortar

	Units	
Starting Weight of Mortar Sample	grams	2.5309
Weight of Filter Paper	grams	0.7222
Paper and Dry Sample	grams	2.1171
Dry Weight of Residue	grams	1.3949
% Insoluble Residue (Dried Basis)	%	55.11

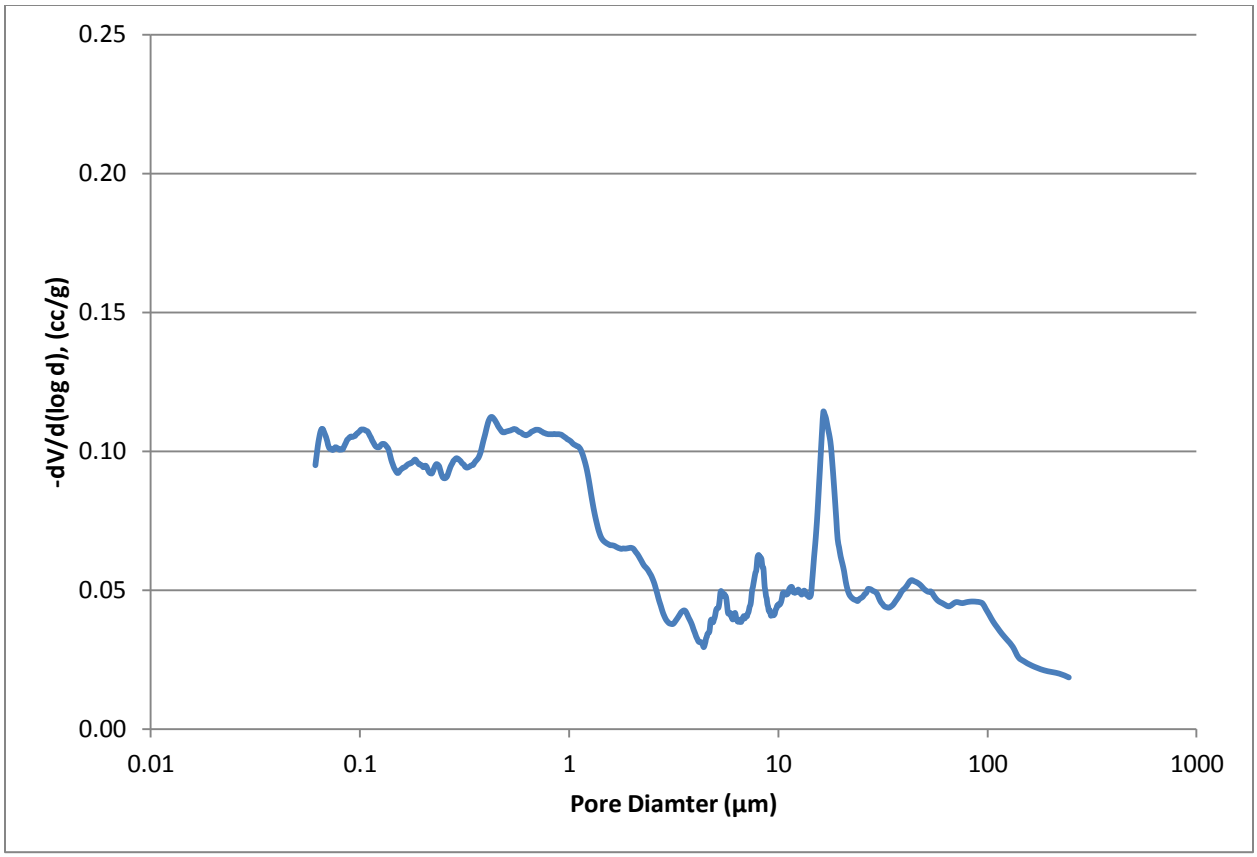

Figure 15: Pore Size Distribution – Charleston Wall Mortar

APPENDIX

Introduction

A mortar specimen from the Charleston Wall was examined using standard petrographic microscopy techniques. The process involved production of petrographic thin sections followed by optical microscopy of the sections using transmitted light. In petrographic examinations of mortar, the usual goals are confirmation of the identity of the binder phase in the mortar, identification of sand and other artifacts in the mortar, and observation of any deterioration within the specimens.

Findings

At low magnification, the mortar is seen to contain oyster shell relics (SH), sand (S), and a matrix (continuum), denoted as "M", of carbonated lime ($CaCO_3$). Larger pores (P) are visible at this magnification, and smaller pores are present but not visible at this magnification (see Figure 15). Opaque particles in the matrix are likely intentional additions of brick dust to the mortar.

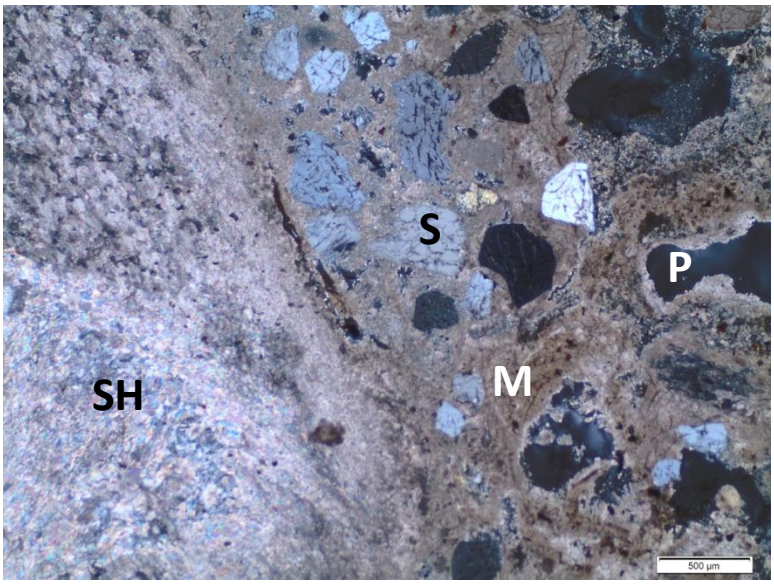

Figure 16: Low Magnification Microscopy of Mortar Showing Shell Relic (SH), Matrix (M, carbonated lime and sand or "S"), and Pores (P); XPL (polarized light, crossed nicols).

The matrix or continuous binder phase in the mortar is shown in Figure 17. A red brick fragment is identified (B). The binder phase exhibits some areas where brick fragments are discrete and others where iron dissolved from the brick has "stained" a localized area forming a "cluster" of fragments. It is possible that underfired bricks were used to obtain the dust (to encourage pozzolanic reactions) and/or that environmental agents encouraged solubilization of iron within localized areas. Regardless, the practice of adding brick dust to produce quicker setting and more durable lime-sand mortars dates back to the Roman era.

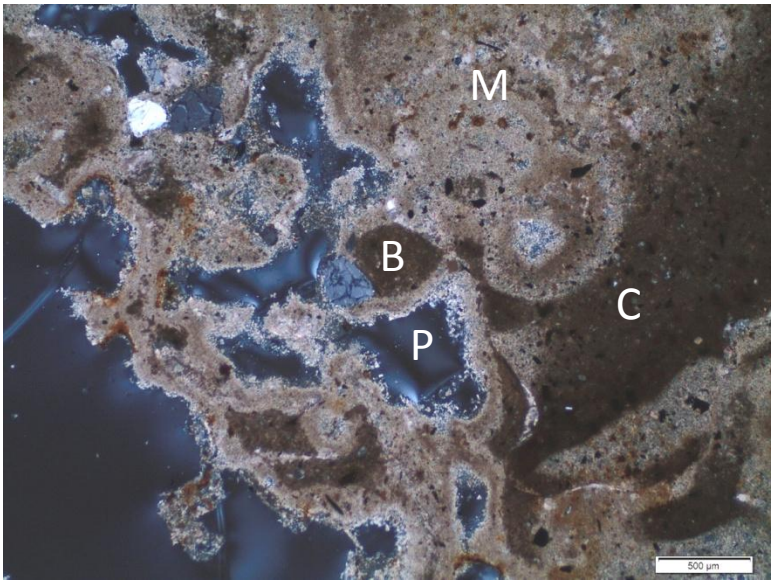

Figure 17: Area of Binder Phase Containing Brick Fragments (B) and Stained Area with a Cluster of Brick Fragments (C), Normal Matrix without Staining (M), and Pores with Carbonated Rims (P); XPL

The extent of carbonation in the mortar in the presence of ground salt intrusion is remarkable. Soluble calcium migrated to pore walls after the initial construction, where it formed calcium carbonate on the pore walls (bright phase along pore periphery in Figure 17). The fact that this phase did not dissolve is likely a consequence of the pozzolanic reactions encouraged by the use of brick dust in the mortar composition.

A photomicrograph with linear measurements of selected mortar constituents is presented in Figure 18 Brick dust fragments range in size from 33 to 365 microns in width (0.033mm–0.365mm), and the sand particle is 253 microns (0.253 mm) in width.

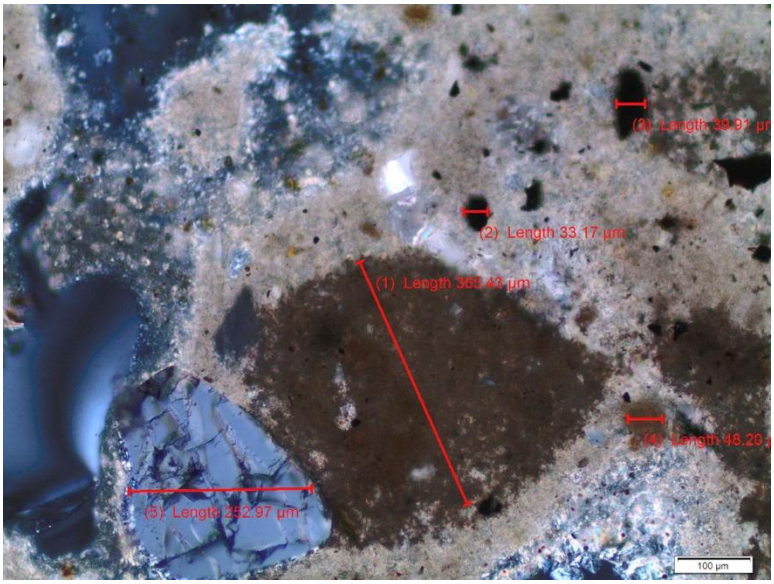

Figure 18: Mortar Specimen with Size Metrics

Conclusions from Petrography

1. The Charleston Wall mortar was a shell, sand, and oyster lime mixture. The mortar hardened by absorption of carbon dioxide from the atmosphere forming calcium carbonate as the permanent binder phase within the mortar.

2. Brick dust or fragments were intentionally added to the mortar to increase the rate of hardening of the mortar and to render it as more durable by virtue of pozzolanic reactions. Brick fragments likely were a source of soluble iron that sporadically colored the mortar matrix. Practices using brick fragments in mortar to achieve higher mortar strength and faster setting characteristics date back to Roman periods.

Appendix III
Animal Remains from the South Adgers Wharf and the Lower Market

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Abstract

Recent work at South Adger's Wharf in Charleston, South Carolina, offers the opportunity to improve our understanding of Charleston Harbor, as well as commercial animal use, in Charleston by providing faunal data from one of Charleston's eighteenth-century markets, the Lower Market. The assemblage from South Adger's Wharf is divided into three time periods: the Moat collection, associated with the moat between the palisade and the redan, deposited from 1710 through 1760 before the Lower Market was established and during the initial occupation of the market; the Early Lower Market collection, associated with the Lower Market below the 1786 paving and above the demolished parapet; and the Later Lower Market collection, associated with the Lower Market above the 1786 market paving but prior to the demolition and abandonment of the market. The faunal assemblage from South Adger's Wharf and the Lower Market contains 4,708 specimens weighing 25,220.77 g and the remains of at least 107 individuals.

Similar to the Atlantic Wharf assemblage, the Moat collection from South Adger's Wharf suggests that areas of Charleston Harbor were used for trash disposal. Such areas created a prime attraction for rats. The Lower Market collections did not contain such high frequencies of Old World rats as the Moat collection, indicating that conditions at South Adger's Wharf were less attractive to rats after the Lower Market was established.

The Lower Market collections are similar to the Beef Market collections. Both market assemblages contain numerous wild and domestic taxa, with beef representing the majority of the biomass. The Lower Market assemblage shows a decline in the frequency of pig and cow individuals through time. The decline in pigs and cows suggests that these animals were less frequent in Charleston as the city grew and became more crowded assuming that cows and pigs represented at the Lower Market were kept in the city rather than livestock from nearby farms and plantations. The Lower Market assemblage has a similar frequency of sawed specimens as compared with the Beef Market and other non-market collections. Because sawing is a commercial practice, and the percentage of sawed specimens is similar at the Lower and Beef Markets and non-market collections, the percentage of sawed specimens may be a signature of bone from the market at non-market locations.

For many years, archaeological excavations in Charleston, South Carolina focused on areas within the city that functioned as residential or mixed-use locations. Zooarchaeological analyses of vertebrate remains recovered from these excavations paint a picture of a dynamic Charleston landscape, with animals active in shaping the urban environments (Zierden and Reitz 2009). Despite these archaeological investigations, few excavations were conducted at locations representing the commercial sale of animal products, such as meat markets. In 2004, excavations were conducted at the Charleston City Hall/Beef Market (Zierden and Reitz 2005). Vertebrate analysis of faunal remains recovered from the Beef Market addressed some of the research questions pertaining to the commercial circulation of foodstuffs in Charleston. However, many questions remain unanswered and it is unknown whether the patterns of commercial animal use described in the Beef Market analysis apply to other markets in Charleston.

Recent excavations at South Adger's Wharf provide further data regarding commercial use and circulation of animal products in Charleston. Vertebrate fauna from South Adger's Wharf represent discarded animal remains from the wharf as well as from the Lower Market. The Lower Market was established in 1750 or 1751 on the waterfront (Zierden et al. 2010). A wooden market shed was erected to receive small watercraft carrying animal products and produce from the sea islands neighbouring Charleston (Zierden et al. 2010). In 1786, the market was expanded, but by 1799 the Lower Market was closed and the land was sold into private hands (Zierden et al. 2010).

Vertebrate remains recovered from excavations at the South Adger's Wharf include animals discarded before the Lower Market was established mixed with some of the initial market remains. These excavations focused on the moat that surrounded South Adger's Wharf. The archaeofaunal collection recovered from the excavation of the moat is compared with the collection from the Atlantic Wharf (Zierden and Reitz 2002). This comparison provides information about conditions at Charleston Harbor during the eighteenth century and into the early nineteenth century when the wetlands surrounding the harbor were used for docking watercraft and trash disposal.

The archaeofaunal assemblages from the Lower Market are compared with those from the Beef Market and non-market assemblages of eighteenth-century Charleston. This comparison elaborates upon patterns of commercial animal use in Charleston and expands our understanding of how commercial animal products related to household level choices. Several areas of research are examined using the Lower Market vertebrate assemblage.

Firstly, trends in the frequency of specific animals and groups of animals used in the city are investigated. Previous zooarchaeological analysis at the Beef Market indicates that during the Beef Market's 100-year operation, the sale of wild aquatic and terrestrial fauna increased and the sale of products from larger domestic animal, such as beef and pork, decreased (Zierden and Reitz 2005:114). The vertebrate collection from the Lower Market may show whether this trend is specific to the Beef Market or if it is observed in other market collections.

Secondly, patterns of butchery at market and non-market locations may indicate aspects of butchery that are signatures of household versus market animal use. Butchery marks on animal remains from the Beef Market suggest sawing is largely a signature of commercial butchery, but that hack and cut marks are not clearly associated with commercial butchery (Zierden and Reitz 2005:114). Trends in butchery at the Lower Market may suggest other markers of commercial and household butchery practices.

Lastly, the frequency of commensal taxa, specifically rats (*Rattus* spp.), is an indication of sanitation at the Lower Market. Through time, non-market locations in the city experienced an increase in the frequency of rats (Zierden and Reitz 2009). The increase in rats was not observed in the Beef Market collections (Zierden and Reitz 2005:113). This indicates that efforts were made to keep the Beef Market clean. Alternatively, the open-air market might have offered few hiding places for rats, or the cats of the market provided adequate vermin control.

Zooarchaeological Materials and Methods

Vertebrate remains reported here were excavated in 2009 by Martha Zierden of the Charleston Museum and the College of Charleston Archaeological Field School. Quarter-inch screen mesh was used to recover materials during excavation. Three analytical units were defined based on depositional context: 1) Zone 10, the Moat collection, is associated with the moat between the palisade and the redan, deposited between 1710 through 1760 before the Lower Market was established mixed with animal remains associated with the Lower Market; 2) Zones 3a, 3b, and 3c, the Early Lower Market collection, is associated with the Lower Market below the 1786 paving and above the demolished parapet; and 3) Zone 3, the Later Lower Market collection, is associated with the Lower Market above the 1786 market paving but prior to the demolition and abandonment of the market. A list of the proveniences reported here and their temporal assignment is attached as Appendix A.

Vertebrate remains were identified following standard zooarchaeological methods. All identifications were made using the comparative skeletal collection of the Zooarchaeology Laboratory, Georgia Museum of Natural History, University of Georgia by Carol Colaninno-Meeks. Laboratory assistance was provided by Julia K. Orr. A number of primary data classes are recorded as part of every zooarchaeological study. Specimens are identified in terms of elements represented, the portion recovered, and symmetry. The Number of Identified Specimens (NISP) is determined. The only exception is the Indeterminate vertebrate category (Vertebrata), for which specimens are not counted due to their fragmented condition. Specimens that cross-mend are counted as one specimen. All specimens are weighed to provide additional information about the relative abundance of the taxa identified. Indicators for age at death, sex, and modifications are noted where observed. Measurements for mammals and birds are recorded following Driesch (1976) and are presented in Appendix B.

The Minimum Number of Individuals (MNI) is estimated based on paired elements, size, and age. Although MNI is a standard zooarchaeological quantification method, the measure has several well-known biases. For example, MNI emphasizes small species over larger ones. This can be demonstrated in a hypothetical sample consisting of ten chickens and one cow. Although

ten chickens indicate emphasis on chicken, one cow could supply more meat. Basic to MNI is the assumption that the entire individual was utilized at the site. From ethnographic evidence, it is known that this is not always true (Perkins and Daly 1968). This is particularly the case for larger individuals, animals used for special purposes, and where food exchange was an important economic activity (Thomas 1971; White 1953).

In addition to these primary biases, MNI is also subject to secondary bias introduced by the way samples are aggregated during analysis. The aggregation of archaeological samples into analytical units (Grayson 1973) allows for a conservative estimate of MNI, while the "maximum distinction" method, applied when analysis discerns discrete sample units, results in a much larger MNI. In estimating MNI for the three analytical units (the Moat, the Early Lower Market, and the Later Lower Market), all faunal remains associated with each unit are grouped together.

