Archaeology at the Powder Magazine:
A Charleston Site through Three Centuries
(38Ch97)

The Charleston Museum
Archaeological Contributions 26

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Archaeological work at the Powder Magazine has been positive and rewarding. The study presented new opportunities for me as a student of Charleston's past and as an archaeologist. The project presented unparalleled opportunties to work with knowledgeable and dedicated people on all levels, in a team approach. The daily interaction with students, Foundation staff and volunteers, and scholars from a variety of fields made the project a success.

The powder magazine excavations were the most popular project I have conducted. For the first time we were not working in the back yard, but were right on a busy street and so were more visible. The project attracted considerable interest from passers–by, neighbors, and out–of–town visitors. 'VIP' site visitors were many, and included colleagues from out of town, friends of the Foundation and the Museum, and trustees from both institutions. A number of special tours were held, and drop–in guests were many.

The field and lab work was exceptional, due to the efforts of an enviable field crew. My associate, Ron Anthony, and our long–time volunteer Larry Cadigan kept the soil moving, the grid straight, and the features properly defined. Many of the field tasks and most of the lab duties were ably handled by crew members Virginia Pierce and Suzanne Rauton, recent graduates of the the College of Charleston. Their enthusiasm, good humor, and professionalism made the project a real pleasure. In the field, we were assisted by a number of volunteers and College of Charleston students: Melissa Milling, Kurt Oberle, Scott Jernigan, Holly Prince, Mike Ard–Kelly, Joe Gorman, Scott Cave, Kevin Standifer, and Barbara Iosue.

The enthusiasm and cooperation of the entire Historic Charleston Foundation staff contributed greatly to the overall quality of the project, and heightened the interest of the public. Connie Wyrick and Michael Robertson brought numerous donors and media folks to the site. Kristy Varn kept the budget straight. Carroll Ann Bowers took numerous photos and kept the publicity flowing. Mary Pope Waring scheduled the volunteer docents. Ben Wilson and his crew of preservation craftsmen interns removed the voluminous backdirt piles. Tom Savage and Robert Leath planned and implemented the innovative exhibition at the site. Special thanks go to Carter Hudgins for guidance, consultation, and inspiration. My deepest gratitude goes to Jonathan Poston, who coordinated every detail of the project from inception to completion. Moreover, Carter and Jon coordinated the research of all of the scholars and made the project truly interdisciplinary.

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The National Society of Colonial Dames of America, South Carolina Chapter watched the project closely and helped us in many ways. President Derrill Hagood visited the site several times and provided a great deal of information. Julia Logan and Frances Henderson were gracious hostesses and provided logistical assistance.

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CHAPTER I

Introduction

Introduction

The old Powder Magazine on Cumberland Street is one of Charleston's best known historic structures. Built in 1713, it is designated a National Historic Landmark as the oldest public secular building in the Carolinas. The building was purchased for preservation by the National Society of the Colonial Dames of America, South Carolina chapter in 1902; in 1993 Historic Charleston Foundation leased the building from the Colonial Dames on a long-term basis, for restoration, research and reinterpretation. They have embarked on an ambitious and expensive plan of restoration (figure 1).

Historic Charleston Foundation contracted with the architectural firm of Phillips and Opperman, P.A. to plan the restoration of the site. Of overriding concern was a problem with moisture in the 32-inch thick walls of the structure. Although the building has suffered from moisture retention since its construction, the current problems stem from deterioration and inappropriate repair to the current roof, and the application of portland cement and a polyeurethane varnish to the brick interior, trapping moisture inside the brick walls of the structure.

The restoration plan called for removal of the current roof and construction of a separate shed roof over the building for a period of one to two years, to facilitate gradual evaporation of the trapped moisture. A subsequent re-thinking of the roof problem resulted in a delay in restoration. This process is now underway by Richard Marks Restorations, under the direction of architect Glenn Keyes. During this period, multidisciplinary research continued and the restoration and research process was interpreted to the public.

Historic Charleston Foundation and Phillips and Opperman determined that archaeological excavations were an essential component of the site research process. The Foundation contracted with The Charleston Museum to conduct the archaeological research. The Museum proposed a 6-week excavation project, designed to explore approximately 25% of the available site area.

The Museum proposed to study the site on a variety of levels. Most specifically, the excavations were designed to answer questions about the construction and periodic renovations of the building itself. Secondly, the project explored colonial military technology through recovered artifacts and relevant documents. On a broader level, the site was studied in the larger context of ongoing archaeological research on the Charleston landscape. The first question

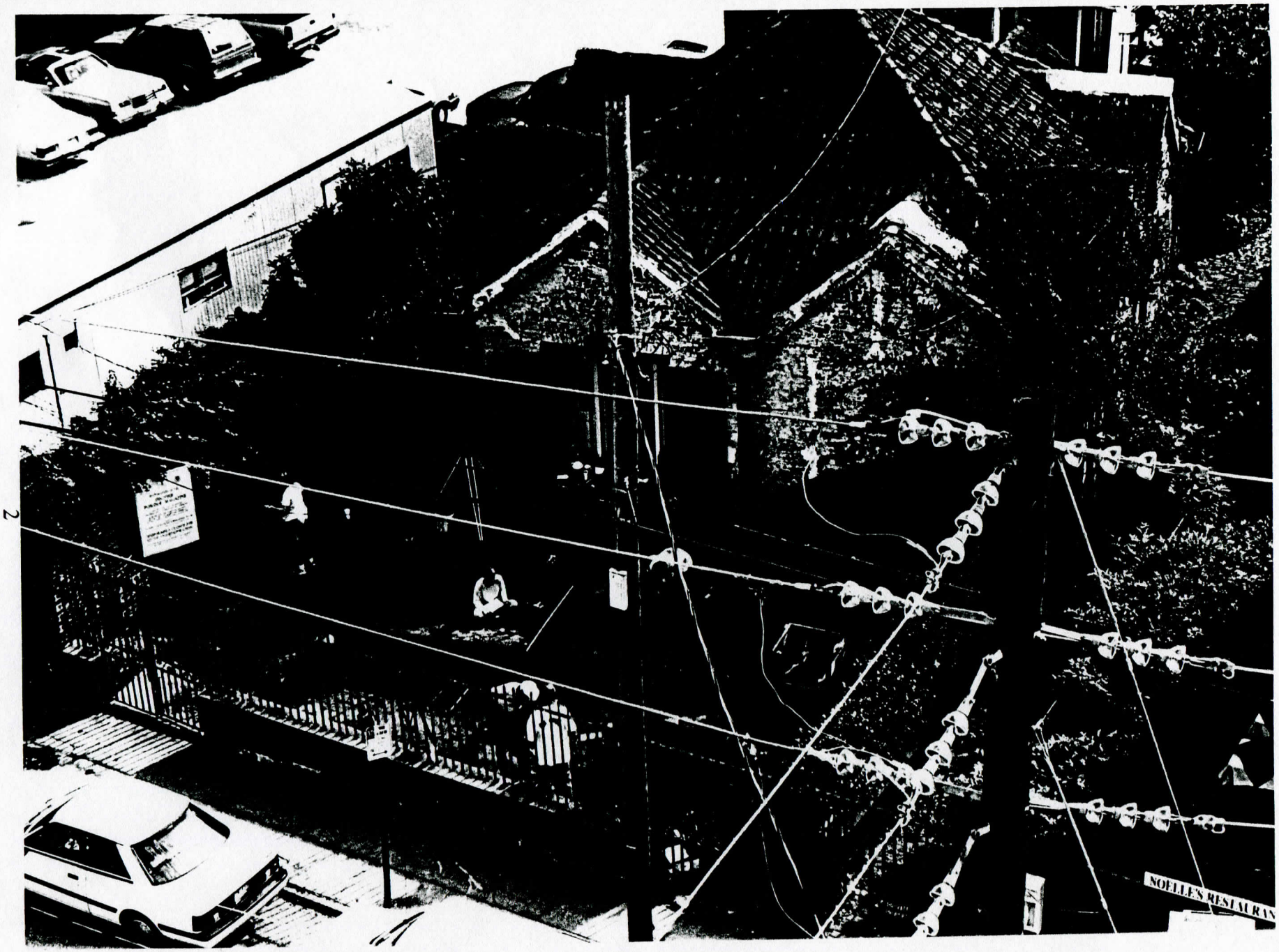


Figure 1

View of the Powder Magazine, exterior excavations
from the Cumberland Street Parking Garage

explores the role of the Powder Magazine in the colony's Proprietary period (1670–1720) and the characteristics of the pre–1740 city. The second explores the changing role and symbolism of the Powder Magazine through time (Zierden 1993).

Fieldwork commenced on October 20 and continued through December 23, 1993, and again from January 10 – 18, 1994, at a rate of c. 30 hrs per week. During this period, 558 square feet of soil were excavated, or about 35% of the total site. Excavations were conducted by Museum archaeologists Martha Zierden and Ron Anthony, and archaeological technicians Virginia Pierce and Suzanne Rauton, graduates of the College of Charleston. Assistance was provided by student interns from the Anthropology Department, College of Charleston and volunteers from the Charleston Area Chapter, ASSC. In addition, the ongoing excavations were interpreted to the public by volunteer docents from Historic Charleston Foundation (see figure 26).

Archaeological Research in Charleston

The Powder Magazine is one of 20 archaeological sites excavated in Charleston to date. As such, it builds on long–term research, begun nearly 20 years ago. The Charleston Museum has sponsored a program of urban archaeological research since the late 1970s. In the 1980s, urban archaeology nationwide developed a set of research questions and methods particular to the study of urban life. Archaeological research in Charleston has been guided by a long– term research design, initiated in 1980. The subsequent archaeological studies have been complemented by, and often conducted with, periodic architectural and documentary studies, by both staff researchers and scholars from other institutions.

This four–phase project used archival records as a source for surveying the archaeological resources of the city, making predictive statements about the nature and condition of archaeological resources, and suggesting questions for long–term study. Following the example of Deagan (1983), relevant documents were those that gave insights into the fomation of adaptive patterns, the ways in which they are manifested in the community, and the ways in which they are reflected in the ground. Specifically of interest were social variability in the city population, information relevant to the material world and economy of Charleston, and information relevant to the physical formation of the archaeological record.

The survey was completed in 1984 (Zierden and Calhoun 1984; Calhoun et al. 1982; Calhoun and Zierden 1984). This initial study focused on the portion of the city occupied in the 18th century, and on the city's economic activities. Research topics proposed in the study and investigated at subsequently excavated sites included site formation processes, site function, status variability, urban subsistence strategy, the archaeological signature of urban slavery and the free black population, spatial patterning, the development of socially definable neighborhoods, and rural/urban contrast (Honerkamp 1987; Zierden and Calhoun 1986, 1990).

This study was amended in 1987 (Rosengarten et al. 1987). The second study focused on physical changes to the city in the 19th century, development of residential suburban areas in the

late 18th to late 19th centuries, and the city's African American and European immigrant populations. Many of the originally proposed research questions were amended, based on new archival and archaeological data, and new ones were proposed. Most significant was the reformulation of various research questions into an overarching investigation of the urban landscape.

The past decade of archaeological research in Charleston has produced a data base of 20 sites. The sites vary widely, but can be grouped into two categories: residential and residential–commercial. The latter are located in that portion of the city that has been intensely utilized for commercial activity from at least the early 18th century through the present day, including the immediate environs of the powder magazine. The nine dual function sites include retail, craft, and residential areas (Charleston Place, First Trident, Lodge Alley, 38 State Street, Visitor's center), the Beef Market, two public waterfront dump/wharf areas (Atlantic Wharf, Exchange building), and a tavern (McCrady's Longroom) (Honerkamp et al. 1982; Zierden and Hacker 1987; Zierden et al. 1983a, 1983b; Grimes and Zierden 1988; Calhoun et al. 1984; Zierden n.d.; Zierden and Hacker 1986b; Zierden et al. 1982).

The eleven residential sites are, with two exceptions, located in what were suburban areas of the late 18th to early 19th century and contain standing structures dating to the initial occupation of the site. Their continuous use as residential properties into the present facilitates study of the domestic evolution of these sites. Those double houses (homes of the gentry) that were built in the 18th and early 19th century suburbs include those of William Gibbes (1772), Miles Brewton (1769), John Rutledge (1763), Thomas Heyward (1772), Joseph Manigault (1803), Nathaniel Russell (1808) and William Aiken (1817). The Rutledge and Heyward lots were occupied in the early 18th century, prior to construction of the present houses. The remainder were among the first in their respective neighborhoods. The five middle class sites include 66 and 40 Society Street and 72 Anson Street, rebuilt on Ansonborough lots after the 1838 fire, and 70 Nassau Street, built in the Charleston Neck in the 1840s. President Street was located on the west side of the Neck, and developed as a middle class neighborhood in the 19th century (Zierden et al. 1987; Zierden 1989, 1990a, 1990b, 1992; 1996; Zierden and Anthony 1993; Zierden and Grimes 1989; Zierden 1993b; Herold 1978; Zierden and Hacker 1986a; Zierden et al. 1986, 1988; Zierden and Raynor 1988). These projects were the first that were amenable to the interdisciplinary study of architectural and archaeological components; previous sites were razed lots.

Excavation of the residential sites has been the principal focus of research since 1985, and most of the newest archaeological interpretation of Charleston's development is based on data from these projects. The powder magazine, a public site located in the 18th century commercial corridor, will allow us to return to the complex, mixed use sites studied in the early 1980s, utilizing new ideas and a variety of data (figure 2).

Sites Excavated in Charleston

Dual–function sites

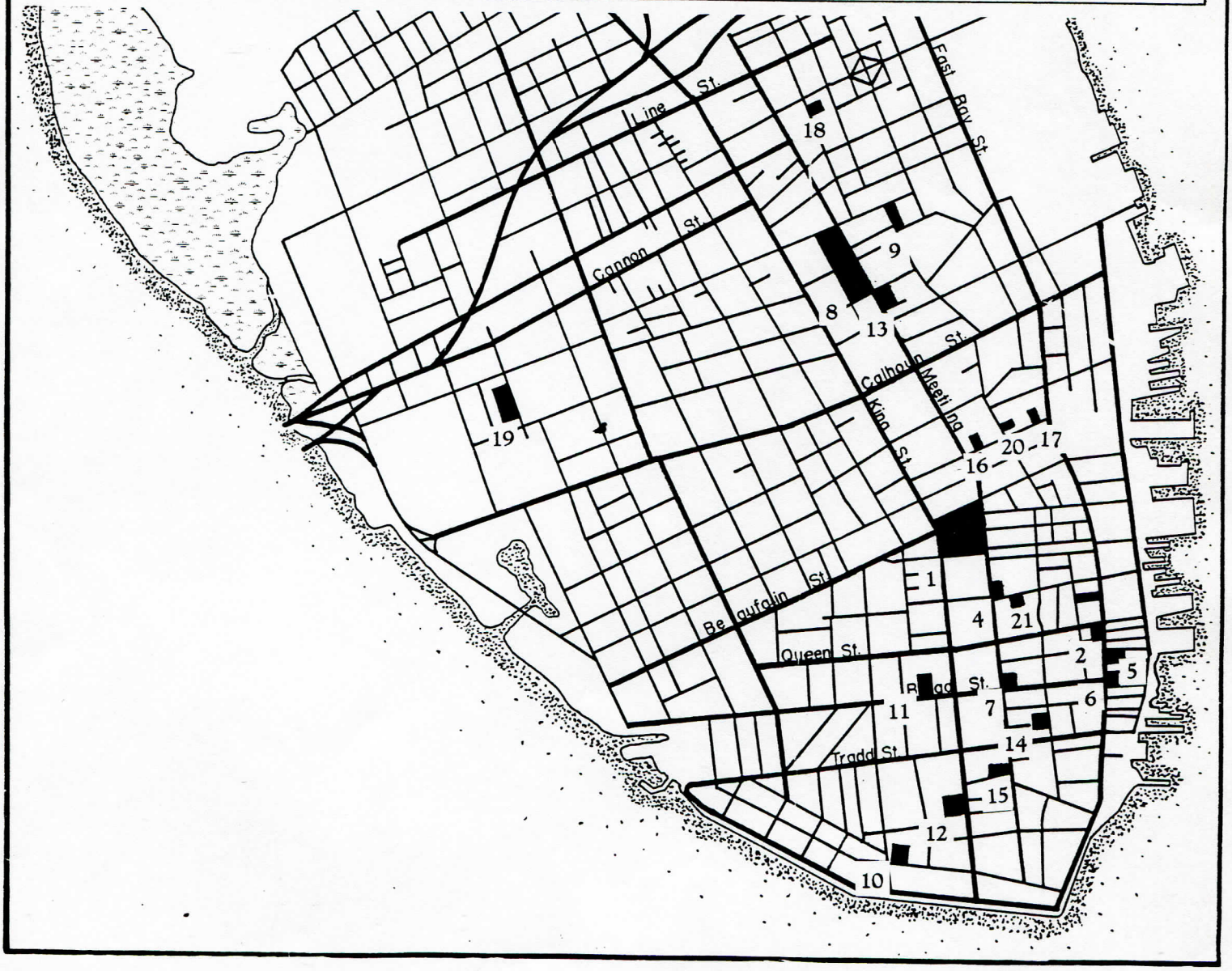
1. Charleston Place
2. McCrady's Longroom
3. Lodge Alley/38 State
4. First Trident
5. Atlantic Wharf
6. Exchange building
7. Beef Market
8. Visitor's Center

Town–house sites

9. Aiken–Rhett
10. William Gibbes
11. John Rutledge
12. Miles Brewton
13. Joseph Manigault
14. Heyward–Washington
15. Nathaniel Russell

Single–house sites

16. 66 Society St.
17. 40 Society St.
18. 70 Nassau St.
19. President St.
20. 72 Anson St.
21. Powder Magazine



Proposed Areas of Research

Proposed archaeological research at the powder magazine ranges from particularistic and descriptive to ideological and processual. The range of topics to be investigated at the site have been divided into four general research categories (Zierden 1993c):

1. The Architecture of the Powder Magazine: The first area of research is descriptive and is designed to answer basic questions about construction and alterations of the building itself. In consultation with the architects and staff at Historic Charleston Foundation, excavations focused on construction dates and methods, and repairs and changes to the building during the ensuing years. The physical characteristics of the property will be analyzed using archaeological, architectural, and documentary evidence.

Basic descriptive research will extend to the potential study of the Charleston wall. Maps and documents suggest that Charleston was originally surrounded by a wall, located along East Bay, Water, Meeting, and the vicinity of Cumberland streets. Yet very little is known about the exact appearance and location of the wall. The sea wall along East Bay was a substantial brick structure, and it has been encountered in deep excavations. The half moon battery remains exposed in the basement of the Exchange building (Herold 1981), and Granville's Bastion at Bay and Water streets was exposed during construction and documented in a 1925 publication (Lapham 1925).

The remaining three walls are even more enigmatic. Recently, the moat at the front gate (Broad and Meeting streets) was exposed in profile by archaeologists working at the State House (Joseph and Elliot 1994). The precise location of the north wall, which runs from Carteret bastion, roughly at the corner of Cumberland and Meeting, to Craven's bastion, below the customs house at the foot of Market street, has been questioned for years.

Construction projects in the vicinity of Cumberland street have been monitored for evidence of the north wall, but nothing substantive has been reported. Construction workers found "nothing of interest" during construction of the Cumberland Street parking garage. Archaeological excavations in front of the garage at the First Trident office building, and diagonally across Meeting Street at the Southern National Bank building failed to reveal anything of note (Herold 1981b; Zierden et al. 1983b). Construction workers at the First Trident site reported a thick wall in the form of two outer brick walls filled with brick rubble, but this was not seen by scholars, and its exact nature remains unknown.