In most cases, MNI is estimated for the lowest taxonomic level. An exception to this rule is made for sheep (*Ovis aries*) and goat (*Capra hircus*). Only a few specimens could be identified to species while a large number of specimens are identified to sub-family (Caprinae). In this case, MNI is estimated for both taxonomic categories. The higher MNI estimate is used in subsequent calculations. The lower MNI is included in the species list in parentheses for information only and is not used in subsequent calculations.

Biomass estimates compensate for some of the problems encountered with MNI. Biomass refers to the quantity of tissue that a specified taxon might have supplied. Estimates of biomass are based on the allometric principle that the proportions of body mass, skeletal mass, and skeletal dimensions change with increasing body size. This scale effect results from a need to compensate for weakness in the basic structural material, in this case bones and teeth. The relationship between body weight and skeletal weight is described by the allometric equation:

$$Y = aX^b$$

(Simpson et al. 1960:397). In this equation, X is specimen weight, Y is the biomass, b is the constant of allometry (the slope of the line), and a is the Y-intercept for a log-log plot using the method of least squares regression and the best fit (Reitz et al. 1987; Reitz and Wing 2008:236-239). Many biological phenomena show allometry described by this formula (Gould 1966, 1971) so that a given quantity of skeletal material or a specific skeletal dimension represents a predictable amount of tissue or body length due to the effects of allometric growth. Values for a and b are derived from calculations based on data at the Florida Museum of Natural History, University of Florida, and the Georgia Museum of Natural History, University of Georgia. The allometric formulae used are presented in Table 1.

Specimen count, MNI, biomass, and other derived measures are subject to several common biases (Casteel 1978; Grayson 1979, 1981; Wing and Brown 1979). In general, samples of at least 200 individuals or 1400 specimens are needed for reliable interpretations. Smaller samples frequently generate a short species list with undue emphasis on one species in relation to others. It is not possible to determine the nature or the extent of this bias, or correct for it, until the sample is made larger through additional work.

Specimen count, MNI, and biomass also reflect identifiably. Some specimens of some animals are simply more readily identified than others and the taxa represented by these elements may appear more significant in terms of specimen count than they were in the diet. If these animals are identified largely by unpaired elements, such as scales and cranial fragments, the estimated MNI for these taxa will be low. At the same time, animals with many highly diagnostic but unpaired elements may yield a high specimen weight and biomass estimate. Hence high specimen count, low MNI, and high biomass are artifacts of analysis for some animals.

The species identified from the South Adger's Wharf and Lower Market are summarized into faunal categories based on vertebrate class. This summary contrasts the percentage of various groups of taxa in the collection. These categories are Fishes, Turtles, Wild birds, Domestic birds, Domestic mammals, Wild mammals, and Commensal taxa. In order to make comparisons of MNI and biomass estimates possible, the summary tables include biomass estimates only for those taxa for which MNI is estimated.

Canada geese and turkeys are placed in the Wild bird category, but may actually be domestic birds. According to the American Poultry Association (1874), standards of excellence for turkeys were established by the mid-eighteenth century. However, measurements are the primary means of distinguishing between wild and domestic animals and specimens that could distinguish wild from domestic forms are not present in these assemblages. Because wild Canada geese and turkeys were present in South Carolina, the more conservative interpretation is to consider the archaeological specimens as pertaining to the wild form, especially for the early dates.

Commensal taxa include rodents, Old World rats, domestic dogs (*Canis familiaris*), and domestic cats (*Felis catus*). Although commensal animals might be consumed, they are commonly found in close association with humans and their built environment as pets, vermin, or part of the urban wildlife. Some commensal animals are ones that people either do not encourage or actively discourage. Just as some of the animals included in the commensal category might have been consumed, likewise some animals identified as consumed might also have been commensal.

The presence or absence of elements in an archaeological assemblage provides data on animal use such as butchering practices and transportation costs. These data are particularly important at a market. The artiodactyl elements identified at South Adger's Wharf are summarized into categories by body parts. The Head category includes only skull fragments, including antlers and teeth. The atlas and axis, along with other vertebrae and ribs, and sternum, are placed into the Axial category. It is likely the Head and Axial categories are under-represented because of recovery and identification difficulties. Vertebrae and ribs of mammals cannot be identified beyond class unless distinctive morphological features support such identifications. Usually they do not, and specimens from these elements are classified as Indeterminate mammal. Forequarter includes the scapula, humerus, radius, and ulna. Carpal and metacarpal specimens are presented in the Forefoot category. The Hindfoot category includes tarsal and metatarsal specimens. The Hindquarter category includes the innominate, sacrum,

femur, and tibia. Metapodiae and podiae which could not be assigned to one of the other categories, as well as sesamoids and phalanges are assigned to the Foot category.

The specimens identified as artiodactyls from each analytical unit are summarized visually to illustrate their number and location in a carcass. Although the atlas and axis fragments are accurately depicted, other cervical, thoracic, lumbar, and caudal vertebrae, as well as ribs, are placed approximately on the illustrations. The last lumbar location is used to illustrate vertebrae that could only be identified as vertebrae. The last rib location is used to illustrate ribs for which the specific rib could not be identified. Specimens identified only as sesamoids, metapodiae, podials, or phalanges are illustrated on the right hindfoot.

Pig, cow, and caprines specimens are also studied by means of logged ratio diagrams, which serve to standardize the relative proportion of identified archaeological specimens with the relative proportion of the represented specimens in complete, unmodified reference pig, cow, and caprine skeleton which serve as standards (Reitz and Wing 2008:223-224; Simpson 1941; Simpson et al. 1960:357-358). The formula is:

$$d = log_e X - log_e Y$$

where d is the logged ratio, X is the percentage of each specimen category in the archeological collection, and Y is the same percentage of this same category in the unmodified skeleton of the standard animal. In graphic format, the standard is represented by a horizontal line at zero and the logged ratio (d) is represented on the vertical axis. Values beneath the line are under-represented compared to the standard and values above the line are over-represented. The pig, cow, and caprine skeletons are subdivided into Head, Forequarter, Hindquarter, and Foot categories defined above. Specimens in the Vertebra/rib are included in the calculation of X and Y, but d for this category is not presented in the figures because vertebrae and ribs are typically rare or absent in these collections, perhaps because of the analytical bias identified above.

Logged ratio diagrams equate fragmentary specimens representing archaeological specimens with whole specimens, a possible source of analytical bias. The negative aspects of this bias are balanced against the controls this method offers over identification difficulties and relative abundance in the skeleton whereas bar diagrams and other devices that rank specimens based on relative abundance in the archaeological collection do not. By standardizing the relative abundance of archaeological specimens against the relative abundance of the specimens that they represent in the unmodified skeleton, some of the problems associated with bar diagrams are avoided.

Relative ages of the artiodactyls identified are estimated based on observations of the degree of epiphyseal fusion for diagnostic elements. When animals are immature, a cartilaginous plate separates the shaft (diaphysis) of the bone from the ends of the specimen (epiphyses). As maturity is reached and growth is complete, these cartilaginous plates ossify and the epiphyses and diaphysis fuse. While environmental factors influence the actual age at which fusion is complete, elements fuse in a regular temporal sequence (Gilbert 1980; Purdue 1983; Reitz and Wing 2008:173-174; Schmid 1972; Watson 1978). During analysis, specimens are recorded as either fused or unfused and placed into one of three categories based on the age in which fusion generally occurs. Unfused elements in the Early-fusing category are interpreted as

evidence for juveniles; unfused elements in the Middle-fusing and Late-fusing categories are usually interpreted as evidence for subadults, though sometimes characteristics of the specimen may suggest a juvenile. Fused specimens in the Late-fusing group provide evidence for adults. Fused specimens in the Early- and Middle-fusing groups are indeterminate. Clearly fusion is more informative for unfused elements that fuse early in the maturation sequence and for fused elements that complete fusion late in the maturation process than it is for other elements. An Early-fusing element that is fused could be from an animal that died immediately after fusion was complete or many years later. The ambiguity inherent in age grouping is somewhat reduced by recording each element under the oldest category possible. Tooth eruption data (Severinghaus 1949) are also recorded.

The sex of animals is an important indication of animal use; however, there are few unambiguous indicators of sex. Males are indicated by the presence of spurs on the tarsometatarsus of chickens and turkeys, antlers on deer, large tusk-like canines on pigs, the baculum in those species that have one, pelvic characteristics, and characteristics of horn cores in bovids. Male turtles are indicated by a depression on the plastron to accommodate the female during mating. Females are recognized either by the absence of these features or by different shapes in these features. Female birds may also be identified by the presence of medullary bone (Rick 1975). Another approach is to compare measurements of identified specimens for dimensions that fall into a male or female range, though rarely are there sufficient numbers of measurements to reliably indicate sex.

Modifications can indicate butchering methods as well as site formation processes. Modifications are classified as hacked, sawed, clean-cut, cut, worked, burned, calcined, rodent-gnawed, carnivore-gnawed, and weathered. Although NISP for specimens identified as Indeterminate vertebrate are not included in the species lists, modified Indeterminate vertebrate specimens are included in the modification tables.

Hacked, sawed, clean-cut, and cut specimens are the product of butchering and food preparation. Hacked marks are evidence that some larger instrument, such as a cleaver, was used. Presumably, a cleaver, hatchet, or axe was used to dismember the carcass before, rather than after, the meat was cooked. Saw marks may result from a variety of metal-toothed instruments (Reitz and Wing 2008:130). Saw marks from metal-toothed tools result in parallel striations which are usually clearly visible; however, some specimens have smooth, straight, but unstriated, edges. These "clean-cut" specimens are most likely sawed, but the serrations are not visible because of the cancellous bone over which the saw passed. Cuts are small incisions across the surface of specimens. These marks were probably made by knives as meat was removed before or after the meat was cooked. Cuts may also be left on specimens if attempts are made to disarticulate the carcass at joints. Some marks that appear to be made by human tools may actually be abrasions inflicted after the specimens were discarded, but distinguishing this source of small cuts requires access to higher powered magnification than is currently available (Shipman and Rose 1983).

Worked specimens provide evidence of human modification probably not associated with butchery, such as the manufacture of tools, jewelry, and other implements. These are described

in more detail in the results for each temporal subdivision.

Burned and calcined specimens are the result of exposure to fire when a cut of meat is roasted or if specimens are burned intentionally or unintentionally after discard. Burned specimens result from the carbonization of bone collagen and are identified by their charred-black coloration (Lyman 1994:384-385). Calcined specimens are usually indicated by white or blue-gray discoloration (Lyman 1994:385-386). Calcined bones are the result of two possible processes: burning at extreme temperatures (≥ 600º C) and leaching of calcite. Experimental studies indicate that the color of bone may be a poor indicator of the type of modification because it is difficult to precisely describe color variation and other diagenetic factors may alter bone color (Lyman 1994:385). Both types of calcination are believed to have occurred in this assemblage, but no attempt was made to distinguish between them.

Gnawing by rodents and carnivores indicates that specimens were not immediately buried after disposal. While burial would not ensure an absence of gnawing, exposure of specimens for any length of time might result in gnawing. Rodents include such animals as rats and squirrels (*Sciurus* spp.). Carnivores include such animals as opossums (*Didelphis virginiana*), dogs, raccoons (*Procyon lotor*), and cats. Gnawing by rodents and carnivores result in loss of an unknown quantity of discarded material. Kent (1981) demonstrates that some bone gnawed by carnivores, such as dogs, may not necessarily leave any visible sign of such gnawing and yet the specimens would quite probably be removed from their original depositional context.

Copper and rust stains are evidence that the specimen was deposited in the same location as a metal object. These modifications appear as green or rust discolorations on the surface of the specimen. Copper and rust stains are noted on numerous specimens. Metal stains were recorded during data collection, but are not reported in the modifications table.

Results

Zone 10: The Moat, 1710-1760

The earliest division in the analysis contains the smallest sample. The vertebrate collection from the moat contains 1,023 specimens weighing 5,292.03 g and the remains of an estimated 30 individuals from 16 taxa (Table 2). Domestic mammals contribute 33% of these individuals and 96% of the biomass (Table 3). The domestic mammals are pigs (*Sus scrofa*), cows (*Bos taurus*), and sheep or goats (Caprinae), including at least one sheep. Sheep and goats are slightly more abundant than pigs and cows. Beef contributes 66% of the biomass and pork and mutton or chevon each contributes 15% of the biomass. The only domestic bird is a chicken (*Gallus gallus*). Wild taxa, both terrestrial and aquatic, contribute 40% of the individuals and 4% of the biomass. Wild terrestrial taxa include a turkey and an opossum (*Didelphis virginiana*). Aquatic taxa include numerous estuarine fishes common to the waters surrounding Charleston, as well as a pond turtle (Emydidae) and a sea turtle (Cheloniidae). Old World rat is the only commensal taxon, representing 23% of the individuals.

Indications of sex are noted on several specimens. One Indeterminate bird (Aves) fragment has medullary bone present, indicating a female bird. At least one of the pig

individuals and the sheep individual were males. The male pig is indicated by a large tusk-like canine fragment. The male sheep is evidenced by horn core fragments.

Specimen distribution data for pig, cow, and caprines are summarized in Table 4 and Figures 1-3. Pig specimens are dominated by fragments from the head. Specimens from the meaty portion, including the Forequarter and the Hindquarter are also present. The remaining specimens are from the Forefoot and Hindfoot. Specimens from the Head, Forequarter, and Hindquarter are over-represented compared to the standard pig (Figure 4). Cow specimens are primarily from the Head and the Hindquarter. Cow specimens from the Vertebra/Rib, Forequarter, Hindfoot, and Foot are also present. Compared to the standard cow, specimens from the Head, Forequarter, Hindquarter, and Foot are over-represented (Figure 5). Over half of the caprine specimens are from the Head and the Foot. The remaining specimens are relatively evenly distributed among the other skeletal portions with the exception of specimens from the Vertebra/Rib and Hindquarter. Compared to the standard caprine, specimens from the Head, Forequarter, and Foot are over-represented, while specimens from the Hindquarter are under-represented (Figure 6).

Juveniles, subadults, and adults are present in this collection. Epiphyseal fusion for pigs indicates at least one individual was a juvenile at death, evidenced by a small and porous humeral shaft fragment. The remaining two individuals were subadults at death (Table 5). One cow individual was a juvenile at death, one was a subadult, and the other cow individual was an adult at death (Table 6). Two caprine individuals were subadults at death, while the age of the other two caprines could not be determined (Table 7).

Hacking is the most common modification in this collection, present on 48% of the modified specimens (Table 8). Cut marks are present on 27% of the modified specimens, while saw and clean cut markings are present on 16% of the modified specimens. Evidence of burning and rodent and carnivore gnawing is present on 10% of the modified specimens. No specimens are worked.

The Early Lower Market below the 1786 Paving and above the Parapet Demolition

The second temporal subdivision studied is the Early Lower Market, deposited below the 1786 paving and above the demolished the parapet. The vertebrate collection from the early subdivision of the Lower Market contains 2,357 specimens weighing 13,789.06 g and the remains of at least 42 individuals from 19 taxa (Table 9). Domestic mammals contribute 50% of these individuals and 98% of the biomass (Table 10). The domestic mammals are pigs (*Sus scrofa*), cows (*Bos taurus*), and sheep or goat (Caprinae). At least one of the caprines is a sheep (*Ovis aries*). Cows contribute the greatest number of individuals, 21%, and the greatest amount of biomass is beef, 81%. Pigs constitute 17% of the individuals and 10% of the biomass; caprines constitute 12% of the individuals and 7% of the biomass. Domestic birds are represented by three taxa, a Muscovy duck (*Cairina moschata*), a rock dove (*Columba livia*), and three chickens (*Gallus gallus*). At least one of the chickens was a female. Wild taxa, both terrestrial and aquatic, comprise 24% of the individuals, but only 1% of the biomass. Of the wild taxa, 70% are animals that reside in estuarine waters surrounding Charleston. Three Old World

rats (*Rattus* spp.), a dog (*Canis familiaris*), and two cats (*Felis catus*) are commensal taxa and contributes 14% of the individuals.

Specimen distribution data for, pigs, cows, and caprines are presented in Table 11 and Figures 7-9. Pig specimens are dominated by specimens from the Head and Forequarter. Specimens from the Vertebra/Rib, Hindquarter, Forefoot, Hindfoot, and Foot are present, but are less common in the collection. Compared to the standard pig, specimens from the Head, Forequarter, and Hindquarter are over-represented, and specimens from the Foot are under-represented (Figure 4). Cow specimens are abundant (Table 11). The specimen distribution for cow suggests that specimens are evenly distributed throughout the skeletal portions with the exception of the Vertebra/Rib (NISP=2). Specimens from the Forequarter, Hindquarter, and Foot are over-represented compared to the standard cow, while specimens from the Head are under-represented (Figure 5). The caprine specimens also are relatively evenly distributed among the skeletal portion, with the Hindquarter most represented (Table 11). However, specimens from the Vertebra/Rib and Forefoot are under-represented. Specimens from the Forequarter, Hindquarter, and Foot are over-represented compared to the standard caprine, and specimens from the Head are under-represented (Figure 6).

Juvenile, subadults, and adults are present. Epiphyseal fusion for pigs indicates at least three individuals were juveniles at death, while age at death of the remaining four individuals could not be determined (Table 12). One cow individual was a juvenile at death, two cows were subadults at death, and one was an adult at death (Table 13). The age of the remaining five cow individuals could not be determined. One caprine individual was a juvenile and one was an adult at death. The age of the remaining three individuals could not be determined (Table 14). One of the chickens, the turkey (*Meleagris gallopavo*), the cats and the dog were subadults at death.

Hacks and cuts are the most common modification in this collection. Hacked and cut specimens are present on 85% of the modified specimens (Table 15). Saw and clean-cut marks are present on 9% of the modified specimens. Other specimens are burned, calcined, rodent and carnivore gnawed, and weathered. Worked bones comprise less than 1% of the modified specimens. All worked specimens are Indeterminate mammal (Mammalia) fragments. Both worked specimens are polished into thin, flat rectangles. One worked specimen has notches along the side. The worked specimen without notches measures 40.21 mm in length, 6.13 mm in width, and 1.16 mm in thickness (FS# 183) while the specimen with notches measures 20.70 mm in length, 7.50 mm in width, and 2.67 mm in thickness (FS# 64).