The powder magazine was to be built "within the intrenchments" and its orientation suggests that it was at least parallel to the city wall. A goal of the present excavations is to locate and document the old city wall, if it is indeed in close proximity to the powder magazine.

2. Colonial Military Technology and Comparative Study of Colonial Powder Magazines: What is the role of a powder magazine in a Proprietary colonial outpost? The Charleston powder magazine is one of only a few surviving examples, and only the third to be studied archaeologically in detail. The others are in Williamsburg, Virginia, built in 1715 (Samford 1985; Campbell 1935), and in St. Mary's County, Maryland, on Lord Baltimore's Mattapany plantation, built in 1672 and abandoned in the 1690s (Chaney and King 1993). This site is currently under investigation by Dr. Julia King of Jefferson Patterson Park and Museum. Dr. King is a recognized expert in 17th century studies and in the study of landscape symbolism. Dr. King has also conducted research on 18th century Lowcountry sites. Dr. King served as a consultant for the present project. The comparative study of the powder magazines at Charleston, Williamsburg, Mattapany, and others will center on late 17th to early 18th century military technology, the role of powder magazines, and defensive strategies in the early colonies. Also considered in this discussion are other colonial powder magazines from the lowcountry (Taylor 1994). These include the magazine at Fort Johnson, the possible magazine at the Charleston Naval Base, and the archaeological remnants at Fort Dorchester.

3. The Powder Magazine in the Proprietary Period: The powder magazine is the only public site in Charleston to interpret the Proprietary period in Carolina history. It is one of a handful of pre−1720 structures in the city and the oldest public building. Only a few early colonial domestic structures remain, as the cityscape was radically altered by the 1740 fire. This disaster, coupled with changing world view and a tremendous economic ascendancy, led to a building, or rebuilding, boom after 1750. Almost all of Charleston's significant public structures post−date this event, as do most of the domestic buildings. Further, the visual landscape of historic Charleston encompasses structures constructed in the 19th century, as well as 19th and 20th century changes made to 18th century buildings.

Archaeology and related disciplines have provided a great deal of information on the Charleston landscape between 1750 and 1880 (Zierden and Herman 1996; Zierden 1993a), but relatively little is known about the appearance of the pre−1740 city, or about the causes, concerns, beliefs, and values that created that appearance. An overriding concern of the Proprietary period was protection of the colony from the very real threats of Indians, pirates, Spanish and French. The powder magazine now seems a quaint little building, askew from the city street grid, and dwarfed by surrounding architecture, both historic (St. Phillips an the Circular churches) and modern (the parking garage). When it was built, it was one of only a few substantial brick buildings in the frontier city, snug against an "intrenched" city wall, a symbol of England's defiant answer to all who would challenge Carolina's existence. That it alone survives to the present day gives further credence to its role as a visual symbol.

When reopened to the public for interpretation, the powder magazine wil be the site in the city for interpreting the proprietary period. It will serve as a visual and physical anchor for a broader study of Charleston's earliest history.

4. The Powder Magazine's Changing Symbolic Role in the Charleston Landscape: Just as the powder magazine served a key symbolic role in the Proprietary period, its continued existence suggests that it is important to study the changing role of the site through time. Why does it survive? Is it just because it is brick and thus escapes the ravages of Charleston's periodic fires? Or does it continue to have symbolic and functional importance? The present study will explore evidence of changing use as the powder magazine passed out of military use and into private hands in the 19th century, through its acquisition in 1902 by the Colonial Dames to its present landscaped appearance. Study of the evolution of the property will consider changes to the surrounding properties and the immediate city environs, as well.

The changing role of the powder magazine will be examined within the larger, ongoing research context of the Charleston landscape. This research is based on the premise that landscapes are cultural products; they are spaces that are used, shaped, and interpreted by human society. Study of the landscape involves many levels of interpretation, ranging from environmental adaptation to cultural values and world view. Study of the Charleston landscape has been interdisciplinary, involving the data and interpretations of historians, architects, a zooarchaeologist, and a palynologist, as well as comparative data from other archaeologists. This research has focused principally on the later periods, c. 1750 to 1880. The present research will expand the study of the Charleston landscape to encompass the early 18th century.

Archaeology, Preservation, and Public Interpretation

Archaeology's role in the preservation of a property such as the Powder Magazine is two-fold. First, the archaeological record – the layers of soil and artifacts – is part of the total fabric, worthy of preservation. All standing structures have an associated archaeological component, but not all archaeological sites have an extant architectural component. Further, the archaeological component is non-renewable, damaged or destroyed by any ground-disturbing activity. At the same time, the ground disturbing activities of today, just as those of the 18th and 19th centuries, are part of the continuing changes and addition to a continually occupied archaeological site.

Secondly, archaeological research is an additional source of broad interpretive data for an historic site, ranging from tangible artifacts and foundations to abstract ideas. The key word is interpretation, for current anthropological theory suggests that all types of data are subject to interpretation, to be read by many viewers. Archaeological data, like architectural data, documentary information, maps, plats, oral history, etc. contributes to a clearer understanding of a historical question, but archaeological answers do not supercede those from other disciplines. This report, along with the artifacts and ideas in the new exhibitions, is one contribution to the multifaced exploration of the evolution of Charleston's powder magazine.

CHAPTER II

Documentary Background

Exploration and Settlement

In the 16th century, European competition for perceived wealth in the Americas focused on a battle for naval supremacy. Spain had grown rich by her early exploitation in Central and South America, but was increasingly threatened by English sea power. In 1588, the Spanish Armada was destroyed off the coast of England. The subsequent English domination of the Atlantic facilitated the establishment of colonies in what had been considered Spanish territory (Calhoun 1986; Durant and Durant 1962; Quattlebaum 1956).

The 17th century was a period of intense competition for American colonies. The province of Carolina was alternately, and often simultaneously, claimed by the French, Spanish, and English. Spain considered the vast tract of wilderness an expansion of La Florida, and indeed founded a second, though short-lived, settlement of Santa Elena on Parris Island in 1566, a year after the founding of St. Augustine. The French settlements in Carolina and in Florida were equally ephemeral, cut short by Spanish retaliation.

The English, with a similar perspective, viewed Carolina as the southern expanse of Virginia. Though relative latecomers, their Carolina settlement of 1670 was nonetheless the one to persevere, and the English thereafter verified their claim to the area through possession (figure 3). Each of the European powers came with their own economic and political agenda, but it was ultimately the English mercantile system that proved the most successful in the New World.

Land was not the target of colonial acquisition; rather a lust for riches drove the 16th and 17th century exploration and settlement efforts. The early explorers sought the obvious bounty of gold, silver and jewels, and the Spanish shipped home quantities of these from their Central and South American colonies. But for the English nation, silk, wine, hemp, and naval stores were equally attractive. The English government developed an economic policy of mercantilism in order to ensure that they alone benefitted from their colonies. Under this system, colonies were encouraged to raise staples, which were sold exclusively to Britain. In return, Britain enforced a monopolistic trade in their own manufactured goods. The basic principals, the importance of commerce to the British empire and the necessity to secure a favorable balance of trade, were enforced in a series of acts which culminated in the rebellion of the North American colonies in 1775.

The Carolina colony was founded by a group of eight English noblemen, who found themselves on the winning side of a battle for the monarchy. Through the machinations of Sir John Colleton, King Charles II granted a large tract to eight men in 1663: George Monk, Duke