The Later Lower Market 1786-1804

The Later Lower Market contains 1,328 specimens weighing 6,139.68 g and the remains of an estimated 35 individuals from 24 taxa (Table 16). Domestic mammals contribute 23% of these individuals and 95% of the biomass (Table 17). The domestic mammals are pigs (*Sus scrofa*), cows (*Bos taurus*), and sheep or goats (Caprinae), including at least one sheep (*Ovis aries*). Cow and caprine individuals and biomass are more abundant than pigs. Beef contributes the greatest amount of biomass at 76%. Pigs constitute 6% of the individuals and 9% of the biomass; caprines constitute 9% of the individuals and 10% of the biomass. Chickens (*Gallus gallus*) are the only domestic bird. Wild taxa, both terrestrial and aquatic, contribute 57% of the

individuals and 4% of the biomass. Wild terrestrial taxa include both birds and mammals, such as turkey (*Meleagris gallopavo*) and white-tailed deer (*Odocoileus virginianus*). Aquatic taxa include numerous estuarine fishes common to the waters surrounding Charleston, as well as a chicken turtle (*Deirochelys reticularia*), slider (*Trachemys* sp.), and sea turtle (Cheloniidae). Old World rats (*Rattus* spp.) and a cat (*Felis catus*) are the only commensal taxa and represent 9% of the individuals.

Evidence for the sex of some of these taxa is observed. One Indeterminate bird (Aves) fragment has medullary bone, indicating a female bird. The sheep individual was a male as evidenced by horn core fragments.

Distribution of pig, cow, and caprine specimens is summarized in Table 18 and Figures 10-12. Pig specimens are dominated by specimens from the Head, which are mostly teeth. Specimens from the meaty portion, including the Forequarter and the Hindquarter are also present. The remaining specimens are from the Vertebra/Rib, Hindfoot, and Foot. Specimens from the Head, Forequarter, and Hindquarter are over-represented compared to the standard pig, and specimens from the Foot are under-represented (Figure 4). Cow specimens are abundant in this collection. The specimen distribution for cow suggests that specimens are evenly distributed throughout the skeletal portions with the exception of the Head and Vertebra/Rib. Compared to the standard cow, specimens from the Forequarter, Hindquarter, and Foot are over-represented and those from the Head are under-represented (Figure 5). Most of the caprine specimens are from the Foot. The Forequarter, Hindquarter, and Hindfoot each have six specimens represented and only two specimens are represented from the Head and Forefoot portions each. Specimens from the Forequarter, Hindquarter, and Foot are over-represented compared to the standard caprine, while specimens from the Head are under-represented (Figure 6).

Juveniles, subadults, and adults are present in this collection. Epiphyseal fusion for pigs indicates at least one individual was a juvenile and the other individual was a subadult at death (Table 19). One cow individual was a juvenile at death, one individual was a subadult at death, and one individual was an adult at death (Table 20). One caprine individuals was a juvenile at death (Table 21). The remaining two caprine individuals were subadults at death. Of the four chicken individuals, at least one is a subadult.

Hacking is the most common modification in this collection, present on 62% of the modified specimens (Table 22). Cut marks are present on 26% of the modified specimens, while saw and clean cut markings are present on 4% of the modified specimens. Burned, calcined, and rodent and carnivore gnawed specimens constitute 6% of the modified specimens. Four Indeterminate mammal (Mammalia) specimens are worked. One worked specimen (FS# 243) was whittled down at one end and appears to have been screwed into another object. This worked bone possibly served as a handle. Another worked specimen has several "X" carved into the bone and was flattened along one side (FS# 233). The remaining two worked fragments were shaped at one end. One of these fragments was worked into a semicircle shape at one end (FS# 144) and the other fragment was carved into a straight, square-like shape at one end (FS# 101).

Discussion

South Adger's Wharf and the Lower Market

The three divisions of South Adger's Wharf indicate a degree of continuity through the almost 100 years of deposition. In all three collections, a diverse array of taxa is represented, including both domestic and wild taxa and the biomass is dominated by domestic mammals, particularly beef. Although the South Adger's Wharf collections are very similar, noteworthy temporal changes are observed (Table 23). The Moat collection is unusual in that a high percentage of the individuals are commensal taxa, specifically Old World rats. The Early and Later Market collections have a much lower frequency of rat individuals compared to the Moat collection (Table 23). With the establishment of the Lower Market, there is a decrease in the percentage of non-domestic and commensal individuals and an increase in the number of domestic individuals (Table 23). The increase in the frequency of domestic individuals does not continue in the Later Lower Market collection. Instead, the percentage of domestic individuals in the Later Lower Market collection decreases to levels similar to the Moat collection (Table 23). The Later Lower Market collection has higher percentages of wild taxa compared to the Early Lower Market. There also is a further decline in commensal individuals in the Later Lower Market collection.

The changes in the percentage of individuals at this site provided insights into the condition of Charleston Harbor and commercial animal use in the city. These interpretations are strengthened by the comparison of South Adger's Wharf assemblages with the vast vertebrate database established for eighteenth- and early nineteenth-century Charleston (Zierden and Reitz 2009). The vertebrate remains from the 1710-1760 moat at South Adger's Wharf are discussed separately from the Lower Market collections and are compared to the vertebrate remains from the Atlantic Wharf, which dates to 1790-1820 (Zierden and Reitz 2002). Temporal trends in the frequency of several taxa in the Lower Market collections are compared to these from at the Beef Market (Table 24) and non-market locations (Table 25) during the eighteenth century.

The South Adger's Wharf 1710-1760 Moat and The Atlantic Wharf

Previous analysis of the vertebrate remains from the Atlantic Wharf indicates the conditions of the Charleston Harbor during the late eighteenth and early nineteenth century (Zierden and Reitz 2002). The Atlantic Wharf deposit is the result of trash disposal from nearby residences and businesses before municipal refuse collection was implemented in Charleston (Zierden and Reitz 2002:57).

The archaeofaunal collection from the Atlantic Wharf is remarkable due to the large number of commensal taxa, specifically Old World rats, in the collection; Old World rats contribute 31% of the individuals (Zierden and Reitz 2002:Table 4). The presence of Old World rats in Charleston is well documented. These animals frequently are recovered from archaeological sites throughout the city; however, they seldom comprise such a high percentage of the individuals (Tables 24 and 25; Zierden and Reitz 2009). The high frequency of rats in the Atlantic Wharf collection compared to other collections from Charleston indicates that people made an effort to remove animal debris from areas of human habitation. In doing so, the people of Charleston created a prime attraction for Old World rats in areas where trash was discarded.

Areas of trash disposal provided rats with added food and habitat within the city (Zierden and Reitz 2002:57).

Although not as dramatic, the Moat collection of South Adger's Wharf also contains a remarkably high percentage of Old World rat individuals, 23% of the MNI (Table 2). Before the Lower Market was constructed, the moat at South Adger's Wharf likely was used for trash disposal, similar to the Atlantic Wharf. The high frequency of Old World rats at these two wharves suggests that the Charleston Harbor was ideal for Old World rats. The wharves of Charleston not only provided spaces for boats to dock and merchants to engage in commerce, but also served as neglected areas for trash disposal, refuse accumulation, and relative safety for rats.

The Moat collection has a high frequency of Old World rats, but rats decline with the establishment of the Lower Market. The percentage of Old World rats drastically decreases in the Early Lower Market collection compared to the Moat collection, from 23% to 7% of the individuals (Table 23). The decline in Old World rats continues in the Later Lower Market collection, in which Old World rat individuals comprise 6% of this collection. The decrease in Old World rats throughout the occupation of South Adger's Wharf suggests that this location was an area where people discarded debris and disregarded issues of sanitation until the market was established. After that, sanitation issues must have been addressed and it is possible the area was cleaned to discourage vermin.

The Beef Market and Non-Market Trends

Extensive zooarchaeological research throughout Charleston demonstrates that the residents of Charleston consumed Eurasian domesticates and numerous wild taxa native to the lowcountry (Zierden and Reitz 2009). Although this characterization of animal use applies to the Lower Market collections as well, the relative frequency of animal species, animal classes, and butchery changes during the century. Three temporal trends of animal use in the Beef Market and non-market collections emerged through zooarchaeological research.

Firstly, research in Charleston indicates that through the eighteenth century, the relative frequency of domestic individuals declines in relation to individuals from wild taxa. For non-market collections of the city, the frequency of domestic taxa decreased by 11% during the eighteenth century (Table 25). The decline in domestic individuals is more drastic in the vertebrate data from the Beef Market (Table 24). From the inception to the closing of the Beef Market, a 30% decrease in the frequency of domestic individuals is observed. Although there is an overall decrease in the frequency of domestic individuals throughout the city and at the Beef Market, not all domestic animals decreased. Chickens, in particular, increase in frequency through time at non-market locations (Table 25) and at the Beef Market (Table 24). The frequency of pigs is relatively consistent in non-market locations (Table 25), though pigs decrease at the Beef Market (Table 24). The frequency of cows, sheep, and goats decreases in both non-market and market collections. Concern over keeping cattle in a growing, crowded urban landscape is reflected in the decline of cattle in the Beef Market collection (Zierden and Reitz 2005:11-12). It is possible that live cattle were kept at the Beef Market during the early years, but that space for large livestock became limited as the market square grew. Alternatively, if live cattle were not brought to or kept at the Beef Market, the decline in the percentage of cow

individuals may suggest that keeping of cattle on throughout the city was discouraged. The decline of cattle on household lots in the city is reflected in the decline of the frequency of cows in the eighteenth-century, non-market collections (Table 25). Also, if beef and pork regularly were brought into the city from outlying farms, this practice may have been discouraged or became unpopular through the eighteenth century.

These observations are supported by the temporal increase in wild taxa at both the Beef Market and non-market locations (Tables 24 and 25). The frequency of both wild terrestrial and aquatic individuals increases during the eighteenth century throughout Charleston. Residents consumed more wild taxa as the century advanced. This increase in wild taxa consumption likely removed some of the difficulties of keeping domestic animals in a growing city, such as the waste and smells produced by domestic animals, the valuable space that these animals occupied, and the costs associated with keeping large livestock.

As the frequency of domestic taxa decreased at non-market locations throughout the city, the frequency of commensal taxa increased (Tables 24 and 25). A drastic increase in the frequency of rats is documented in several collections. The increase in rats is related to the development of the urban environment, especially crowding, urban sanitation, trash disposal, and health (Zierden 1996, 2000; Zierden and Reitz 2001, 2002, 2007). Although there is a temporal increase in the frequency of rats in Charleston non-market collections, there is not an increase in the frequency of rats throughout the occupation of the Beef Market (Table 24). Instead, there is a slight decrease in rats at the Beef Market. The decline in rats at the Beef Market suggests that efforts were made to keep the growing rat populations out of the Beef Market. Alternatively, the Beef Market offered fewer hiding places and food resources compared to other locations in the city, or the cats of the Beef Market kept the rat population adequately controlled compared with non-market locations in Charleston (Zierden and Reitz 2005:113). The frequency of commensal taxa, particularly Old World rats, may further attest to the conditions and cleanliness of Charlestons' markets compared to wastelands and residential lots in the city.

Butchery may distinguish commercial from household-level meat production. Butchery evidence from the Beef Market, compared to non-market butchery, suggested that the percentage of sawed bones may indicate the amount to which commercially prepared meats were used in the city, compared to household butchery. This is because sawing is primarily a commercial butchery practice and the percentage of sawing at the Beef Market falls within the documented sawing percentage from non-market collections for the eighteenth-century collections (Tables 24 and 25). Although the percentage of sawing may be a good signature of commercial meat production, hacking and cutting were inconclusive as market signatures (Zierden and Reitz 2005:114). The percentage of different modifications at the Lower Market may refine the use of butchery as a way to distinguish between market and non-market meat preparation.

The Lower Market Compared to the Beef Market and Non-Market Collections

Trends in the frequency of several taxa in the Lower Market collections are examined in relation to the Beef Market and non-market collections that are contemporaneous with the eighteenth-century Lower Market. The range of animals recovered in the Lower Market assemblage indicates that local resources were important components to the diet of eighteenth-

century Charlestonians. As at the Beef Market, domestic animals, in addition to wild terrestrial and aquatic taxa were sold at the Lower Market.

The vertebrate assemblage from the Lower Market shares some features with the Beef Market assemblage. Consistent with the temporal trends of the Beef Market and the non-market collections throughout Charleston, the Early and Later Lower Market collections show a decline in the frequency of domestic individuals throughout the eighteenth century. Although the overall frequency of domestic taxa declines through time, the frequencies of specific domestic taxa do not decline or only decline slightly. For example, the frequency of domestic birds increases through the eighteenth century at the Lower Market (Table 23). There is, however, a decrease in the frequency of chickens in the Beef Market assemblage (Table 24). Sheep and goat frequency declines slightly at the Lower Market, but only by 3% (Table 23). This is similar to the decline in the frequency of caprines from the Beef Market. These modest changes in the Lower Market collections contrasts with the sharp declines observed in the relative frequency of two domestic mammals, pigs and cows. The relative frequency of pigs declines by 11% through time at the Lower Market, while the frequency of cows declines by 13% (Table 23). The temporal decline in the Lower Market collection mirrors that of the Beef Market. However, similar declines are not observed in non-market collections, which only have a 0.4% and 6% decline in the relative frequency of pigs and cows respectively (Table 25).

Overall, when the vertebrate data from the Lower and Beef Markets are compared with the collections from non-market locations, it appears that the sale of pigs and cows decreased, while the sale of small domestic animals, including caprines and chickens, was stable or increased. The Lower and Beef Markets also saw an increase in the sale of wild taxa, including many aquatic animals such as estuarine fishes and sea turtles. When these trends are considered together, it appears that the sale of large animals, such as cattle, decreased through time, and was replaced by smaller taxa. Although pigs are not much larger than sheep and goats, keeping pigs in the city may have been discouraged because pigs disturb land; both untended land, such as areas of trash disposals, and tended land, such as yards and gardens. This suggests that keeping cows and pigs in a growing city was discouraged or was impractical. This is particularly true if live animals were stabled or slaughtered near the market.

The relative frequency of commensal taxa in the Lower Market collections is similar to that of the non-market eighteenth-century collections of Charleston. Approximately 9% to 14% of the Lower Market individuals are considered commensal, whereas commensal taxa comprise 11% to 14% of the individuals from non-market Charleston collections (Tables 23 and 25). The abundance of commensal taxa in the Beef Market assemblage is lower compared to the Lower Market and non-market Charleston collections, but is higher than the Lower Market by the end of the century. Although the frequency of commensal taxa at the Lower Market is within the range of non-market Charleston collections, the frequency of Old World rats is lower in both the Lower and Beef Market collections. The two market assemblages also differ from the non-market Charleston collections in that the relative frequency of Old World rat individuals decreases temporally in the Lower and Beef Market assemblages.

Similar to the relative frequency of Old World rat individuals is the frequency of vertebrate specimens gnawed by rodents. The frequency of rodent-gnawed specimens increases in non-market Charleston collections through the eighteenth century (Table 25). This contrasts with the frequency of rodent-gnawed specimens at the Lower and Beef Markets, which was always low. None of the specimens in the eighteenth-century Beef Market collections showed evidence of rodent gnawing (Table 24). Rodent-gnawed specimens are slightly more common in the Lower Market collection, but the frequency of modified rodent-gnawed specimens at the Lower Market decreases temporally (Table 23). The decline in the relative frequency of Old World rats through the occupations of both markets and rodent-gnawed specimens support the interpretation that the markets of Charleston did not provide ideal habitat and food for rats.

The frequency of modification on specimens may indicate aspects of butchery and the commercial circulations of animal products in Charleston and the surrounding lowcountry. The percentage of sawing in the Beef Market collection is between 2% and 8% (Table 24). This percentage is within the range of the summarized data for non-market, eighteenth-century Charleston collections, 6% and 9% (Table 25). The fact that the percentage of sawed specimens in the Beef Market collection is within the non-market percentage suggests that the percentage of sawed bones may indicate the amount to which commercially prepared meats were used in the city as compared to household butchery. This is because sawing is primarily a commercial practice, and the percentage of sawed specimens may be a good signature of remains from the market at non-market locations. Similarly, the percentage of sawed specimens in the Lower Market collection is within the range of the non-market sawed percentage (Tables 23 and 25). This supports the hypothesis that the frequency of sawed specimens may indicate the amount to which commercially prepared meats were used in Charleston.

Using the frequency of hack and cut marks as a signature of commercial meat production was inconclusive with the Beef Market data (Zierden and Reitz 2005:114). This is because the frequency of hacks was much higher in the Beef Market collection compared to the frequency of non-market, eighteenth-century hacking, while the frequency of cuts was lower in the Beef Market collection. The relative frequency of hacking in the Lower Market collections also is high, between 57% and 62%, compared to the non-market collections, but is low compared to the Beef Market collections (Table 23). As with the percentage of hacked specimens from the Beef Market, the percentage of hacked specimens in the Lower Market collections does not clearly indicate whether or not the percentage of hacked specimens can distinguish between household and commercial butchery. In the Lower Market collections, the frequency of cut marks is within the range of the summarized data for non-market Charleston collections (Tables 23 and 25). Although this may suggest that the frequency of cut marks can distinguish between household and commercial butchery, cut marks can be left on bones from carcass disarticulation, which may be commercial or household butchery. Cuts marks also can be left on bones from meat consumption after the meat is cooked. This process generally occurs at home. Distinguishing between cut marks resulting from carcass disarticulation or meat consumption is usually not possible; therefore, the ability of cut marks to discriminate between household and commercial butchery is unclear.

The proceeding discussion focused on interpreting the zooarchaeological assemblage of the Lower Market within the context of other Charleston collections using MNI. Although interpreting the individual animals at the Lower Market has merit, examining biomass estimations also has value. Despite the fact that many of the individuals sold at the Lower Market were wild taxa, the vast majority of the meat sold was from domestic taxa, particularly beef. Beef comprises 81% of the biomass in the Early Lower Market collection, while 76% of the biomass is beef in the Later Lower Market collection (Table 23). The majority of the meat sold at the Lower Market was beef, but the percent of beef represented in the Beef Market assemblage is generally higher compared to the Lower Market assemblage (Zierden and Reitz 2005:115). This suggests that although beef was a major product sold at the Lower Market, a larger volume of beef was sold at the Beef Market.

The analysis of the domestic mammal skeletal portions represented in the South Adger's Wharf collections suggests a continuity of butchery and market practices (Figures 4-6). The South Adger's Wharf logged ratio diagrams for the domestic mammals in the Moat and the Early and Later Lower Market collections are very similar.