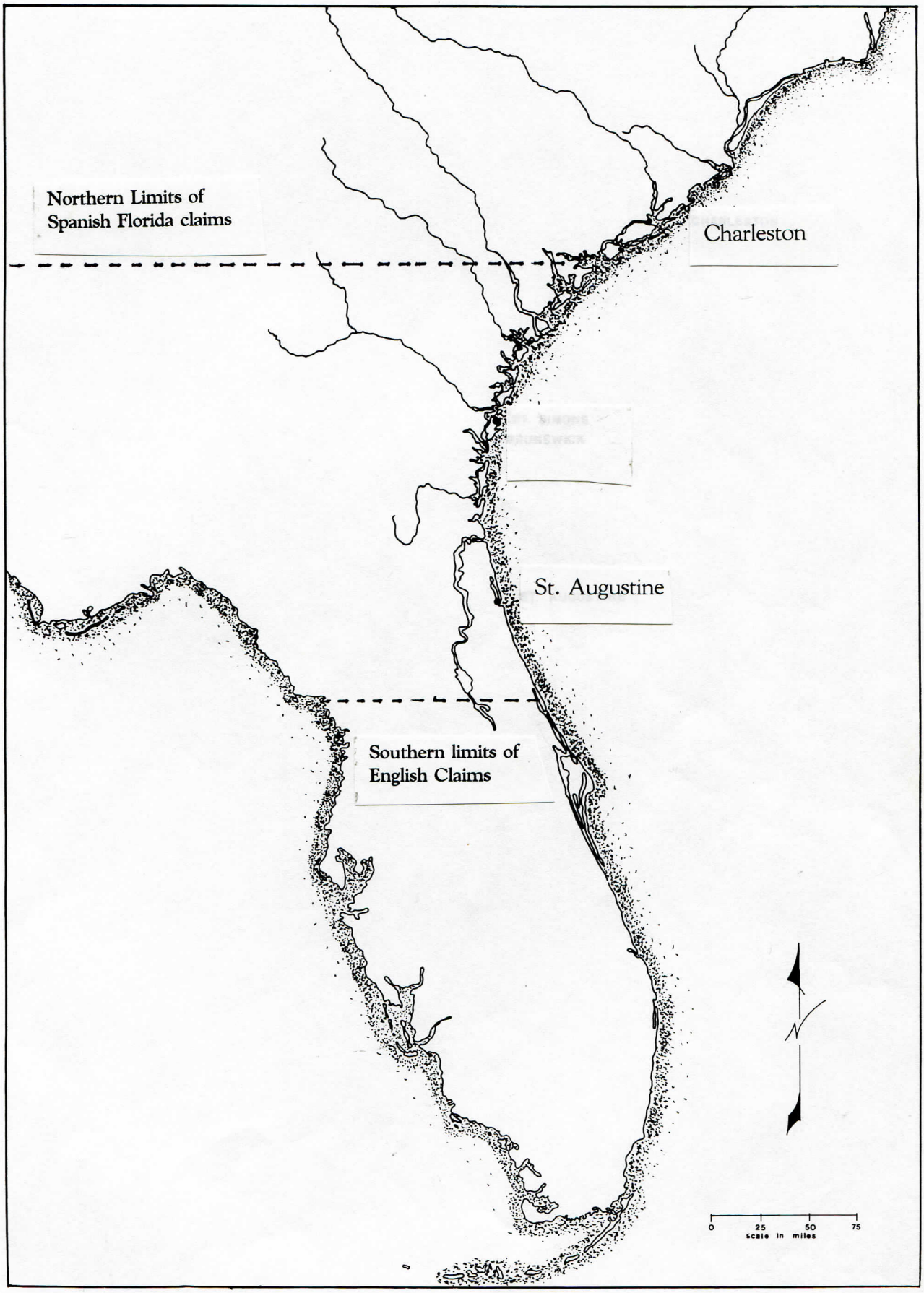


Figure 3
Anglo–Spanish Rivalry along the Southeastern Coast

of Albemarle; Anthony Ashley Cooper, Lord Shaftsbury; William, Earl of Craven; Edward Hyde, Earl of Clarendon; John, Lord Berkeley of Stratton; Sir George Carteret; Sir William Berkeley; and Sir John Colleton. The grant gave these men sweeping powers to govern the province. The Lords Proprietors hoped to attract as many settlers as possible, not necessarily from England; New England and Barbados were seen as likely sources of people. While the Proprietors were particularly impressed with the Puritan's success in establishing towns, efforts to transplant these people to Cape Fear proved unsuccessful. A number of Barbadians, led by Colleton's oldest son Peter and later Sir John Yeamans, were more determined, and they ultimately had a more lasting effect on the settlement. Following their unsuccessful landing at Hilton Head Island in 1663, several British events galvanized the Proprietors into action: The Great Plague of 1667 and the Great Fire of London in 1666, as well as the 1667 war between the Dutch and the French kept their attention close to home, but Anthony Ashley Cooper's brush with mortality in 1668 seems to have led him to pursue his interest in colonial affairs (Weir 1983:49–54; Lesser 1995).

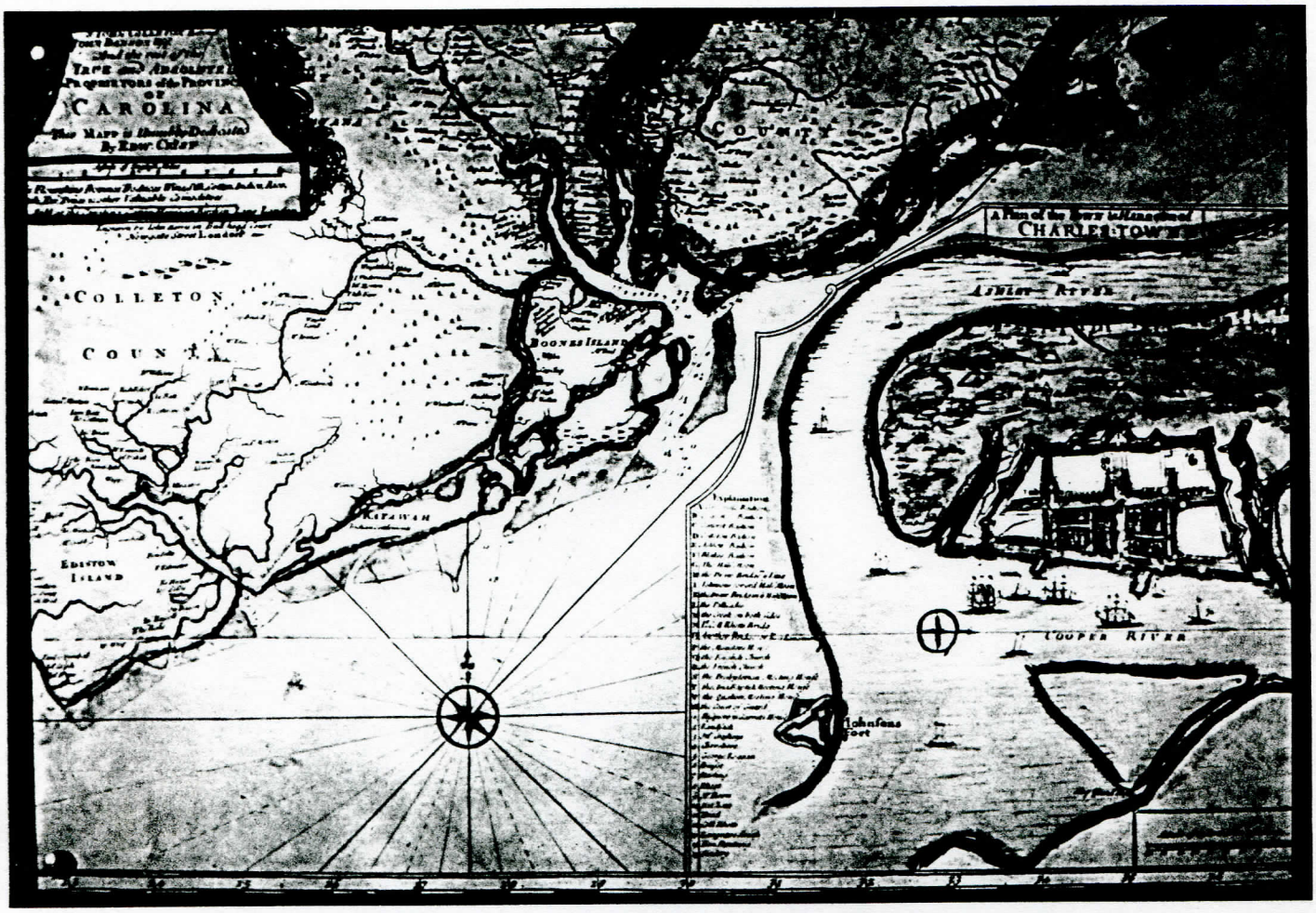
The expedition that would become the first of the permanent settlement left Gravesend near London shortly after August 17, 1669. The three vessels, the Carolina, Port Royal, and Albemarle. They stopped in Ireland for additional settlers, but recruiting proved disappointing. The vessels arrived in Barbados in late October; here the Albemarle was lost to high winds on November 2. The expedition replaced this vessel with a similar ship, the Three Brothers. From here, the vessels set sail for Bermuda by a variety of courses. All three were battered by a sudden storm, and the Carolina struggled into port on January 12. The Port Royal floundered in the Bahamas; they eventually reached Bermuda by rented boat, and the expedition then purchases another, known only as the Bermuda sloop. The Three Brothers, meanwhile was driven to the shores of Virginia, eventually to St. Catherine's sound in present–day Georgia, and finally to Carolina where they eventually met the two others in Bull's Bay. The settlers then explored the coast, arguing over three suitable locations – Port Royal, St. Helena, or Charles Town. The latter was finally selected, and the three ships sailed into Charleston Harbor in April 1670 (Ripley 1970).

Only too aware of their precarious position, the settlers chose what seemed to be a suitable location,

> "a point (Albemarle) defended by the main river (the Ashley) with a brooke on one side and inaccessible marsh on the other wch all at high tides is ever overflown: joyning itself to the mainland in a small neck not exceeding fiftie yards" (Cheves 1897:156–157).

The settlement was protected by a palisade and four pieces of artillery which were directed toward the river. Indians reported to their Spanish allies in 1672 that there were thirty small houses on the west bank of the Ashley river and four on the east bank of Oyster Point, a peninsula formed by the confluence of the Ashley and Cooper rivers (Andrews 1937:203n) (figure 4).

Oyster Point proved attractive to the colonists and, after some exploration of the surrounding area, increasing numbers of them left Albemarle for this new location, approximately four miles away. The leaders of the settlement not only recognized but sanctioned this trend. In December of 1679 the Lords Proprietors sent word to the governing body of the colony that,



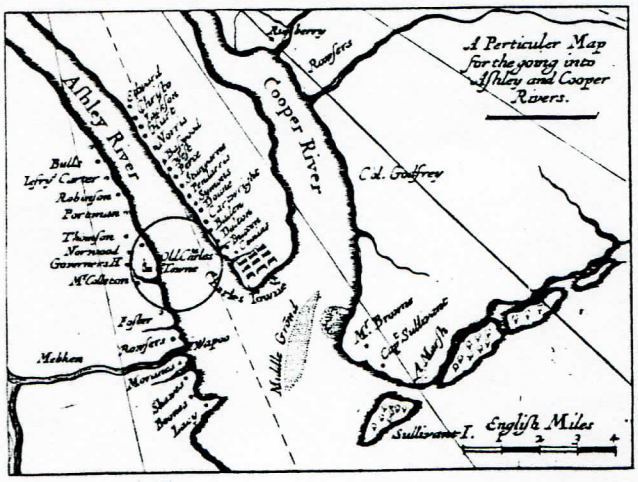


Figure 4
Map of Charles Town by Edward Crisp, drawn 1704 and published 1711. (from the collections of Colonial Williamsburg Foundation, copy courtesy Historic Charleston Foundation).
(Inset) **A New Map of Carolina** by Thornton and Morden, c 1685
(From Weir 1983, Courtesy Henry E. Huntington Library and Art Gallery)

"We are informed that the Oyster Point is not only a more convenient place to build a towne on that formerly pitched on by the first settlers but that also the peoples Inclinations tend thither. Wherefore wee think fitt to let you know that the oyster point is the place wee doe appoint for the port town of which you are to take notice and call it Charles towne, and order the meetings of the Council to be there held and the Secretarys Registers & Surveyors offices to be kept within that town..." (Salley 1928:95).