When the Lower Market assemblages are compared with collections from the city and with the Beef Market, a consistent pattern emerges (Figures 13 and 14). For all four Charleston assemblages, Head, Forequarter, and Hindquarter portions of pig are over-represented (Figure 13). Despite the uniformity in the pig logged ratio diagram, one exception is noted: elements from the Forequarter and Hindquarter are slightly over-represented in the Lower Market assemblage compared to other Charleston locations, particularly the Beef Market (Figure 13). This suggests that bones from the Forequarter and Hindquarter were more frequently discarded at the Lower Market compared to the Beef Market. Similarly, when the cattle logged ratio diagram from the Lower Market is compared to the collections from the city of Charleston and the Beef Market, the Forequarter and Hindquarter portions of cattle are more over-represented at the Lower Market (Figure 14). These data suggest that when cuts of pork and beef were purchased from the Lower Market, it may have been to augment home-slaughter and meats available for purchase at the Beef Market.

Summary of the Lower Market

Overall, the zooarchaeological collection from the South Adger's Wharf moat is similar to that from the Atlantic Wharf and the collections from the Lower Market are similar to those from the Beef Market. Both the Moat and Atlantic Wharf collections have a remarkably high frequency of Old World rat individuals. The high frequency of Old World rats suggests that areas of the Charleston Harbor were used for trash disposal and were prime habitat for rats. The frequency of Old World rats drops with the establishment of the Lower Market, suggesting that either the Lower Market was intentionally kept clean of trash and debris, or the hustle and openness of the market did not provide ideal habitats for rats.

The assemblages from the Lower Market demonstrate that numerous wild taxa were sold at the market in addition to domestic taxa. Four trends in the zooarchaeological assemblage from the Lower Market are observed. Firstly, like the Beef Market assemblage, there is a temporal decline in the relative frequency of pig and cow individuals in the Lower Market collections,

suggesting that pigs and cows may have declined in the city as Charleston grew and became more crowded. Secondly, the frequency of Old World rats declines through time at both markets and rodent-gnawed specimens is lower in both the Lower and Beef Market collections compared to non-market, eighteenth-century collections from Charleston. This suggests that the markets were cleaner compared to other locations within Charleston, that the markets did not supply rats with the ideal food and habitats needed for them to thrive, or that the Old World rats were kept at bay by the market predators, cats. Thirdly, the frequency of sawed specimens at the Lower Market is within the range of the non-market sawed percentage and may be a signature of commercially produced meats at non-market locations. The use of hack and cut marks as evidence of commercially produced meats remains ambiguous. Lastly, although individuals from numerous taxa were sold at the Lower Market, the greatest volume of meat sold was from domestic mammals, particularly beef.

Conclusions

Zooarchaeological research at South Adger's Wharf and the Lower Market provides further data that expand the archaeological understanding of commercial production and circulation of meats in Charleston. Additionally, the comparison of the Lower Market archaeofaunal assemblage with the Beef Market and other eighteenth-century non-market assemblages generates further knowledge of the commercial role of animals, as well as commensal animals in the city and their impact on the urban environment. The temporal changes observed in the South Adger's Wharf and Lower Market are similar to other assemblages from Charleston, particularly the Beef Market. These temporal changes likely reflect accommodations for growth within the city, as well as the commercial production and circulation of meats from outlying areas surrounding the city. Although the zooarchaeological research at the Lower Market has greatly expanded the understanding of animal use in Charleston, further research is needed to fully explore the relationship between commercially available meats and household production and consumption in eighteenth-century Charleston.

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Table 1. South Adgers Wharf: Regression Formulae Used

Taxon	N	Slope (b)	Y-intercept (a)	r^2
Actinopterygii	393	0.81	0.90	0.80
Siluriformes	36	0.95	1.15	0.87
Perciformes	274	0.83	0.93	0.76
Centrarchidae	38	0.84	0.76	0.80
Haemulidae	25	0.82	0.84	0.42
Sciaenidae	99	0.74	0.81	0.73
Pleuronectiformes	21	0.89	1.09	0.95
Testudines	26	0.67	0.51	0.55
Aves	307	0.91	1.04	0.97
Mammalia	97	0.90	1.12	0.94

Note: $Y = aX^b$ where Y is biomass or meat weight; x is bone weight; a is the Y-intercept; and b is the slope. N is the number of observations (Reitz and Wing 2008:234-242).

Table 2. South Adgers Wharf, The Moat: Species List

Taxa	NISP	MNI #	%	Weight, g	Biomass, kg
Carcharhiniformes	1	1	3.3	0.81	0.104
Ground sharks					
Actinopterygii	56			30.94	0.476
Indeterminate bony fish					
Bagre marinus	1	1	3.3	0.18	0.004
Gafftopsail catfish					
Centropristis spp.	4	2	6.7	2.50	0.050
Sea bass					
Sciaenidae	23			35.86	0.550
Drums					
Micropogonias undulatus	1	1	3.3	0.05	0.004
Atlantic croaker					
Pogonias cromis	21	1	3.3	31.19	0.496
Black drum					
Paralichthys sp.	1	1	3.3	0.71	0.019
Southern flounder					
Testudines	2			1.77	0.046
Indeterminate turtle					
Emydidae	3	1	3.3	11.58	0.163
Pond turtles					
Cheloniidae	10	1	3.3	38.64	0.366
Sea turtles					
Aves	12			6.17	0.107
Indeterminate bird					
Anatidae	1	1	3.3	2.45	0.046
Ducks and geese					
Galliformes	1			1.68	0.033
Gallinaceous birds					
Gallus gallus	6	1	3.3	5.57	0.097
Chicken					

Table 2. South Adgers Wharf, The Moat: Species List (cont.)

Taxa	NISP	MNI #	%	Weight, g	Biomass, kg
Meleagris gallopavo	1	1	3.3	2.13	0.041
Turkey					
Mammalia	680			2135.90	26.100
Indeterminate mammal					
Didelphis virginiana	1	1	3.3	1.09	0.028
Opossum					
Rodentia	2			0.23	0.007
Rodents					
Rattus spp.	19	7	23.3	9.60	0.201
Old World rats					
Artiodactyla	6			25.22	0.408
Even-toed ungulate					
Sus scrofa	33	3	10.0	404.24	5.834
Pig					
Bos taurus	65	3	10.0	2049.66	25.149
Cow					
Caprinae	67	4	13.3	400.49	5.786
Sheep and goat					
Ovis aries	6	(1)		56.55	0.994
Sheep					
Vertebrata				36.82	
Indeterminate vertebrate					
Total	1023	30		5292.03	67.109

Table 3. South Adgers Wharf, The Moat: Summary Table

	MNI		Biomass	
	#	%	kg	%
Fishes	7	23.3	0.677	1.8
Turtles	2	6.7	0.529	1.4
Wild birds	2	6.7	0.087	0.2
Domestic birds	1	3.3	0.097	0.3
Wild mammals	1	3.3	0.028	0.1
Domestic mammals	10	33.3	36.769	95.8
Commensal taxa	7	23.3	0.201	0.5
Total	30		38.388	

Table 4. South Adgers Wharf, The Moat: Element Distribution

	Pig	Cow	Sheep/Goat
Head	17	16	22
Vertebra/Rib		7	1
Forequarter	6	7	8
Hindquarter	8	16	3
Forefoot	1	3	5
Hindfoot	1	8	8
Foot		8	20
Total	33	65	67

Table 5. South Adgers Wharf, The Moat: Epiphyseal Fusion for Pig (*Sus scrofa*)

	Unfused	Fused	Total
Early Fusing:			
Humerus, distal			
Scapula, distal			
Radius, proximal			
Acetabulum			
Metapodials, proximal			
1st/2nd phalanx, proximal			
Middle Fusing:			
Tibia, distal	1		1
Calcaneus, proximal			
Metapodials, distal			
Late Fusing:			
Humerus, proximal			
Radius, distal	1		1
Ulna, proximal			
Ulna, distal	1		1
Femur, proximal	2		2
Femur, distal	2		2
Tibia, proximal	2		2
Total	9		9

Table 6. South Adgers Wharf, The Moat: Epiphyseal Fusion for Cow (*Bos taurus*)

	Unfused	Fused	Total
Early Fusing:			
Humerus, distal			
Scapula, distal			
Radius, proximal		1	1
Acetabulum		2	2
Metapodials, proximal			
1st/2nd phalanx, proximal	1	4	5
Middle Fusing:			
Tibia, distal	1	3	4
Calcaneus, proximal	1		1
Metapodials, distal	1		1
Late Fusing:			
Humerus, proximal			
Radius, distal			
Ulna, proximal			
Ulna, distal			
Femur, proximal	1	1	2
Femur, distal	1		1
Tibia, proximal	1		1
Total	7	11	18

Table 7. South Adgers Wharf, The Moat: Epiphyseal Fusion for Sheep/Goat (Caprinae)

	Unfused	Fused	Total
Early Fusing:			
Humerus, distal		1	1
Scapula, distal			
Radius, proximal			
Acetabulum		1	1
Metapodials, proximal		4	4
1st/2nd phalanx, proximal	1	11	12
Middle Fusing:			
Tibia, distal		2	2
Calcaneus, proximal			
Metapodials, distal	8	5	13
Late Fusing:			
Humerus, proximal			
Radius, distal	1		1
Ulna, proximal			
Ulna, distal			
Femur, proximal			
Femur, distal			
Tibia, proximal			
Total	10	24	34

Table 8. South Adgers Wharf, The Moat: Modifications.

Taxon	Hacked	Sawed	Clean Cut	Cut	Worked	Burned	Calcined	Rodent gnawed	Carnivore gnawed	Weathered
Sea turtles				1						
Chicken									1	
Indeterminate mammal	67	6	14	41		2		4	4	
Even-toed ungulate	2			1						
Pig	5	1	1	2						
Cow	10		7	4					2	
Sheep and goat	9	2	1	3		1		2	4	
Indeterminate vertebrate	2			1						
Total	95	9	23	53		3	0	6	11	0

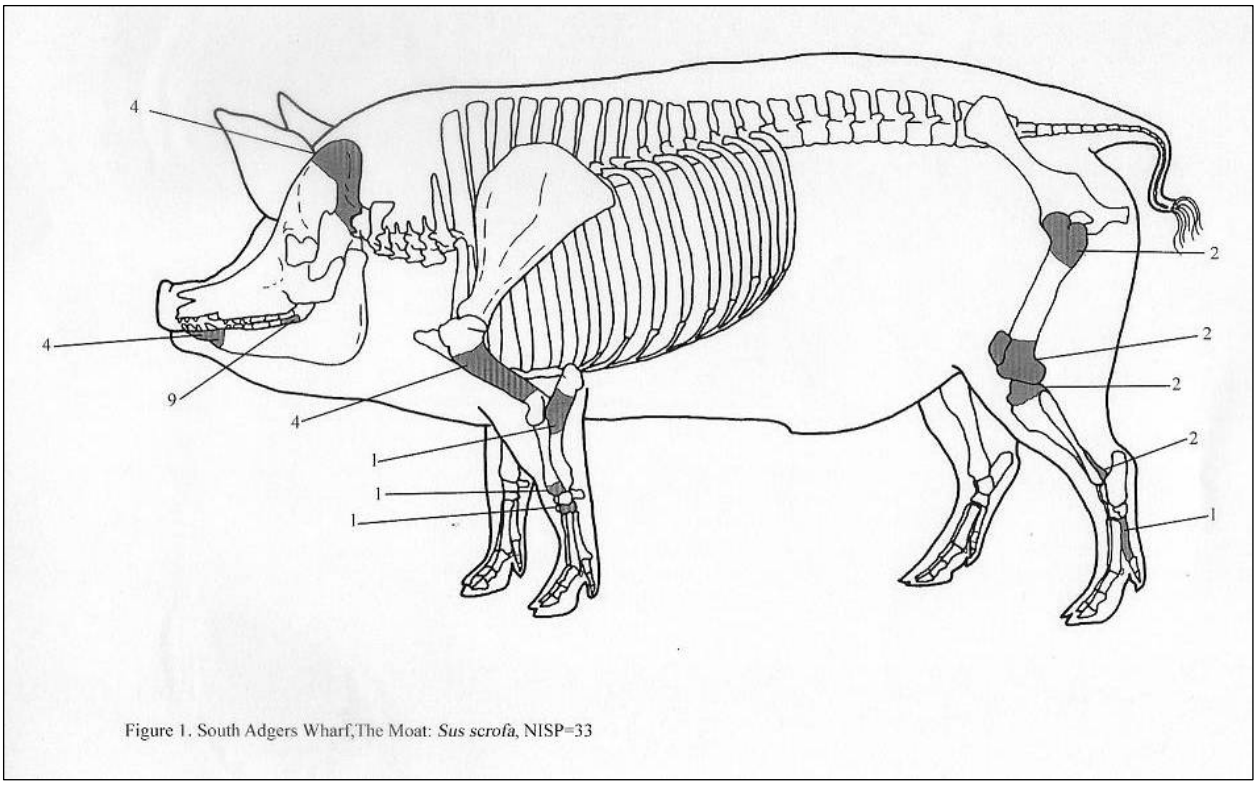


Figure 1. South Adgers Wharf,The Moat: *Sus scrofa*, NISP=33

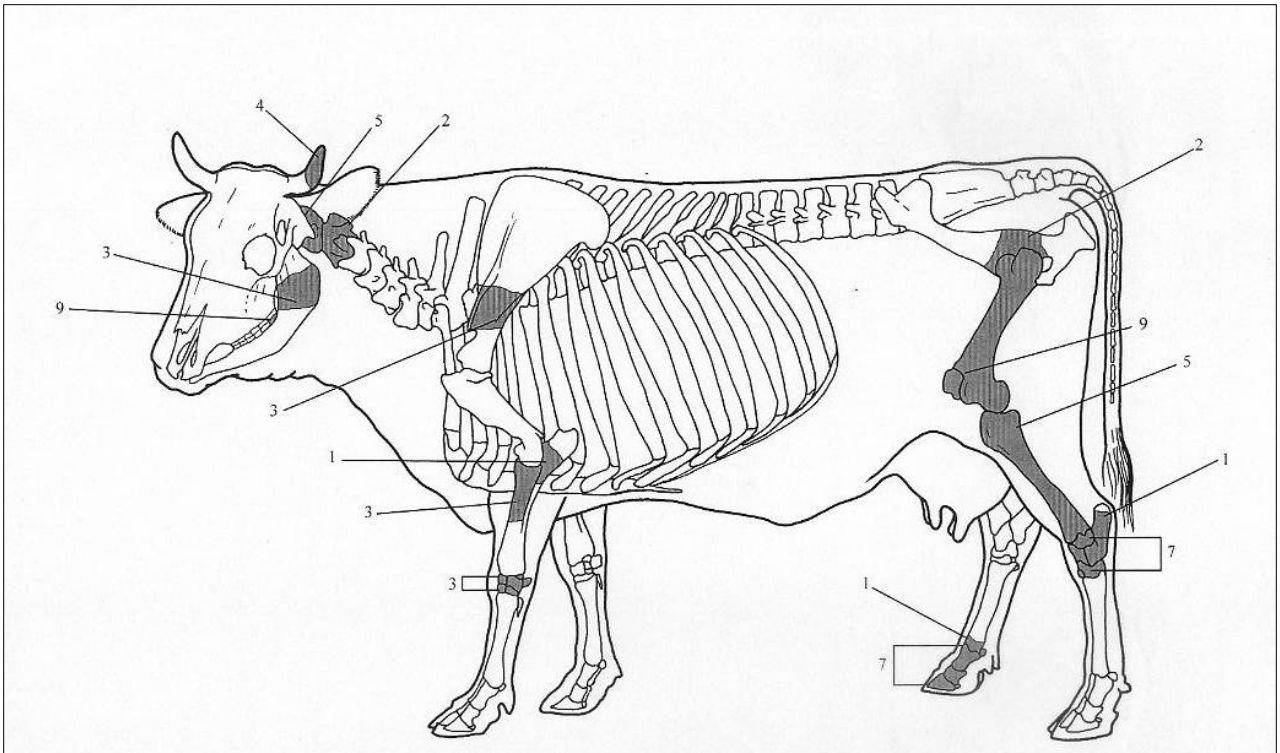


Figure 2. South Adgers Wharf, The Moat: *Bos taurus*, NISP=65

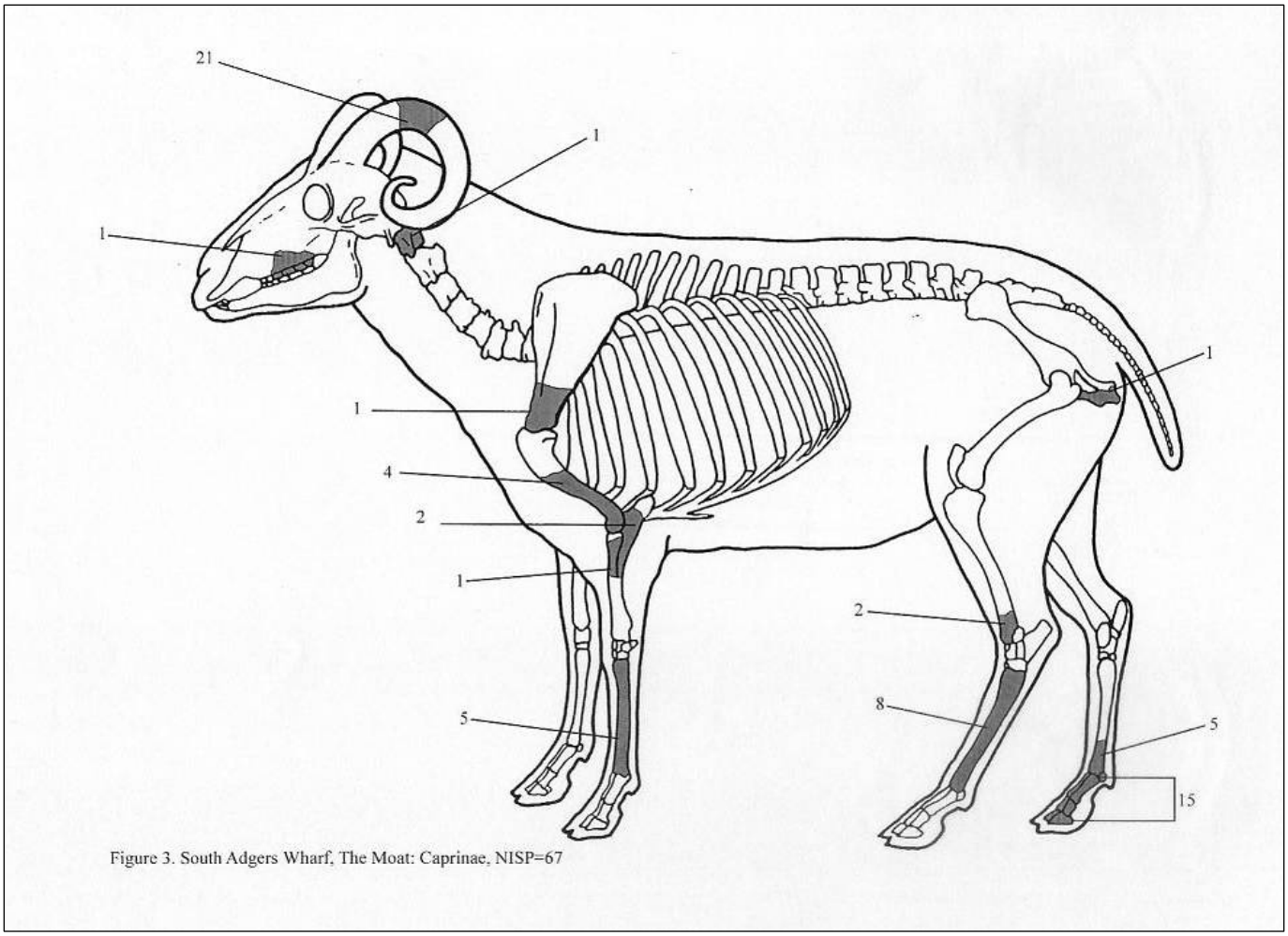


Figure 3. South Adgers Wharf, The Moat: Caprinae, NISP=67

Table 9. South Adgers Wharf, Early Lower Market: Species List

Taxa	NISP	MNI #	%	Weight, g	Biomass, kg
Actinopterygii	12			16.00	0.279
Indeterminate bony fish					
Bagre marinus	1	1	2.4	0.45	0.009
Gafftopsail catfish					
Centropristis spp.	2	1	2.4	2.43	0.049
Sea bass					
Cynoscion sp.	1	1	2.4	0.15	0.009
Seatrout					
Pogonias cromis	3	1	2.4	6.02	0.147
Black drum					
Testudines	3			2.24	0.054
Indeterminate turtle					
Emydidae	3			19.89	0.234
Pond turtles					
Deirochelys reticularia	1	1	2.4	11.18	0.159
Chicken turtle					
Malaclemys terrapin	1	1	2.4	0.91	0.030
Diamondback terrapin					
Cheloniidae	1	1	2.4	1.30	0.038
Sea turtles					
Aves	54			39.92	0.585
Indeterminate bird					
Anatidae	9	1	2.4	7.85	0.133
Ducks and geese					
Branta canadensis	1	1	2.4	1.80	0.035
Canada goose					
Cairina moschata	1	1	2.4	2.15	0.041
Muscovy duck					
Columba livia	1	1	2.4	0.19	0.004
Rock dove					

Table 9. South Adgers Wharf, Lower Market, Below 1786 Pavement: Species List (cont.)