The new location proved to be "conveniently situated for trade." Situated at the confluence of the Ashley and Cooper rivers and the Atlantic Ocean, the town possessed a good, although somewhat shallow, harbor. Large ships were able to sail up the Cooper for twenty miles while smaller vessels could roam up to forty miles inland from the bay. A network of rivers provided easy access to inland areas. The settlers chose to build the city on a stretch of bluffs along the Cooper river, the portion of the peninsula with the deepest water access. Three hundred acres extending from the point to what is now Beaufain Street were surveyed and mapped out in a Grand Model. 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; Zierden and Calhoun 1984). Specified lots were set aside for a church, town house, and other "publick structures" (Bridenbaugh 1938:10).

Prosperity, both agricultural and commercial, though, demanded security. This proved to be the chief concern of those settling the contested Carolina landscape. The 17th century settlement was, after all, in the "very chaps of the Spaniards." 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 to St. Helena (Port Royal) to St. Augustine and westward through northern Florida to the Apalachicola River. A treaty concluded in 1670 between Spain and England had stated that effective occupation bestowed the right of possession to the occupying power. Despite this agreement, the coastal area from St. Augustine to St. Helena was the scene of persistent warfare between the two countries until the missionaries abandoned their northern outposts in 1702 (Andrews 1938:203; Hann 1988; Wright 1971).

The French, spreading along the Mississippi River, constituted another threat to Britain's southernmost settlement. While the colonists depended on the coastal Indians for trade in deerskins, the neighboring tribes of the Kiawha, Etiwan, Wando, Sampa, and Sewee Indians added to the colonist's anxiety; these fears were realized in the Yemassee War of 1715. Fear of the Indians was later supplanted by unease over the Lowcountry's rapidly growing population of African slaves. Pirates, the scourge of the Caribbean and Atlantic Oceans, were merely another hazard adding to an already formidable list.

The growing town never lacked settlers. Dissenters, Englishmen, Scots, New Englanders, Jews, and African and West Indian slaves formed the core of this diverse group. In the West Indies, large sugar planters were squeezing out those of lesser means or younger sons; the

adventurous among these sought opportunities elsewhere. Carolina offered a familiar climate, cheap land, and often familial connections; Barbadians flocked to the new colony. This group was diverse, with planters, merchants, artisans, small farmers and sailors all transplanting their West Indian money, experience, and slaves to Carolina (Dunn 1972:112–113).

The Carolina policy of religious toleration also attracted a variety of settlers. French Huguenots, suffering persecution in their native land, were another group which immigrated to the province. The Lords Proprietors and the British government were swayed by thoughts of potential income from labor and skills of the Huguenots and eased their immigration to Carolina. Huguenots rapidly assimilated into the prevailing English society of Carolina. The 1697 Naturalization Act calmed fears of future oppression, exogamous marriages created familial links to other colonists, and rapid adoption of English farming methods soon made Huguenots indistinguishable from dominant English settlers.

A large number of Carolina's settlers came unwillingly. The increasing cultivation of rice throughout South Carolina created a voracious demand for slave labor. Although the Carolina colonists were unfamiliar with this crop, many Africans brought to the lowcountry came from rice producing areas of Africa. Rice itself was introduced to South Carolina from Madagascar, and many African slaves possessed skills in rice cultivation and other tasks essential to the plantation economy (Littlefield 1981; Wood 1975). Significant continuities between African and Carolinian methods of planting, hoeing, winnowing, and pounding rice persisted until these techniques were no longer economically feasable (Joyner 1984:13–14). By 1708 the majority of lowcountry residents were black. African bondsmen and women worked the crops in the country and provided labor for building and maintaining the city. Many Africans and their descendants lived in relative isolation on increasingly large sea island plantations.

Protection of the Colony

The threat of Spanish invasion plagued Carolina until the mid–18th century. Spanish–led Indian raiders first appeared in the Charleston Harbor (on Morris Island) in 1670, and returned a few years later. Though both times the enemy was sent scurrying back to Florida, the brief raids fueled the colonists' fears. The 1686 raid was more serious, and a precursor to the Yemassee war twenty years later. Three "gallies" of Spanish, Indians, and "Negroes" overran plantations along the North Edisto and burned a small settlement of Scots in the Port Royal area; there followed a retreat of settlers back toward the immediate Charleston environs. Further, the Assembly mandated an immediate invasion of Spanish territory. Though some 400 men made ready for the invasion, the newly arrived governor canceled the planned raid, afraid of provoking a larger war.

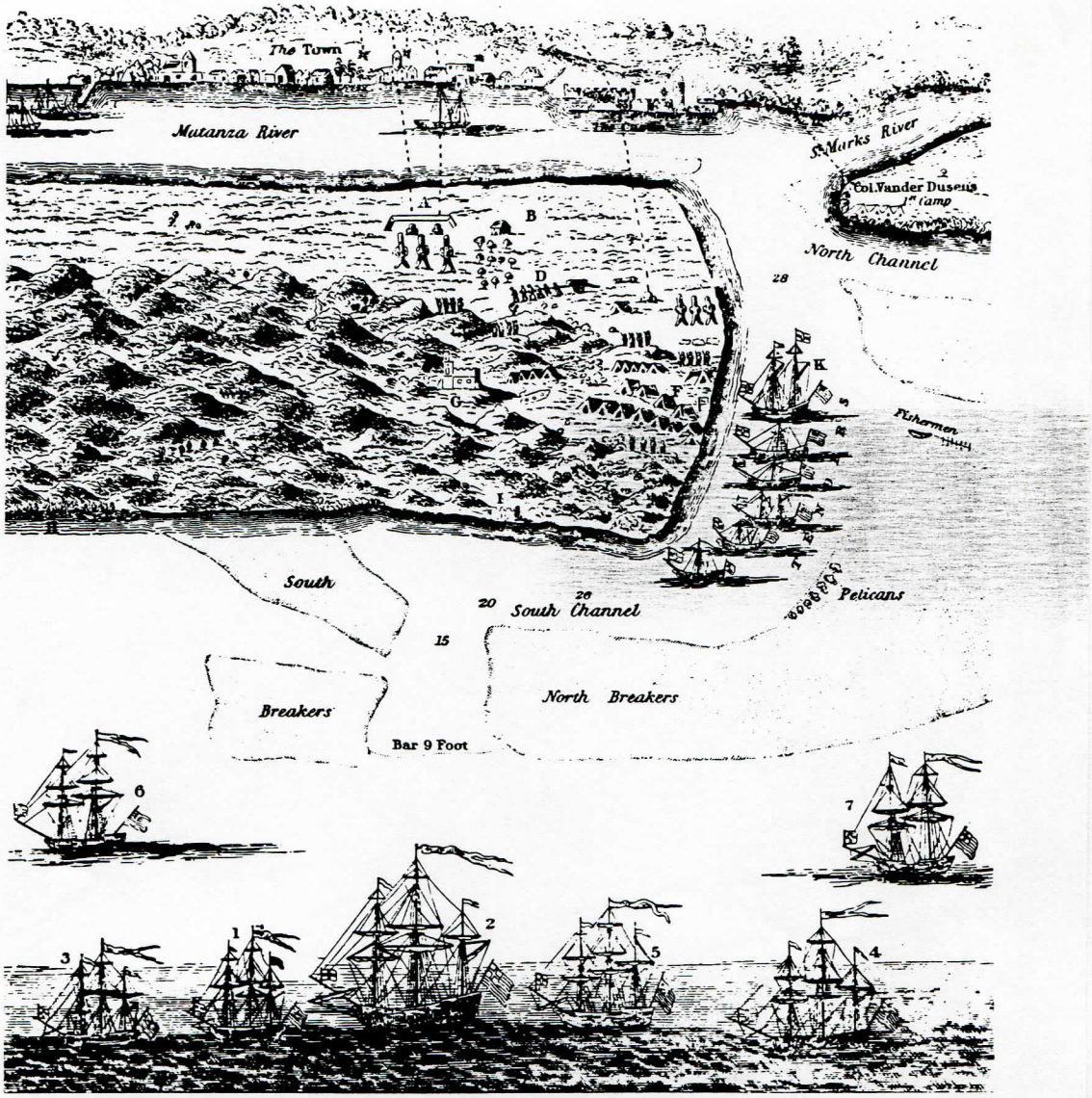
The English settlers got another chance with the outbreak of Queen Annes War in 1702. Unrest began when Spanish and Apalachee Indians headed for Carolina, but were defeated in Georgia by a Creek force loyal to the English. An invasion force, under Governor James Moore, then set seige to St. Augustine, by sea and by land. The Spanish were forewarned, however, and barricaded in the Castillo de San Marcos. Though Moore and his men occupied the town, he was

unable to capture the fort, and when ships appeared on the horizon, he abandoned the seige and his ships, returning to Carolina by land. Highly criticized for this endeavor, he redeemed his reputation two years later in a victorious raid on the Apalachee Indians in the north Florida mission settlements.

The Spanish retaliated in 1706, invading Charleston Harbor as the city languished under a yellow fever epidemic. The English were the prepared ones this time, and skirmishes at James Island and Shem Creek kept the Spanish at bay. The Spanish mounted another unsuccesful raid in 1719. This pattern of minor skirmishes continued another twenty years, and if they gained little territory for either side, the served to keep Anglo–Spanish rivalry at a heated level. Southeastern Indians capitalized on this rivalry by constantly trading alliance for favorable trade relations; a series of annoying and frightening Indian raids were seen as Spanish–instigated. English and Spanish trade competition was complicated by privateers and pirates who patroled the seas. The last large raids began with the War of Jenkins Ear in 1739. An English raid on Florida, this time led by James Oglethorpe of Georgia, was spectacularly unsuccessful (figure 5), and was retaliated by the Spanish expedition at St. Simons, Georgia, repulsed at the Battle of Bloody Marsh (Ripley 1970:21–22). Though this was the last major skirmish among the colonists, the feelings of mutual enmity continued, until a stroke of the pen in Paris gave Florida to the British in 1763.

Intimately linked to rivalry with the Spanish was control of the Native American population, principally through trade relations. Although the defeat of the Indians in the Yemassee War resulted in increased safety for all colonists, it also radically altered the fur trading network of some, as the defeated tribes retreated inland. Carolina was surrounded by a variety of aboriginal groups, including Siouans, Cherokee, Creek, Choctaw, and a number of smaller coastal tribes; arrival of Europeans began a complex and rapid series of movement, decimation, and realignment among these southeastern groups (Smith 1987). Charleston's access to inland waterways facilitated trade with the Indians, as did the forts established in the backcountry (Crane 1981). These outposts promoted traffic with the Indians, protected the frontier inhabitants, and guarded against French and Spanish encroachments (Calhoun 1986; Sellers 1970:12; Sirmans 1966).

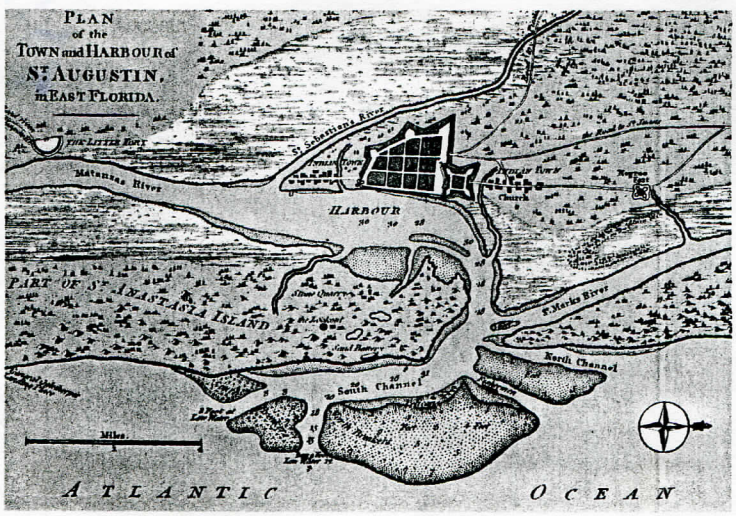
Native Americans were not the only group attempting to play the Anglo–Spanish rivalry to their advantage. The large numbers of newly–arrived African slaves also saw alliance with the Spanish as their salvation; for their part, the Spanish capitalized on this issue to further erode British control of their new colony. Lured by the promise that escaped slaves would be given religious sanctuary in Spanish Florida, Africans in the English colonies, aided by Indian allies, escaped and made their way to Florida. The first recorded group of fugitives arrived in St. Augustine in 1687, and included eight men, two women, and a nursing child. By 1738, more than 100 had settled in Spanish Florida, and that year they established a fort and community just north of the town, Gracia Real de Santa Teresa de Mose. Many of the male fugitives were made members of the Spanish slave militia, and in 1738 they formed a free black company under the command of Francisco Menendez. Fort Mose quickly came to represent freedom to Carolina slaves, and helped incite the 1739 Stono rebellion. Destroyed during Oglethorpe's raid and briefly abandoned, Mose was resettled in 1752 (figure 6), and remained the northermost defensive line



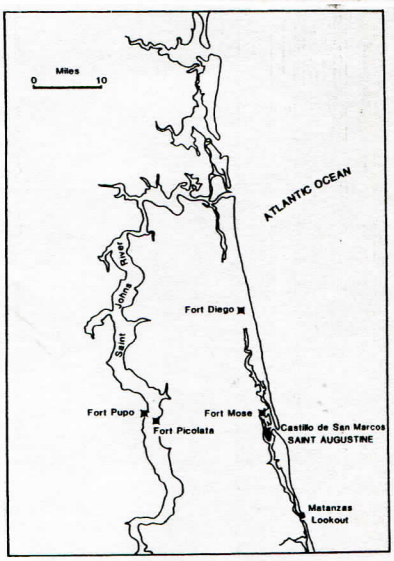
St. Augustine, Florida, and the English camp before it June 20, 1740.

Figure 5

Reproduced from *Charles Towne: Birth of a City*, by Warren Ripley, 1970



The Thomas Jefferys map of 1762, showing what Fort Mose (labelled "Negroe Fort") looked like in 1740.[52]



This map shows the fortifications which protected St. Augustine in the early eighteenth century. Fort Mose was the northernmost offical fortress protecting Spanish Florida. Farther north, Ft. Diego was actually the fortified home of the mulatto cattle rancher Diego de Espinosa and was often used as a remote outpost.

Figure 6

Reproduced from *Fort Mose: Colonial America's Black Fortress of Freedom*, by Kathleen Deagan and Darcie MacMahon, 1995

of the Spanish until 1763, when the residents of Mose departed with their St. Augustine compatriots for Havanna (Deagan and MacMahon 1995). Opportunistic alliance between southeastern Indians and Africans would continue throughout the colonial period.

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. Although this trade was condemned by the Lords Proprietors, it was profitable for the colonists, and a large number of these enslaved people were shipped to the Caribbean.

The principal item of trade was not slaves, but animal skins. The main animal pursued by Native people, and desired by European people, 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 (Silver 1990). This use of fire decreased the amount of underbrush and promoted the growth of grass; in the early colonial period deer roamed these man-made savannahs in large herds.

Deerskins soon became the colonists' most profitable export. The earliest trade was as secondary, small-scale pursuit of individual planters. Some of these entrepeneurs hired an Indian hunter to supply them with skins; others traded in more haphazard fashion (Crane 1981:118). 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 Yemassee war changes the mechanics of this trade as the defeated tribes moved inland. Those involved in the fur trade now required storage facilities to support their long-distance enterprise.

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. These merchants established credit relations with British businessmen, enabling them to procure and finance the trading goods necessary for the (primarily) barter 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).

Charleston sought to protect its rapidly expanding economic base by fortifying the city and the surrounding hinterland. The new Charles Town at Oyster Point was heavily fortified with a surrounding wall, as represented on Edward Crisp's 1704 map of the city (figure 7). This consisted of a wall, probably earthen, plus a moat on the town's north, west and south sides, with bastions at each corner. The eastern, or water side consisted of a brick sea wall, with a series of batteries protruding into the water. Joe Joseph notes that the use of a ravelin at the Broad Street entrance to the city, as well as the overall appearance of the fortifications mirrors principals presented in Vauban's New Method of Fortification, published in 1693, and suggests that Charleston's defensive structure was developed in consultation with Vauban's philosophy regarding lines of fire, use of projecting bastions, and other defensive military techniques (Joseph and Elliott 1994:7). The city

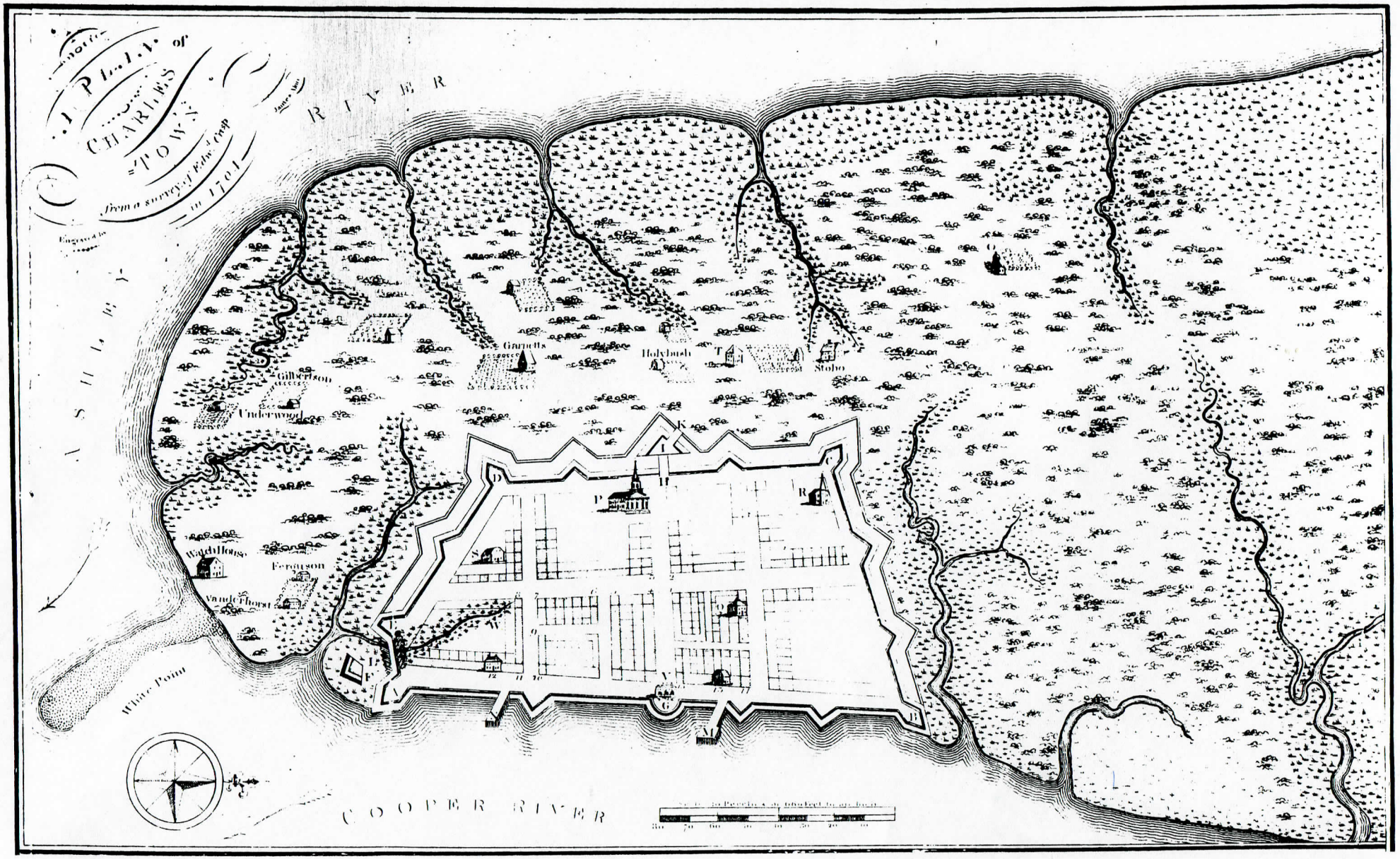


Figure 7

c. 1704 map of Charles Town
The surrounding wall is accentuated in this rendition

walls were evidently demolished in gradual fashion after the Yemassee war, and the city rapidly expanded beyond these boundaries.