Taxa	NISP	MNI #	%	Weight, g	Biomass, kg
Galliformes	1			1.37	0.027
Gallinaceous birds					
Gallus gallus	17	3	7.1	21.11	0.328
Chicken					
Meleagris gallopavo	8	1	2.4	26.29	0.400
Turkey					
Mammalia	1904			5763.96	63.777
Indeterminate mammal					
Rattus spp.	6	3	7.1	2.60	0.062
Old World rats					
Canis familiaris	1	1	2.4	0.47	0.013
Domestic dog					
Felis catus	3	2	4.8	5.85	0.126
Domestic cat					
Artiodactyla	12			73.98	1.265
Even-toed ungulate					
Sus scrofa	84	7	16.7	666.46	9.150
Pig					
Bos taurus	175	9	21.4	6626.68	72.307
Cow					
Caprinae	51	5	11.9	411.17	5.924
Sheep and goat					
Ovis aries	1	(1)		6.83	0.148
Sheep					
Vertebrata				69.81	
Indeterminate vertebrate					
Total	2357	42		13789.06	155.333

Table 10. South Adgers Wharf, Early Lower Market: Summary Table

	MNI		Biomass	
	#	%	kg	%
Fishes	4	9.5	0.214	0.2
Turtles	3	7.1	0.227	0.3
Wild birds	3	7.1	0.568	0.6
Domestic birds	5	11.9	0.373	0.4
Wild mammals	0	0.0	0.000	0.0
Domestic mammals	21	50.0	87.381	98.2
Commensal taxa	6	14.3	0.201	0.2
Total	42		88.964	

Table 11. South Adgers Wharf, Early Lower Market: Element Distribution

	Pig	Cow	Sheep/Goat
Head	22	27	10
Vertebra/Rib	1	2	1
Forequarter	27	31	8
Hindquarter	15	27	14
Forefoot	3	23	1
Hindfoot	7	31	8
Foot	9	34	9
Total	84	175	51

Table 12. South Adgers Wharf, Early Lower Market: Epiphyseal Fusion for Pig (*Sus scrofa*)

	Unfused	Fused	Total
Early Fusing:			
Humerus, distal	4		
Scapula, distal		3	3
Radius, proximal		3	3
Acetabulum	1	1	2
Metapodials, proximal			
1st/2nd phalanx, proximal	1	3	4
Middle Fusing:			
Tibia, distal	2		2
Calcaneus, proximal	2		2
Metapodials, distal	2		2
Late Fusing:			
Humerus, proximal			
Radius, distal	5		5
Ulna, proximal			
Ulna, distal			
Femur, proximal			
Femur, distal	3		3
Tibia, proximal			
Total	20	10	26

Table 13. South Adgers Wharf, Early Lower Market: Epiphyseal Fusion for Cow (*Bos taurus*)

	Unfused	Fused	Total
Early Fusing:			
Humerus, distal	1	2	3
Scapula, distal			
Radius, proximal		3	3
Acetabulum	1	4	5
Metapodials, proximal		21	21
1st/2nd phalanx, proximal	1	15	16
Middle Fusing:			
Tibia, distal	2	1	3
Calcaneus, proximal	1	3	4
Metapodials, distal	5	12	17
Late Fusing:			
Humerus, proximal	1	1	2
Radius, distal	3		3
Ulna, proximal	1	1	2
Ulna, distal			
Femur, proximal	5		5
Femur, distal	1		1
Tibia, proximal	2	2	4
Total	24	65	89

Table 14. South Adgers Wharf, Early Lower Market: Epiphyseal Fusion for Sheep/Goat (Caprinae)

	Unfused	Fused	Total
Early Fusing:			
Humerus, distal	1		1
Scapula, distal		3	3
Radius, proximal			
Acetabulum		3	3
Metapodials, proximal		3	3
1st/2nd phalanx, proximal	1	4	5
Middle Fusing:			
Tibia, distal		1	1
Calcaneus, proximal	2	1	3
Metapodials, distal	1	3	4
Late Fusing:			
Humerus, proximal			
Radius, distal			
Ulna, proximal	1	1	2
Ulna, distal			
Femur, proximal	1		1
Femur, distal	1	1	2
Tibia, proximal		1	1
Total	8	21	29

Table 15. South Adgers Wharf, Early Lower Market: Modifications

Taxon	Hacked	Sawed	Clean Cut	Cut	Worked	Burned	Calcined	Rodent gnawed	Carnivore gnawed	Weathered
Indeterminate bony fish	1			1						
Indeterminate bird	2			2				1	1	
Ducks and geese								1		
Canada goose				1						
Indeterminate mammal	269	10	25	131	3	1	2	8	5	2
Even-toed ungulate	5		2	2				1		
Pig	18		2	12				2		1
Cow	47	1	15	11				1	4	1
Sheep and goat	12		2	8				2		
Indeterminate vertebrate		1						1		
Total	354	12	46	168	3	1	2	17	10	4

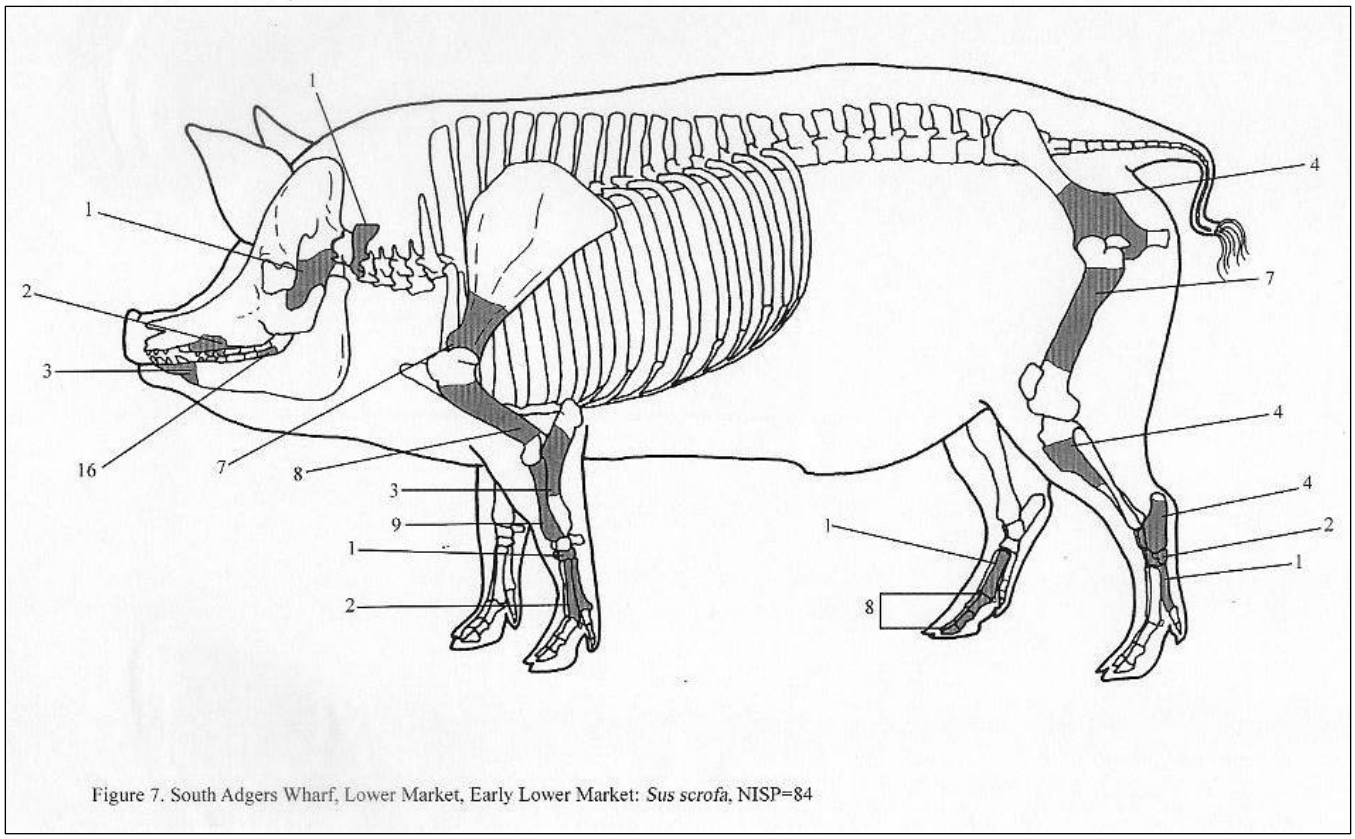


Figure 7. South Adgers Wharf, Lower Market, Early Lower Market: *Sus scrofa*, NISP=84

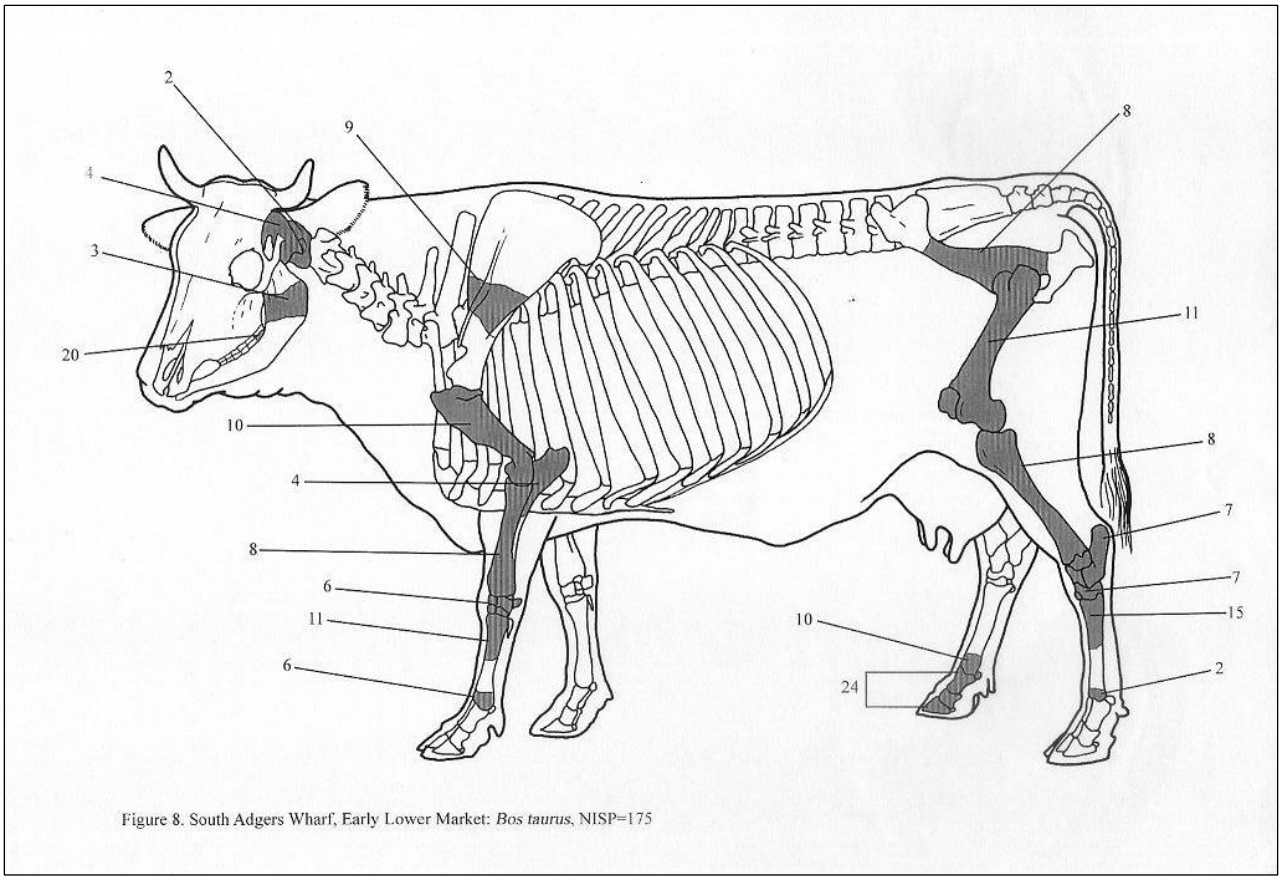


Figure 8. South Adgers Wharf, Early Lower Market: *Bos taurus*, NISP=175

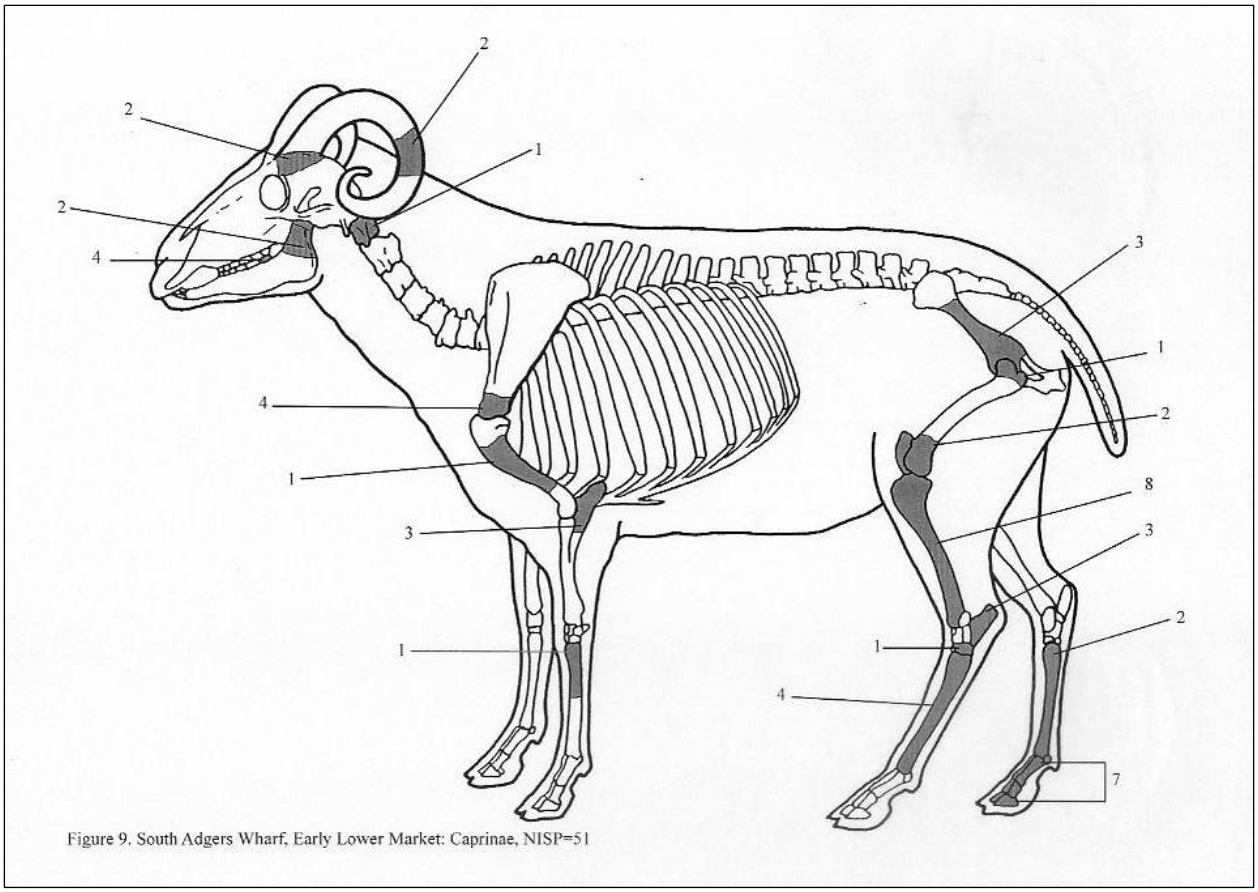


Figure 9. South Adgers Wharf, Early Lower Market: Caprinae, NISP=51

Table 16. South Adgers Wharf, Later Lower Market: Species List

Taxa	NISP	MNI #	%	Weight, g	Biomass, kg
Carcharhiniformes	1	1	2.9	0.26	0.040
Ground sharks					
Actinopterygii	29			34.56	0.520
Indeterminate bony fish					
Ariidae	1			0.82	0.017
Sea catfishes					
Ariopsis felis	1	1	2.9	0.14	0.003
Hardhead catfish					
Centropristis spp.	7	2	5.7	3.56	0.073
Sea bass					
Carangidae	1	1	2.9	0.09	0.005
Jacks and pompanos					
Orthopristis chrysoptera	1	1	2.9	0.03	0.001
Pigfish					
Prionotus sp.	1	1	2.9	0.28	0.011
Searobin					
Diodontidae	1	1	2.9	1.50	0.041
Burrfishes					
Testudines	3			2.66	0.061
Indeterminate turtle					
Emydidae	1			16.46	0.207
Pond turtles					
Deirochelys reticularia	1	1	2.9	2.28	0.055
Chicken turtle					
Trachemys sp.	1	1	2.9	22.70	0.256
Sliders					
Cheloniidae	2	1	2.9	3.71	0.076
Sea turtles					
Aves	34			17.47	0.276
Indeterminate bird					

Table 16. South Adgers Wharf, Later Lower Market: Species List (cont.)