Early on, the city also made provisions for raising a store of gunpowder for defense of the province; Acts of the Assembly facilitating this enterprise were first passed in 1686; the Assembly deemed that the province have " a publicque store of powder alwayes in readiness" and that same act set forth provisions for raising a public store of powder. In 1702 the Assembly directed that a "country magazen" be built for proper storage of powder and arms. This magazine was evidently never built, and the Assembly later dictated that a public magazine be built within the "intrenchment" from the land of three indifferent freeholders. On December 23, 1703, the assembly authorized "that a brick powder house be built, thirty foot long and eighteen food wide, within the said line, in such place and in such manner as the Commisioner by this Act appointed (William Rhett), with the advice of the Governor, shall think fitt." (Davis 1942:188).

Subsequent records indicate that some time passed before this mandated magazine was constructed. A Committee report of 1712 shows that the powder was still kept "in the Public Store in Charles Towne" and in the several forts, or bastions, fortifying the town. (Davis 1942: 188). Other records indicate that the efforts to build the magazine were renewed at this time. The magazine was evidently begun this year, and completed by 1713. It was found, however, "not to be well and sufficiently covered to preserve the powder therein lodged from any storms of rain which may happen." In December 1714 the Commissioners authorized the purchase of a quantity of slate to cover the magazine, but the repairs were evidently slow in coming; when a store of arms and ammunition arrived from England in 1716, the powder was secured in Craven's bastion, and Samuel Wragg and Benjamin De La Conseilliere were "empowered to treat and fully agree with Madam Burtell for the store house room in her house to lodge & secure the arms & other habiliments of war." A year later, the Commissioners exhorted Captain Porter to "get the Public Magazine covered with slate, and forthwith employ a person for that purpose." The magazine was evidently used exclusively for the store of powder, for there are references which imply the storage of arms elsewhere. In 1739, the Committee on the Armory and Warlike Stores reported that they had "visited the Places in which the Public Arms are kept" and found the same so small that it was impossible to examine them. The Committee had given directions to "those who have the Care of the Arms" to get them in a more convenient place (Commons House Journal, 1739)

These cycles of repair and disrepair continued throughout the colonial period. In 1721 the Magazine was reported as being "very dry, clean and in good order". In 1724, however, the review Committee reported that the magazine was "unfit to preserve Powder, without some more effectual Method be taken by making draughts for air." A year later, a similar committee reported "that the floor of the Magazine is much sunk and the powder in great danger of being damaged by great Raines." Though authorized, Davis (1942:189) reports that these repairs were not made. A 1729 tour of the Magazine revealed that "the floor on the north side should be raised with new sleepers it now being so low that water in wet seasons overflows that part of the floor wch very much indangers the Powder". A similar report was made two years later.

Consideration of a new magazine was evidently the reason for delaying these improvements. In 1732 the motion was made that the magazine be "removed to a more convenient location" This new magazine was constructed near the Work House, on a part of the Old Burying Ground, and completed in 1737 (see figure 8: the burying ground is near the top of the map, and the new magazine is marked T). It was inadequate from the start, however, and inspecting committees in 1739 suggested that the old magazine be repaired and reused instead. They suggested the following necessary repairs:

1. A new Floor of Cypress or Pine to be fastened with Pegs.
2. The Walls inside of the magazine be lined with Boards.
3. A new Outer Door to be well fortified with Nails.
4. New & Stronger Window Shutters.
5. That the Passage between the two Doors be rammed with clay and not to be boarded.
6. That two Centry Boxes be built to be placed near the And that two of the Men belonging to the Watch be placed there every Night as Centrys and to be relieved every two Hours.
7. That while the Magazine is Repairing, the Powder be removed into Cravens Bastion and kept under Guard.

The urgency of this request and the silence of the records on this subject in the years after led Nora Davis to conclude that this round of repairs were made. The archaeological record supports this interpretation, as well.

Growth of the Colony

In accordance with British mercantilistic policies, colonists immediately began to experiment with profitable staples, those commodities not available in Britain. Crops were first planted for subsistence; livestock was raised for the same purpose. Cattle soon proved profitable, and quantities of beef and provision crops were exported to the West Indies (Wood 1975: 32). These, and deerskins, were the colony's earliest successful exports. But experimentation was endless, and Englishmen planted oranges, grapes, olives, flax, hemp, cotton, indigo, and ginger (Calhoun et al. 1982). It was rice, however, introduced in 1695 from Madagascar, that made Carolinians wealthy. It would require many years of experimenting, and many shiploads of enslaved Africans from that continent's rice–growing region, before rice proved profitable. This rather chaotic trading situation was regulated by a series of Navigation acts, which included bounties for desired crops. Under this system, indigo and naval stores were also profitable colonial crops. Naval stores included pitch and tar produced from the longleaf pine which covered the lowcountry. Eliza Lucas Pinckney first produced a commercial crop of indigo on her father's plantation in 1741 (Rogers 1980).

Between the challenges of a rapidly expanding economy and the constant threats of invasion and warfare, the people of Charles Town became increasingly impatient with the Proprietors who governed from across the ocean (Fraser 1989:37). A rumored Spanish invasion,

and a series of broad-sweeping decisions by the men in 1719 brought the situation to a crisis point, and in December the Carolina Assembly declared itself "the government until His Majesty's pleasure be known." (Fraser 1989:37; Lesser 1995:455). Proprietary governor Nathaniel Johnson attempted to regain control, but was unsuccessful. The colony remained in legal limbo for the next ten years, during which the proprietors attempted to sell their interests. In 1729, the crown bought out seven of the eight shares, and the colony entered the mainstream of royal rule. (Weir 1983; Fraser 1989; Lesser 1995).

The arrival of a royal governor was only one of several events during these years that galvanized Charleston's position as a central port in a profitable and expanding colony. The reduction of aboriginal threat following the Yemassee war and years of disease and decimation, and the reduction of Spanish threat, partially through colonization of Georgia in 1733, opened the backcountry to settlement. This inland expansion was given official sanction with the township plan of 1730, which projected a series of frontier communities to be settled by small farmers. By the 1730s, the techniques of inland rice production had developed to a point where rice became the most popular staple; the plantation economy expanded, bringing with it a financial stability and enough capital to entice merchants and factors to remain in Charleston and reinvest their earnings rather than returning to England (Rogers 1980, chapt. 3; Calhoun et al. 1982)

The commercial expansion of Charleston was matched by remarkable physical growth. The 1739 map of Charleston indicates that the city had expanded well beyond the original city walls and that growth was primarily to the west (figure 8). The city spread west to the banks of the Ashley River, encompassing the Mazyck lands, and south to the tip of the peninsula, though much of the peripheral area was only sparsely occupied. Late 18th century maps suggest that subsequent growth to the north proceeded more slowly and, instead, the areas already occupoed in the early eighteenth century were subject to more intensive occupation. Still, development had encompassed the Magazine by mid-century (figure 9).

Two events in the 1740s signaled the declining significance of the magazine. In 1741 the rightful ownership of the property was called into question by descendants of Peter Buretel, on whose land the magazine was built. The three plantiffs, Ralph Izard, Nathaniel Broughton, and Paul Mazyck were awarded rents on the property. After 1745, the owners were to be paid an annual rent for the magazine, "until the same shall be delivered into their possession."

It was shortly after this that public outcry forced disuse of the magazine. On January 19, 1744, Robert Pringle and "above 50 more" petitioners, merchants, traders and inhabitants, to the Council, showing that "they are in danger from the Incommodious Situation of the Powder Magazine being so near to the principal Places of Divine Worship." These and other petitioners also complained that their powder had been ruined by the damp conditions of the magazine, and that the magazine was in a state of disrepair. Reportedly, Powder Receiver Colonel Brewton had been advised that the walls had "given way on every side" and that it must be secured on every side by strong pieces of Timber." Another petition read on May 3, 1745 feared that "if it should please God to strike the same with Lightning, it would in all probability destroy the lives of the Inhabitants of this town." (Davis 1942:192). These petitions led to disuse of the magazine in 1748.

Figure 8

1739 map of Charleston, plus enlargement of the powder magazine area (marked S)
The city wall location is still shown, and the area to the north remains an expanse of marsh. The powder magazine sits in the center of a large lot, from Meeting to Church streets, bordered by cemeteries.

Figure 9
1788 map of Charleston

Most of the creek to the north has been filled, and Cumberland Street has been constructed (30). The magazine, here indicated with an arrow, does not receive special designation in the map key; the "new" magazine, gaol, and poorhouse are shown instead.

The nearby growth and development that led to the citizens' complaints continued throughout the 18th century. As the 18th century advanced, Charles Town expanded in economic importance and the relative affluence of its citizens. White per capita income was the highest in the colonies (Weir 1983). As the planters and merchants gained in prosperity, they began to demand goods more appropriate to their elevated station in life. The lure of wealth reverberated throughout Britain and the colonies, attracting factors, merchants, and craftsmen. Personal wealth poured into the colony from Europe in the form of furniture, silver, tableware, clothing, and paintings; imports were matched by a rise in local craftspeople and their slaves producing this finery, particularly cabinetmakers and silversmiths. This ascendancy of personal and collective wealth continued after the Revolution, peaking in the early 19th century.