Taxa	NISP	MNI #	%	Weight, g	Biomass, kg
Anatidae	9	2	5.7	6.21	0.108
Ducks and geese					
Branta canadensis	1	1	2.9	3.53	0.064
Canada goose					
Gallus gallus	20	4	11.4	14.76	0.236
Chicken					
Meleagris gallopavo	5	1	2.9	7.57	0.129
Turkey					
Scolopacidae	1	1	2.9	0.16	0.004
Sandpipers					
Mammalia	1016			2586.92	31.011
Indeterminate mammal					
Didelphis virginiana	2	1	2.9	1.00	0.026
Opossum					
Sylvilagus sp.	1	1	2.9	0.27	0.008
Cottontail rabbit					
Rodentia	2			0.70	0.019
Rodents					
Sciurus sp.	1	1	2.9	0.60	0.016
Squirrel					
Rattus spp.	7	2	5.7	1.81	0.045
Old World rats					
Felis catus	1	1	2.9	3.84	0.088
Domestic cat					
Artiodactyla	12			83.67	1.414
Even-toed ungulate					
Sus scrofa	42	2	5.7	258.86	3.906
Pig					
Odocoileus virginianus	3	1	2.9	34.00	0.629
White-tailed deer					

Table 16. South Adgers Wharf, Later Lower Market: Species List (cont.)

Taxa	NISP	MNI #	%	Weight, g	Biomass, kg
Bos taurus	83	3	8.6	2630.88	31.485
Cow					
Caprinae	36	3	8.6	280.65	4.201
Sheep and goat					
Ovis aries	1	(1)		68.98	1.188
Sheep					
Vertebrata				48.75	
Indeterminate vertebrate					
Total	1328	35		6139.68	76.219

Table 17. South Adgers Wharf, Later Lower Market: Summary Table

	MNI		Biomass	
	#	%	kg	%
Fishes	8	22.9	0.174	0.4
Turtles	3	8.6	0.387	0.9
Wild birds	5	14.3	0.305	0.7
Domestic birds	4	11.4	0.236	0.6
Wild mammals	4	11.4	0.679	1.6
Domestic mammals	8	22.9	39.592	95.4
Commensal taxa	3	8.6	0.133	0.3
Total	35		41.506	

Table 18. South Adgers Wharf, Later Lower Market: Element Distribution

	Pig	Deer	Cow	Sheep/Goat
Head	23		7	2
Vertebra/Rib	1		5	
Forequarter	6	1	14	6
Hindquarter	3		18	6
Forefoot			11	2
Hindfoot	5	1	14	6
Foot	4	1	14	14
Total	42	3	83	36

Table 19. South Adgers Wharf, Later Lower Market: Epiphyseal Fusion for Pig (*Sus scrofa*)

	Unfused	Fused	Total
Early Fusing:			
Humerus, distal	1	1	2
Scapula, distal		1	1
Radius, proximal			
Acetabulum			
Metapodials, proximal			
1st/2nd phalanx, proximal	1	3	4
Middle Fusing:			
Tibia, distal			
Calcaneus, proximal	1		1
Metapodials, distal			
Late Fusing:			
Humerus, proximal			
Radius, distal			
Ulna, proximal			
Ulna, distal			
Femur, proximal	1		1
Femur, distal			
Tibia, proximal			
Total	4	5	9

Table 20. South Adgers Wharf, Later Lower Market: Epiphyseal Fusion for Cow (*Bos taurus*)

	Unfused	Fused	Total
Early Fusing:			
Humerus, distal	1		1
Scapula, distal		3	3
Radius, proximal		1	1
Acetabulum	1	2	3
Metapodials, proximal		5	5
1st/2nd phalanx, proximal	1	6	7
Middle Fusing:			
Tibia, distal	2		2
Calcaneus, proximal			
Metapodials, distal	1	5	6
Late Fusing:			
Humerus, proximal	1	1	2
Radius, distal	2		2
Ulna, proximal	1		1
Ulna, distal			
Femur, proximal	3	1	4
Femur, distal	1		1
Tibia, proximal	2		
Total	16	24	38

Table 21. South Adgers Wharf, Later Lower Market: Epiphyseal Fusion for Sheep/Goat (Caprinae)

	Unfused	Fused	Total
Early Fusing:			
Humerus, distal	1		1
Scapula, distal			
Radius, proximal		1	1
Acetabulum		1	1
Metapodials, proximal		5	
1st/2nd phalanx, proximal	1	8	9
Middle Fusing:			
Tibia, distal			
Calcaneus, proximal			
Metapodials, distal	3	2	5
Late Fusing:			
Humerus, proximal			
Radius, distal	1		1
Ulna, proximal	1		1
Ulna, distal			
Femur, proximal	2		
Femur, distal	1		1
Tibia, proximal			
Total	10	17	20

Table 22. South Adgers Wharf, Later Lower Market: Modifications

Taxon	Hacked	Sawed	Clean Cut	Cut	Worked	Burned	Calcined	Rodent gnawed	Carnivore gnawed	Weathered
Indeterminate bony fish				1						
Ducks and geese				2						
Turkey				1						
Indeterminate mammal	148	4	5	58	4		1	2	3	1
Even-toed ungulate	2							2		
Pig	2			2				1		1
White-tailed deer	1							1		
Cow	16		1	5				2		
Sheep and goat	6		1	3					2	
Sheep		1								
Indeterminate vertebrate				2		3				
Total	175	5	7	74	4	3	1	8	5	2

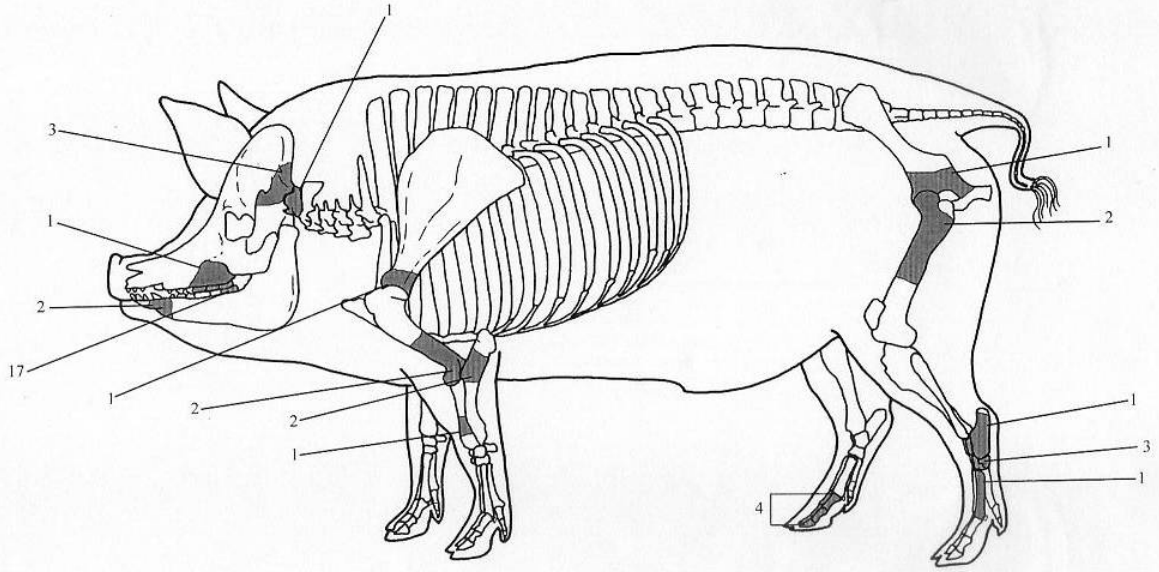


Figure 10. South Adgers Wharf, Later Lower Market: *Sus scrofa*, NISP=42

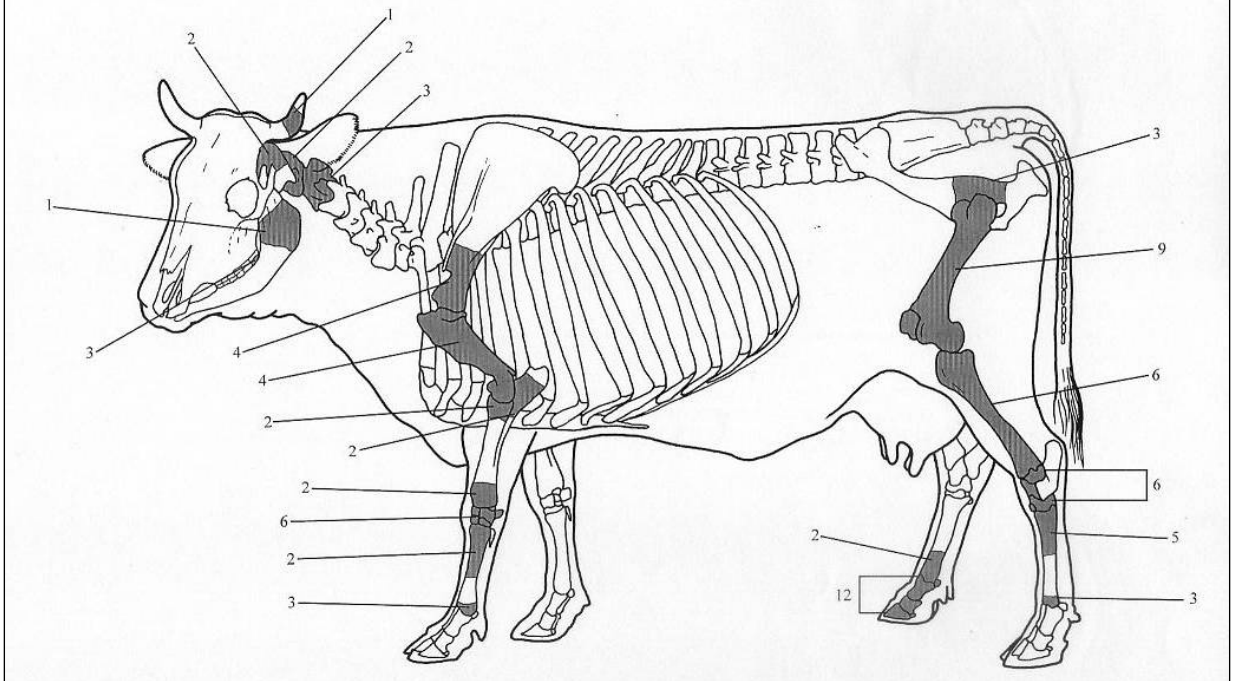


Figure 11. South Adgers Wharf, Later Lower Market: *Bos taurus*, NISP=83

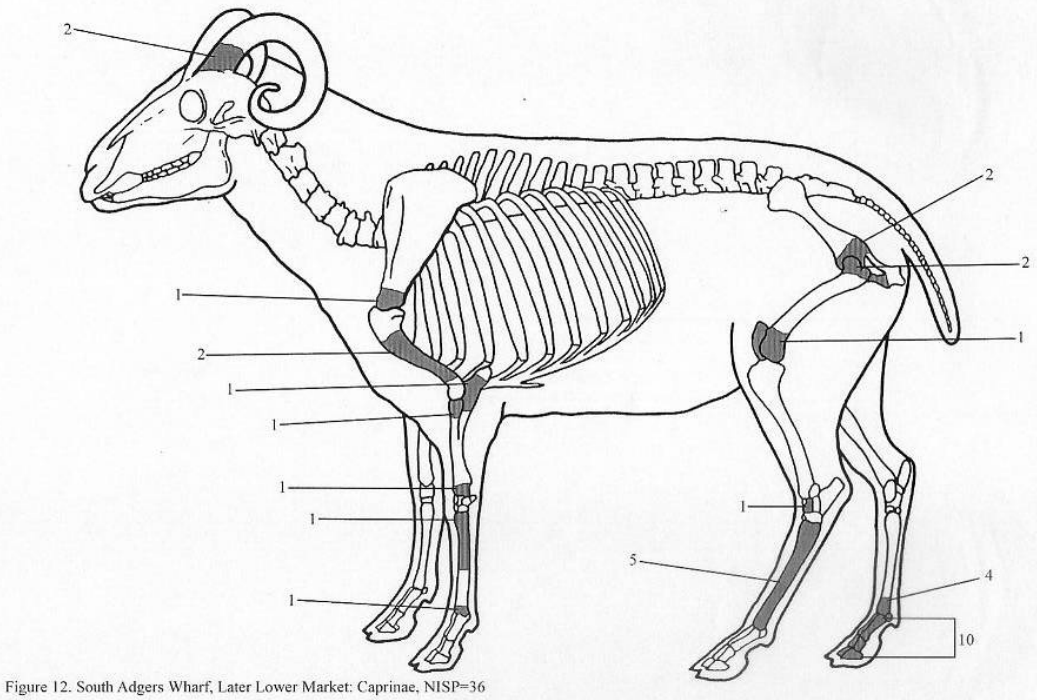


Figure 12. South Adgers Wharf, Later Lower Market: Caprinae, NISP=36

Table 23. South Adgers Wharf Summary						
Number of Taxa	1710-1760	1710-1760	Below 1786	Below 1786	1786-1804	1786-1804
Domestic Mammal	3	18.8%	3	15.8%	3	13.0%
Domestic Bird	1	6.3%	3	15.8%	1	4.3%
Wild Mammal	1	6.3%	0	0.0%	4	17.4%
Wild Bird	2	12.5%	3	15.8%	3	13.0%
Turtles	2	12.5%	3	15.8%	3	13.0%
Sharks, Rays, Fishes	6	37.5%	4	21.1%	7	30.4%
Commensal Taxa	1	6.3%	3	15.8%	2	8.7%
Total	16		19		23	

Table 23. South Adgers Wharf Summary						
4/27/2010	1710-1760	1710-1760	Below 1786	Below 1786	1786-1804	1786-1804
General Categories	MNI	MNI%	MNI	MNI%	MNI	MNI%
Domestic Mammal	10	33.3%	21	50.0%	8	22.9%
Domestic Bird	1	3.3%	5	11.9%	5	14.3%
Wild Terrestrial Mam	1	3.3%	0	0.0%	4	11.4%
Wild Bird	2	6.7%	3	7.1%	4	11.4%
Turtles	2	6.7%	3	7.1%	3	8.6%
Sharks, Rays, Fishes	7	23.3%	4	9.5%	8	22.9%
Commensal Taxa	7	23.3%	6	14.3%	3	8.6%
Total	30		42		35	
Domestic Individuals	11	36.7%	26	61.9%	12	34.3%
Wild Terrestrial	2	6.7%	1	2.4%	5	14.3%
Wild Aquatic	10	33.3%	9	21.4%	15	42.9%
	1710-1760	1710-1760	Below 1786	Below 1786	1786-1804	1786-1804
Specific Taxa	MNI	MNI%	MNI	MNI%	MNI	MNI%
Old World rats	7	23.3%	3	7.1%	2	5.7%
White-tailed deer	0	0.0%	0	0.0%	1	2.9%
Canada geese/turkey	1	3.3%	2	4.8%	1	2.9%
Pig	3	10.0%	7	16.7%	2	5.7%
Sheep and/or goats	4	13.3%	5	11.9%	3	8.6%
Chicken	1	3.3%	3	7.1%	4	11.4%
Cow	3	10.0%	9	21.4%	3	8.6%
	1710-1760	1710-1760	Below 1786	Below 1786	1786-1804	1786-1804
Modifications	NISP	NISP%	NISP	NISP%	NISP	NISP%
Hacked	95	47.5%	354	57.4%	175	61.6%
Cut	53	26.5%	168	27.2%	74	26.1%
Sawed/Clean-cut	32	16.0%	58	9.4%	12	4.2%
Burned/Calcined	3	1.5%	3	0.5%	4	1.4%
Rodent-gnawed	6	3.0%	17	2.8%	8	2.8%
Carnivore-gnawed	11	5.5%	10	1.6%	5	1.8%
Other	0	0.0%	7	1.1%	6	2.1%
Total	200	(Total NISP=1023)	617	(Total NISP=2357)	284	(Total NISP=132

Figure 4. South Adgers Wharf, Pig Element Distribution

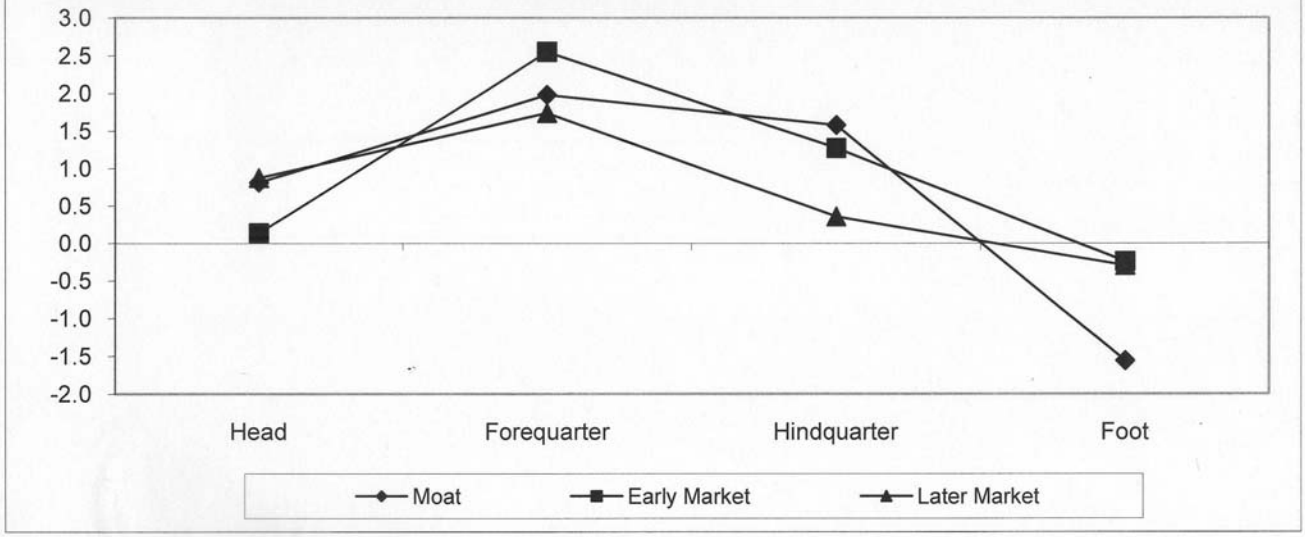
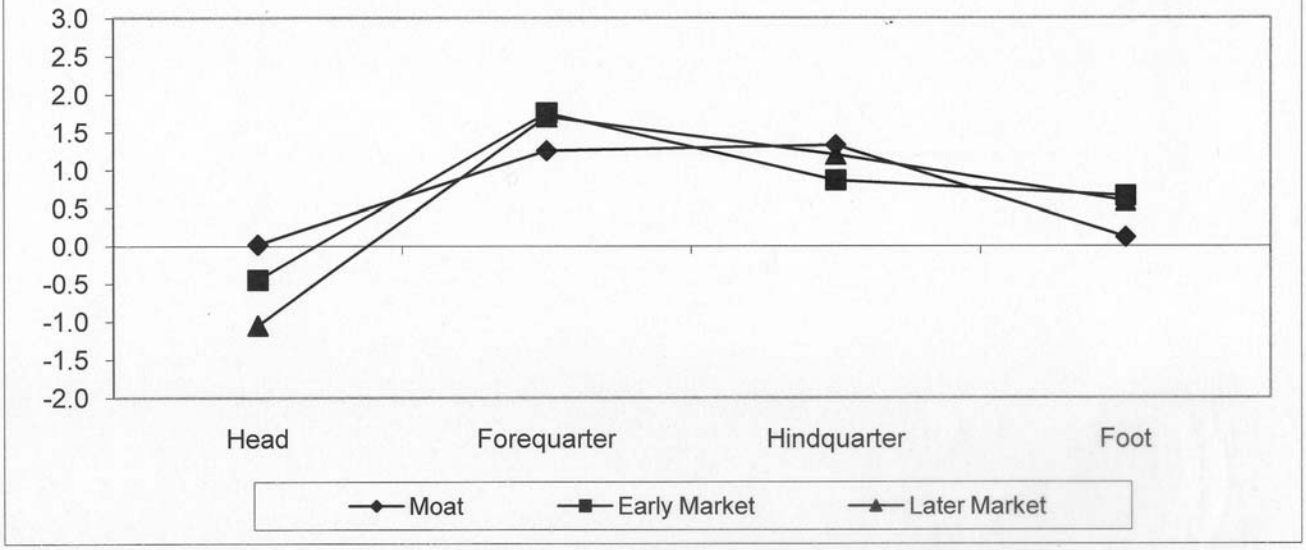


Figure 5. South Adgers Wharf, Cow Element Distribution



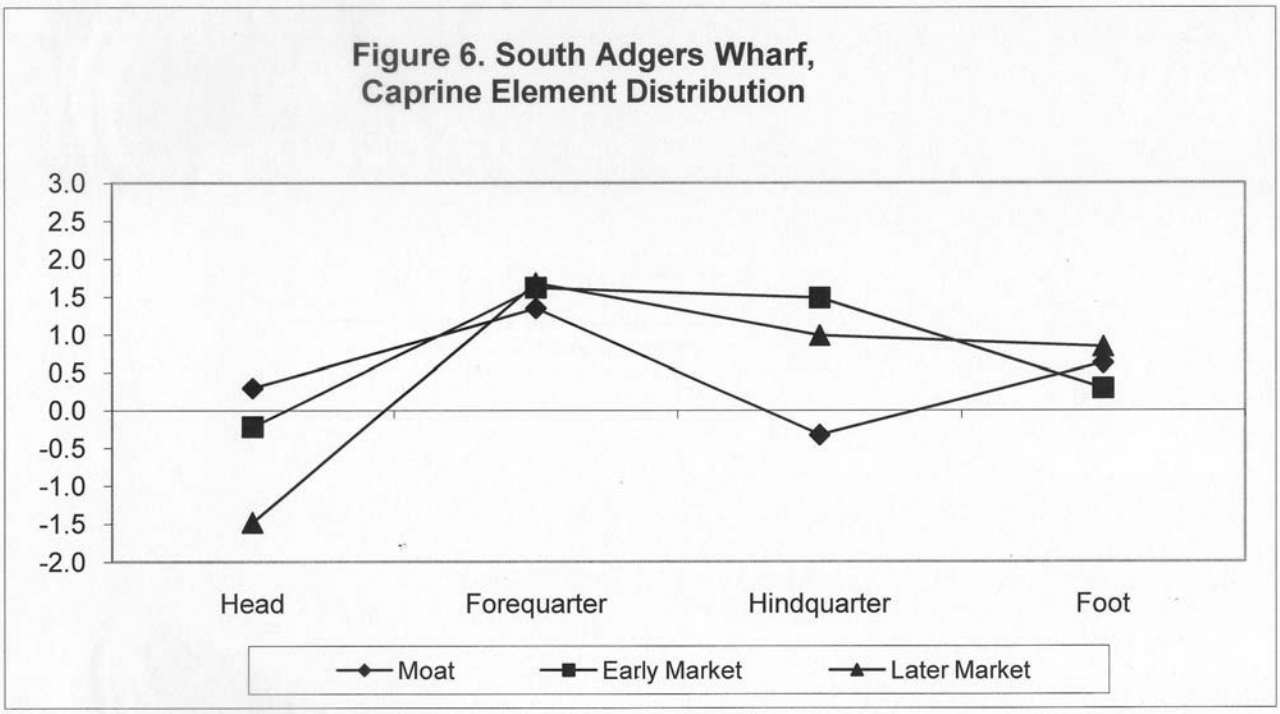


Table 24. Charleston City Hall/Beef Market Project Summary

11/06/05	1692-1739	1692-1739		1739-1760	1739-1760		1760-1796	1760-1796
General Categories	MNI	MNI%		MNI	MNI%		MNI	MNI%
Domestic Mammal	6	54.5%		11	30.6%		10	23.8%
Domestic Bird	1	9.1%		4	11.1%		4	9.5%
Wild Terrestrial Mammal	0	0.0%		3	8.3%		1	2.4%
Wild Terrestrial Bird	1	9.1%		5	13.9%		4	9.5%
Turtles/Alligator	1	9.1%		2	5.6%		2	4.8%
Sharks, Rays, Fishes	1	9.1%		9	25.0%		16	38.1%
Commensal Taxa	1	9.1%		2	5.6%		5	11.9%
Total	11			36			42	
Domestic Individuals	7	63.6%		15	41.7%		14	33.3%
Wild Terrestrial	1	9.1%		8	22.2%		5	11.9%
Wild Aquatic	2	18.2%		11	30.6%		18	42.9%
	1692-1739	1692-1739		1739-1760	1739-1760		1760-1796	1760-1796
Specific Taxa	MNI	MNI%		MNI	MNI%		MNI	MNI%
Old World rats	1	9.1%		0	0.0%		3	7.1%
White-tailed deer	0	0.0%		1	2.8%		0	0.0%
Canada geese/turkey	1	9.1%		4	11.1%		2	4.8%
Pig	2	18.2%		3	8.3%		5	11.9%
Sheep and/or goats	1	9.1%		2	5.6%		1	2.4%
Chicken	1	9.1%		4	11.1%		4	9.5%
Cow	3	27.3%		6	16.7%		4	9.5%
	1692-1739	1692-1739		1739-1760	1739-1760		1760-1796	1760-1796
Modifications	NISP	NISP%		NISP	NISP%		NISP	NISP%
Hacked	47	78.3%		878	84.8%		787	84.8%
Cut	5	8.3%		23	2.2%		42	4.5%
Sawed/Clean-cut	5	8.3%		16	1.5%		29	3.1%
Burned/Calcined	3	5.0%		116	11.2%		69	7.4%
Rodent-gnawed	0	0.0%		0	0.0%		0	0.0%
Carnivore-gnawed				2	0.2%		1	0.1%
Total	60	(Total NISP=1377)		1035	(Total NISP=13007)		928	(Total NISP=15949)

Table 24. Charleston City Hall/Beef Market Project Summary (cont.)						
Number of Taxa	1692-1739	1692-1739	1739-1760	1739-1760	1760-1796	1760-1796
Domestic Mammal	3	37.5%	3	13.0%	3	13.0%
Domestic Bird	1	12.5%	1	4.3%	1	4.3%
Wild Mammal	0	0.0%	3	13.0%	1	4.3%
Wild Bird	1	12.5%	3	13.0%	3	13.0%
Turtles/Alligator	1	12.5%	2	8.7%	2	8.7%
Sharks, Rays, Fishes	1	12.5%	9	39.1%	10	43.5%
Commensal Taxa	1	12.5%	2	8.7%	3	13.0%
Total	8		23		23	
Data are from Zierden and Reitz 2009						

Figure 13. Eighteenth-century Pig Elements

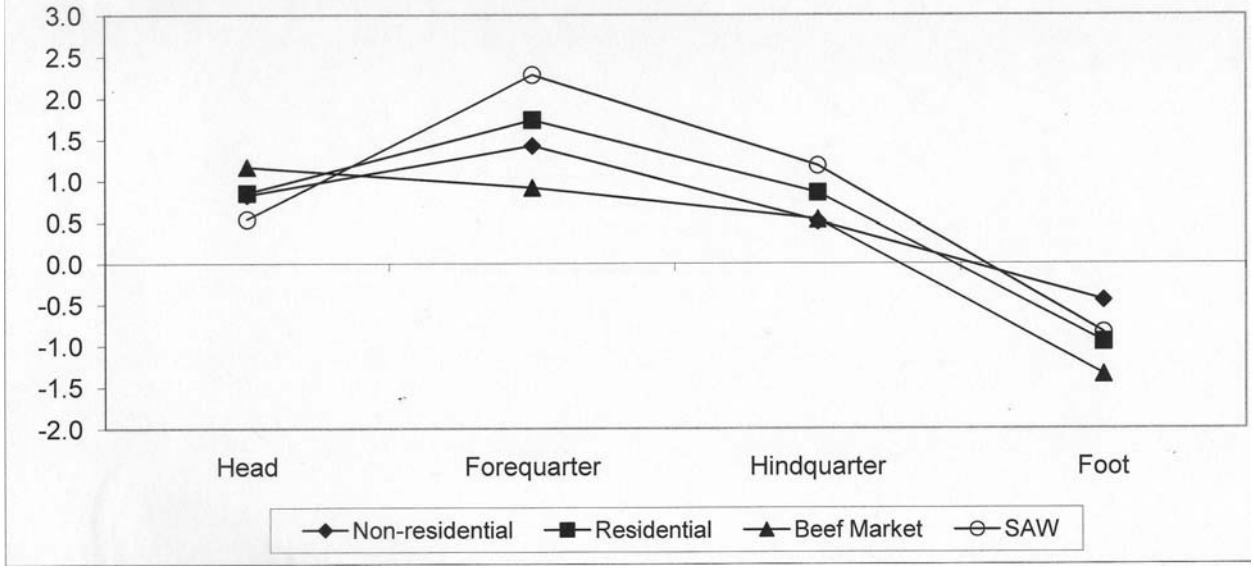


Figure 14. Eighteenth-century Cattle Elements

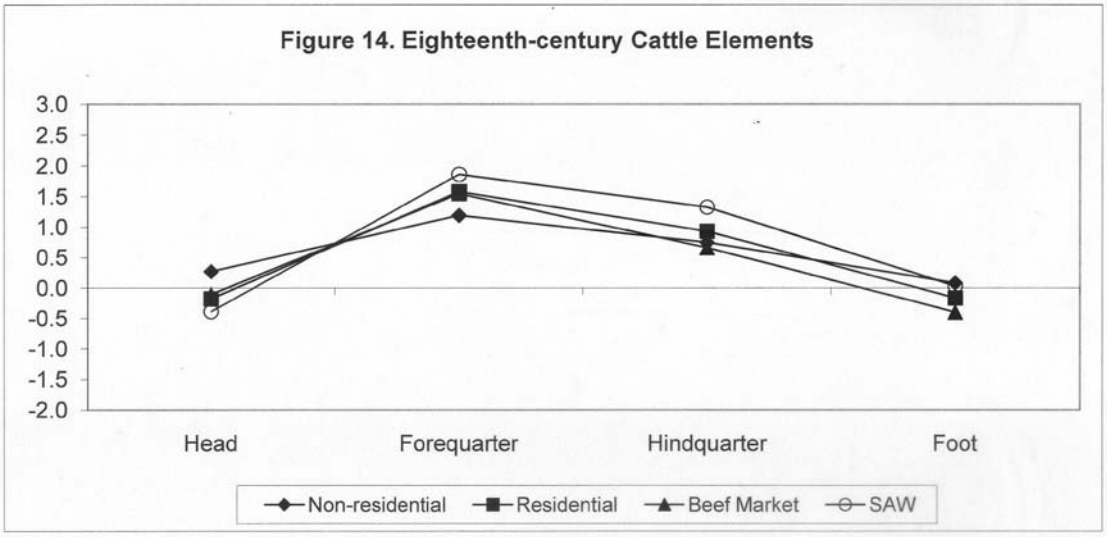


Table 25. Summary Data for Charleston, Excluding Beef Market Data				
11/06/05	1712-1750	1712-1750	1750-1820	1750-1820
General Categories	MNI	MNI%	MNI	MNI%
Domestic Mammal	63	37.5%	128	25.9%
Domestic Bird	19	11.3%	60	12.1%
Wild Terrestrial Mammal	11	6.5%	28	5.7%
Wild Bird	15	8.9%	53	10.7%
Turtles/Alligator	10	6.0%	25	5.1%
Sharks, Rays, Fishes	32	19.0%	131	26.5%
Commensal Taxa	18	10.7%	69	14.0%
Total	168		494	
Domestic Individuals	82	48.8%	188	38.1%
Wild Terrestrial	26	15.5%	81	16.4%
Wild Aquatic	42	25.0%	156	31.6%
	1712-1750	1712-1750	1750-1820	1750-1820
Specific Taxa	MNI	MNI%	MNI	MNI%
Old World rats	12	7.1%	55	11.1%
White-tailed deer	6	3.6%	17	3.4%
Canada geese/turkey	8	4.8%	26	5.3%
Pig	15	8.9%	42	8.5%
Sheep and/or goats	17	10.1%	23	4.7%
Chicken	16	9.5%	55	11.1%
Cow	31	18.5%	63	12.8%
	1712-1750	1712-1750	1750-1820	1750-1820
Modifications	NISP	NISP%	NISP	NISP%
Hacked	280	28.9%	659	28.1%
Cut	282	29.1%	735	31.4%
Sawed/Clean-cut	57	5.9%	214	9.1%
Burned	222	22.9%	429	18.3%
Rodent-gnawed	80	8.3%	218	9.3%
Carnivore-grawed	47	4.9%	89	3.8%
Total	968	(Total NISP=7,788)	2344	(Total NISP=31,239)

Table 25. Summary Data for Charleston, Excluding 1984 Beef Market Data (cont.)				
Number of Taxa	1712-1750	1712-1750	1750-1820	1750-1820
Domestic Mammal	3	6.5%	5	6.0%
Domestic Bird	3	6.5%	4	4.8%
Wild Mammal	4	8.7%	7	8.4%
Wild Bird	5	10.9%	14	16.9%
Turtles/Alligator	6	13.0%	9	10.8%
Sharks, Rays, Fishes	17	37.0%	31	37.3%
Commensal Taxa	8	17.4%	13	15.7%
	46		83	

Data are from Zierden and Reitz 2009

Appendix IV
The Wall at 43 East Bay Street

Background

In 2005, a portion of the c. 1706 city wall was discovered in the front garden of 43 East Bay Street, the c. 1755 George Sommers house (Poston 1997: 92). This house was constructed on Grand Modell lot no. 1, and lies "very close, if not immediately adjacent, to the site of the original city wall." The location of the house on the edge of the walled city, and adjacent to a curve in East Bay Street led the area to be known as Sommers Corner in the colonial period. The brick single house originally featured an entrance on the street and a front ground-level commercial room, a style typical of the mid-18th century. The house was altered in the early-19th century to include a piazza, and piazza entry, on the south side of the house. The narrow south yard includes a drive access to the service buildings and rear yard space, and in the 20th century was paved with two lanes of brick, and a center paving of large ballast cobbles.

Renovations of the small landscaped area just inside the front garden wall led to the discovery of a small area of brick, running at an odd angle to the East Bay property. The brick featured the bright orange color and bright white mortar typical of early 18th century construction. Moreover, the section aligned with other brick features discovered by remote sensing in East Bay Street, and appeared to correspond with the section of wall between the Granville Bastion and the rounded Ashley Bastion, shown on the 1721 Herbert Map.

Figure 1: Portion of the wall exposed in 2000 (in foreground) connects to the portion exposed in modern driveway in 2011 (background).

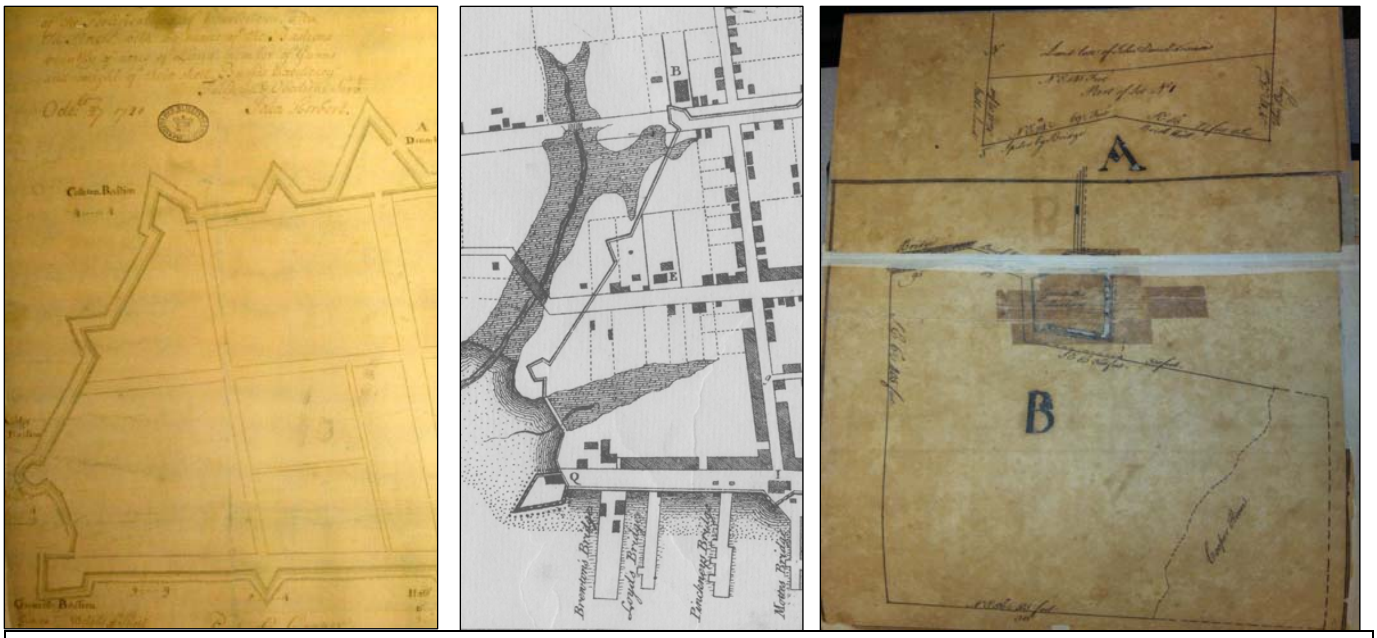


Figure 2: Historic images of area between Granville and Ashley bastions, on the 1721 Herbert map (left), the 1739 Roberts and Toms map (center), and 1755 plat of the property (right).

Fieldwork

In March 2012, the crew of Richard Marks Restorations, Inc. discovered that this wall continues in the driveway, about 6" below surface. The wall has been impacted by a series of service pipes and a storm drain; exposure and repair of these service lines was the purpose of the 2012 excavations. With the wall exposed, Moby Marks called the Walled City Task Force, and a plan was devised to clean and map the exposed portions, ascertain the age of the wall by excavating the surrounding matrix in a controlled manner, and to search for other portions by projecting the locations shown on the 1721 Herbert map onto the present landscape. Based on this projection, the property at 43 East Bay could include the section that continues west-northwest from the intersection with Granville Bastion, then turns at a gradual angle to the west-southwest across the creek at present-day Water Street to the Ashley Bastion.

Figure 3: Excavation of area north of wall.

Based on the schedules and availability of the Task Force members, it was agreed that Dr. Carter Hudgins would direct graduate students from the Clemson/College

of Charleston Graduate Program in Historic Preservation in a field teaching exercise. Other archaeologists participating in the project include Martha Zierden (The Charleston Museum), Sarah Stroud and Carter C. Hudgins (Drayton Hall), and Katherine Pemberton (Historic Charleston Foundation). The project included historic preservation graduate students, anthropology undergraduate students, and the Blessing family. Test excavations on the south side (exterior) of the brick wall were conducted on Saturday, March 16-17, followed by further excavations on March 28.

The excavations of March 16-17 were a combination of continued excavation and documentation of areas already exposed, and excavation of new exploratory units. Samples of each soil level, from each unit, were screened through ¼ inch mesh. To establish horizontal control, an arbitrary line was established across the center path of the brick drive, creating a excavation section 4.0' wide. This served as the eastern boundary of an excavation area that included a section of exposed brick and overburden 17.5' long, running east/west. This eastern line was 27.9' west of the inside lintel of the drive, on the north side. From here, we exposed a 14.0' section of the wall. The area within this section, between the house and the brick wall, was excavated as Unit 1. Soils on the south side, to 1.3' below surface were excavated as Unit 2. On Saturday, March 17, excavations focused on the north side of the wall. This was designated Unit 1. This proved to be backfilled pipe trenching to a depth of 2.9' b.s.

Figure 4: Intact portion of the wall exposed within the modern driveway. Image on the left is facing west, and modern pipes are not yet exposed. Image on the right faces east, showing the relation of the wall section to 40 East Bay Street, which sits on top of the Granville Bastion.

Excavation of Unit 2, to 1.3' below surface, also included material contained in the general area of the confluence of pipe and service lines, all clearly disturbed by 20th century construction activity. On March 28, a crew of Martha Zierden, Katherine Pemberton, and Sarah Stroud were assisted by Mr. Shorty Criswell of Richard Marks Restorations. Excavation of the area outside of (south of) the brick wall were now designated Unit 1 Section 2, and were excavated by zone. This section is shown on map #5, and avoided the area of pipe disturbance to the west.

Area in Unit 1 outside of the wall had been excavated to a depth of 2.1 feet below surface. This wedge-shaped section measures 2.4 feet in width at its widest point, and extends 8' to the east. A section measuring 3 feet by 2.4 feet was tested on March 28, and the south soil profile recorded. Soil from each layer was screened through ¼ inch mesh. Soil samples were retained from each provenience. Each of these recorded layers was designated a zone. Excavation on March 28 began with Zone 5.

Figure 5: Face of the wall exposed on March 17 (left); deep sample excavation on March 28 (right).

A single layer of brick paving, for the current driveway, was the ground surface. This was followed by sterile yellow sand (10yr5/6), which served as a paving surface for the brick drive. This was followed by compacted dark grey-brown sand (10yr 3/3) with fine shell and coal inclusions. This layer extends over the brick wall, and clearly postdates demolition and abandonment of the wall. Zone 4 was slightly lighter grey sand (10yr4/3), and the soil was more friable and less compact. There were larger inclusions of brick and shell.

Screening and excavation of the smaller sample area (3 feet by 2.5 feet) began with Zone 5. This was friable dark grey-brown sand with large artifacts (10yr3/2). This layer was 0.8 feet deep. Creamware (c. 1770) was the latest artifact in the assemblage, suggesting the soil was deposited in the last quarter of the 18th century (and possibly associated with abandonment of the wall).

The soil beneath Zone 5, labeled Zone 6, was very dark grey-brown sand, distinguished by a large amount of coal and whole oyster shell. The heavy coal content is reflected in an overall soil color of 10yr2/1. This deposit was also deep, averaging 1.3

feet. Zone 6 also contained creamware, though in a lower proportion than the above zone 5. Cultural artifacts, particularly ceramics, were less dense in Zone 6.

Because of the depth below surface and the small area available for excavation, the test was truncated to 1.5 feet by 1.5 feet. Beneath the fill layers was brownish clay sand (10yr4/3) that served as a cap for the layer below. The cap of clay sand was designated Zone 7, and was culturally sterile. Beneath this was a very thick layer of roughly crushed oyster shell. The shell contained no soil, and no cultural materials. The shell layer was excavated to a depth of 1.5 feet below the level of initiation, at the point where the water table was reached. A small shovel test indicted that the shell continued at least 0.5 feet below the level where excavations were halted. Both the brick foundation and the oyster shell level appear to continue beyond this point.

The test excavations exposed 4.7 feet of the outer face of the brick wall. The wall is English bond, with 19 courses exposed. The wall is 2.2 feet wide, at the widest available point. It appears that this point is the "true" width, but this was difficult to determine. The wall present in the available excavation area runs at an acute angle, and the northern side has been truncated by excavation of service pipe trenches throughout the 20th century. This created a very long, tapering remnant of the wall to the western section.

Figure 6: Early brick exposed in construction trench near the kitchen.

Width of the wall was confirmed at 2.2 feet in a section exposed on April 20. This new section is located in the vicinity of the kitchen building, approximately 59 ft. from the streetfront (the same gate lintel) and 15.4' south of the kitchen building. A 1.6 foot-long section was exposed in a transverse trench, excavated for new piping. Like the sections closer to the street, this portion of the wall was 2.2 feet wide, and was on plane with the previous section. It appears that the gradual curve, or angle, depicted on the Herbert map has not occurred at this point.

Unit 3 was excavated on March 16-17, near the rear of the service buildings, to encounter evidence of the wall, as it angled back to the southwest toward Ashley Bastion. The approximate location of Unit 3 is 90' west of the lintel at the front gate. The trench measured 2 feet wide by 10 feet long, and was excavated to a depth of 2 feet below surface. The trench revealed a series of fill layers associated with the brick drive, followed by an organic soil layer containing brick and flint cobbles. A soil layer exposed at 1.3 feet below surface contained a range of artifacts and exposed a double row of small yellow bricks, set on angle. Known as Dutch bricks, Noel Hume reported in 1969 that they are generally confined to 17th century sites. These are smaller than the ubiquitous red bricks of late-18th and 19th century Charleston sites, and smaller than the bright

red/orange brick of the city wall. The average around $7^{1/8}$ by $3^{1/4}$ by $1^{3/8}$ inches, though Noel Hume reports variation in size. Dutch bricks are used sporadically in Charleston, and recovered in small, but consistent numbers in archaeological deposits ranging throughout the 18th century. A few were recovered from the fill layers at the Tradd Street redan.

The two rows of yellow brick were a single brick, laid end to end in an east/west orientation. They initiated 1 foot below ground surface, and were 2 feet apart at the base. Each sloped in toward the center, as if creating a void or drain. However, the feature was only one brick deep. A landscaping feature is another possible interpretation.

Based on the depth and complexity of the archaeological record in Unit 3, and the limited time and manpower of the present project, excavation of Unit 3 was suspended at this point (1.7 feet below ground surface). To date, any intact sections of brick wall have been encountered 1 foot or less below ground surface, and therefore are not in this unit. Any other evidence of wall activity (trenches, earthen fortification, etc) is likely to be located at a lower depth.

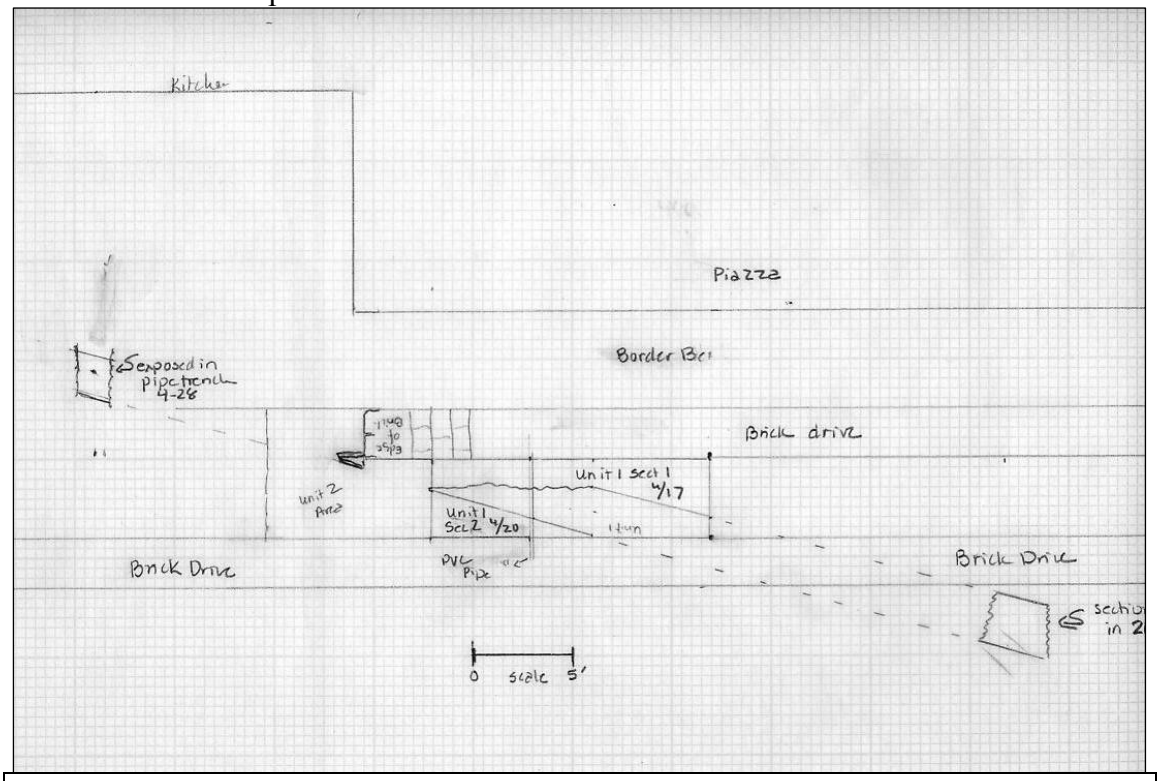


Figure 7: Schematic of brick wall sections encountered at 43 East Bay St.

Recovered Artifacts

Volunteer fieldwork on March 16-17, and on March 28 included screening of a portion of each designated provenience through ¼ inch mesh. Materials from Units 1, 2 and 3, excavated on March 17, were each screened as a single provenience. Those excavated on March 28 were screened by natural zone (Zones 5 through 8). All of the

artifacts and soil samples were taken to The Charleston Museum, where they were washed, sorted, identified, and bagged by College of Charleston interns Melissa Haeffner and Amy Dubis. The materials were then returned to the owners of 43 East Bay Street. Detailed descriptions of the artifact types recovered at 43 East Bay can be found in Chapter 4 of this report.

Materials were then quantified separately by provenience. Terminus Post Quem (TPQ) and date of deposition were determined for the zone deposits. Based on similarity between these segregated levels and the single provenience units, all proveniences were then grouped together to form a single analytical unit.

Materials were isolated from four zones adjacent to the outside of the wall, Zones 5 through 8. Zones 5 and 6 contained a significant amount of artifacts, dating to the 18th century. Both contained a significant amount of creamware, a refined earthenware imported to the American colonies by 1770. Pearlware, manufactured after 1780, was also recovered from Zone 5. Other ceramics typical of the mid- to late-18th century were also recovered, including Chinese export porcelain and Staffordshire combed and trailed slipware. Tin-enameled earthenware (delft) and Nottingham stoneware, manufactured throughout the 18th century were also present. A number of utilitarian earthenwares and stonewares were also present. Several fragments to a black lead-glazed redware bowl were found together. In addition 17 fragments of grey salt-glazed stoneware mended to form the base of a large (3 gallon) stoneware bottle or crock.

Unlike Zones 5 and 6, Zones 7 and 8 were virtually sterile in the small area available for excavation. A single fragment of brown saltglazed stoneware and a single shard of green bottle glass were the only cultural materials recovered from Zone 7, and no materials were present in Zone 8 (packed oyster shell). This would suggest that the two levels are early-18th century deposits, but the small area excavated makes such interpretation tenuous.

Units 1, 2, and 3 exhibited similar artifact assemblages, and so the assemblage will be discussed as a single unit. Artifacts from the 19th and 20th centuries were surprisingly sparse in all units, despite the fact that the soils in Unit 2 were disturbed by pipe installation. The majority of wares are types manufactured and used throughout the 18th century. Ceramics and glassware were the most common artifacts. Tablewares from the early-18th century included Chinese porcelain, British delft, and white saltglazed stoneware. Recognizable vessels included a tea saucer of Scratch blue stoneware and a cann (or tankard) of Nottingham stoneware. Following the pattern for the city in general, combed and trailed slipware from the Staffordshire region was the most common ceramic. Slipwares include drinking cups and large open bowls.

Refined earthenwares from the late-18th century were recovered from Units 2 and 3. Creamware, available by 1770 was more common than pearlware, developed after 1780. The pearlwares from Units 2 and 3 included types developed after 1795.

Container glass was recovered in significant quantity. Olive green glass, from hand-blown beverage bottles was the most common type, with 93 fragments recovered. Far less common were fragments of clear or aqua glass from small hand-blown medicine bottles; only 7 fragments were recovered. Clear container glass was slightly more common; most of these represent 19th century glass types. Three examples of table glass were recovered, including two goblet stems or bases. The third was a rim fragment from a tumbler. All were hand-blown types typical of the late-18th century.

About one-fifth of the artifacts recovered were from buildings. All of the nails (67) recovered were highly corroded, and therefore method of manufacture could not be determined. All appeared to be hand-wrought or machine cut; no wire nails were recovered. The complete nails ranged from 1" to 4" in length. Fragments of window glass were also recovered; most were the hand-blown light aqua glass typical of the 18th and early 19th centuries.

Kaolin tobacco pipe fragments were plentiful at 43 East Bay. Eleven pipe bowl fragments and 73 stem fragments were recovered. None were complete enough to determine form and style, but the measured stems clustered at 5/64, typical of the 18th century.

Six uncommon artifacts were recovered. The most unusual was a fragment of a kaolin wig curler. These small barbell-shaped objects were used to roll the hair on men's and women's wigs of the 18th century. They are relatively rare in Charleston, and are recovered from contexts dating to the first half of the 18th century. Two buttons were recovered, one of brass and one of pewter. Again, these are types associated with the 18th century. A bone-handled knife or fork was found. As is often the case, the iron in the center of the bone was highly corroded, and the utensil-end was absent. A fragment of delft fireplace tile was recovered; this was hand-painted in purple or manganese. It appears to be shaped into a circle, and thus possibly re-used as a gaming piece. The final artifact was a brass straight pin or garment pin. Five fragments of iron strap metal, used to fasten wooden barrels, were recovered.

The soils at 43 East Bay contained a number of cultural materials that were sampled, rather than collected completely. Small flint cobbles, likely ballast aboard ships from England were prevalent in most of the soil layers. Brick and mortar was sampled. Roofing materials included slate, flat clay tiles, and curved, black-glazed pantiles. Coal, as well as charcoal, was recovered from the soil. Zone 6, in particular, had a heavy coal content. Coal was in use in Charleston in the 18th century, as well as in subsequent centuries, and is often recovered from 18th century deposits. The final artifacts were unidentifiable scraps of lead and iron.

In summary, the soils at 43 East Bay Street contained a rich array of cultural materials, comparable to other residential sites occupied continuously for over two centuries. The majority of the artifacts, and soil layers, date to the 18th century, suggesting that the front portion of the yard was not used for refuse disposal after the turn of the 19th century.

Summary

Figure 8: Aerial photo mosaic of exposed wall. A 20th century sewer pipe bisects the feature.

A combination of construction and archaeological excavations exposed a portion of Charleston's original fortifications that was previously unrecorded. As discussed earlier in this report, the only portions of the walled city that have been exposed and recorded are sections of the brick seawall that fronted the water along East Bay Street. The portion extending from East Bay westward into the 43 East Bay lot is the first landward section to be exposed. Though the exposure was intermittent, and the exposed wall was compromised by subsequent occupation and construction, we were able to document over 50 feet of the wall. The exposed wall was 2.2 feet wide and featured straight sides laid in English bond. Nineteen courses, or 5 feet, of the wall was exposed. The most unusual feature was the obviously deliberate deposition of oyster shell along the outer face of the wall. Limited area for excavation and the water table prohibited excavation to the base of the wall, so the depth of the feature is unknown. The feature exhibited the bright white lime mortar and orange brick that is characteristic of the early colonial wall.

Figure 9: Portion of the volunteer crew on March 16.