Personal wealth was matched by a rise in imposing public and domestic architecture. The devastating fire of 1740, the first in a series of such disasters, cleared the way for construction of large structures in new styles; most of the waterfront structures shown on the 1739 view disappear from the Charleston landscape. Public architecture of the mid–18th century includes St. Michael's church (1761), the State house on the opposing corner, and the Exchange building at the foot of Broad (1769). On the domestic front, large Georgian houses were constructed on still–spacious city lots, in some cases replacing earlier, more modest structures on the same lot. These changes are part of a general shift in architectural style and land use in Charleston during this time (Herman 1993; Zierden and Herman 1996).

Thus Charleston became a social and intellectual center, as well as economic and political focus, for the lowcountry planter society. The "sickly season" brought planters for at least part of the year for health reasons, but few returned home without enjoying the social amenities of city life. Taverns and clubs proliferated in Charleston; dancing assemblies, concerts, and dramatic performances were popular as well. The upper class also engaged in intellectual pursuits. Charleston was a center of amateur scientific investigation and correspondence. The Charleston Library Society was founded in 1748 by seventeen men "anxious to save their descendants from sinking into savagery". The Charleston Museum was founded in 1773 (Rogers 1980:99, 113–114).

Revolution and Recovery

Prior to 1760, South Carolina had flourished under British rule. The staple crops produced in the colony commanded a ready market in Britain, and the colony sustained a favorable balance of trade. Relations worsened after the conclusion of the Seven Years War in 1763, when a growing national debt was passed on to the British colonies. To secure collection of these monies, Parliament tightened the Navigation acts and their corollaries, a series of tax acts were passed, and Royal placemen arrived in Carolina to assume lucrative and important positions previously held by respected community members (Calhoun 1986; Rogers 1980:41).

By the 1770s, tea became a symbol of this struggle. The Tea Act was passed in 1773 to help the troubled East India Company, but the tax on tea became the focal point. The first

shipments of taxed tea arrived in New York, Philadelphia, Boston and Charles Town. Though it is Boston that is famous for its demonstrative "tea party", Charlestonians also challenged the arrival of this symbolic product. When the ship bearing the teas appeared over the bar, a meeting was held in the Great Hall over the Exchange; here an agreement prohibiting importation of teas was circulated for signature. The ship's captain was anxious to be rid of the tea as this rebellion brewed, and very early on December 22 the tea was landed and locked in the Exchange. The teas on another ship, the Britannia, were seized and emptied into the harbor in front of cheering crowds.

Meanwhile, pressure for an independent government increased. In September 1774, the First Continental Congress assembled in Philadelphia, and eight months later the Second Continental Congress took the steps of establishing a Continental army and issuing currency. South Carolina participated in these groups and wrote a constitution (Miller and Andrus 1986). On July 4, 1776 the American colonists declared their independence from Britain.

The first attempt to conquer the province of Carolina came in 1776 when the Royal Navy attacked Fort Sullivan (later Fort Moultrie). Repelled by both natural and military surprises, the navy withdrew. When they struck again, Charleston could not withstand the seige and surrendered to the enemy on May 12, 1780; the British remained in Charleston until December 1782. The loss of Charleston was considered the Americans' greatest defeat, but its surrender did not bring about the hoped–for political reconciliation. Instead, "The Very loss of Charlestown became a ground of hope, and an incitement of vigour" (Anon. 1800).

The surrender of Charleston included almost all of the troops defending the city; one not with them was Francis Marion. Following the loss of the city, Marion began his career as a guerilla fighter. He was made a brigadier general of South Carolina State troops in 1780, and began recruiting for his brigade. Though his troops covered much of South Carolina, he was principally involved in the defense of the area east of the Cooper River, in what is now the Francis Marion Forest (Boatner 1975:675–679; Calhoun 1986), where he harrassed the British troops occupying Charleston.

Under the articles of occupation agreed upon by Lt. Governor Gadsden and British commander–in–chief Cornwallis, it was stated:

1. all public property would go to the victor
2. Continentals would remain prisoners until exchanged
3. members of the militia could return to their homes as paroled prisoners and would not be disturbed in the possession of their property unless they broke their parole.
4. all townspeople whether they had borne arms or not would be treated as militia prisoners on parole.

These stipulations were conveniently ignored by the British. During their occupation, many Carolinians suffered sequestration of their property, the quartering of troops in their homes, imprisonment in the "dungeon" of the Exchange, internment 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 totalling 300,000 pounds sterling. Many soldiers looted solely for their own benefit, virtually guaranteed of immunity from prosecution. Slaves were a highly lucrative commodity and thousands of them were appropriated by the British and sold in the West Indies. Thousands more who had hastened to join the British sickened and died (Wallace 1961:294; 1969).

The British occupation evidently brought many changes to the city. There was a great deal of movement, as merchants and planters chose, and sometimes rechose, sides, were exiled, or imprisoned. Trade was interrupted, and a variety of new products, particularly foodstuffs, were imported (Royal Gazette 1780–1782). The occupation forces also worked to clean 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 into 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).

Much of the rubbish was hauled to the "British Dump", whose location is unknown. Their efforts must have been somewhat successful, for in September 1780, the Commissioners of Streets gave notice that,

> "as streets are now clean and put in good condition, people are to avoid throwing out dirt, rubbish, or other offensive matter into any part of the street or vacant lots but are to carry such rubbish &c to such parts of the town as the Commissioners now use for that purpose; Also, do not put anything in the streets that may obstruct the way or endanger the safety of passengers" (Royal Gazette, September 19, 1780).

With the coming of the Revolution, the Powder Magazine was returned to service, as were others. On March 23, 1780, the Powder Receiver paid Richard Peroneau for "Boards and Carpenters work to repair the Magazine behind the old Church" (Davis 1942:192). Two months later the magazine was "near being destroyed by a thirteen inch shell bursting within ten yards of it". In consequence, William Moultrie had the powder (10,000 pounds) removed to the northeast corner under the Exchange, and had the doors and windows bricked up. Evidently, the British never discovered this cache of powder during their two–year occupation (figures 10 and 11).

After the British withdrew in December 1782, the inhabitants of the region struggled to mend their lives. Sequestrations of rebel property were overturned, and the victors turned their attention to estates belonging to Tories. Many of these now suffered confiscation or heavy

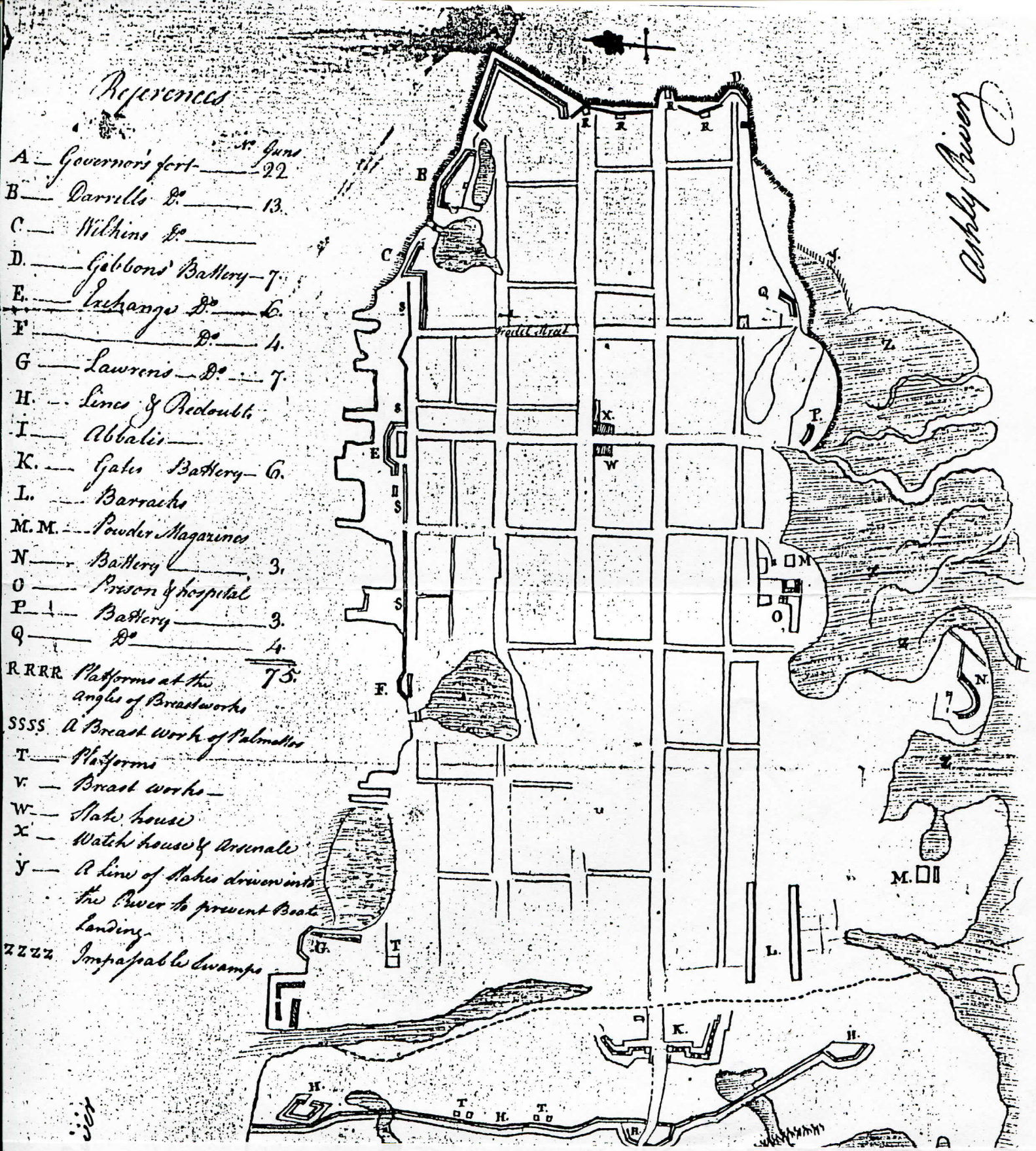


Figure 10

Sir Henry Clinton's 1780 Map of the Defenses of Charleston

Powder Magazines are shown on the bank ofthe Ashley River; the Cumberland street magazine is not indicated.

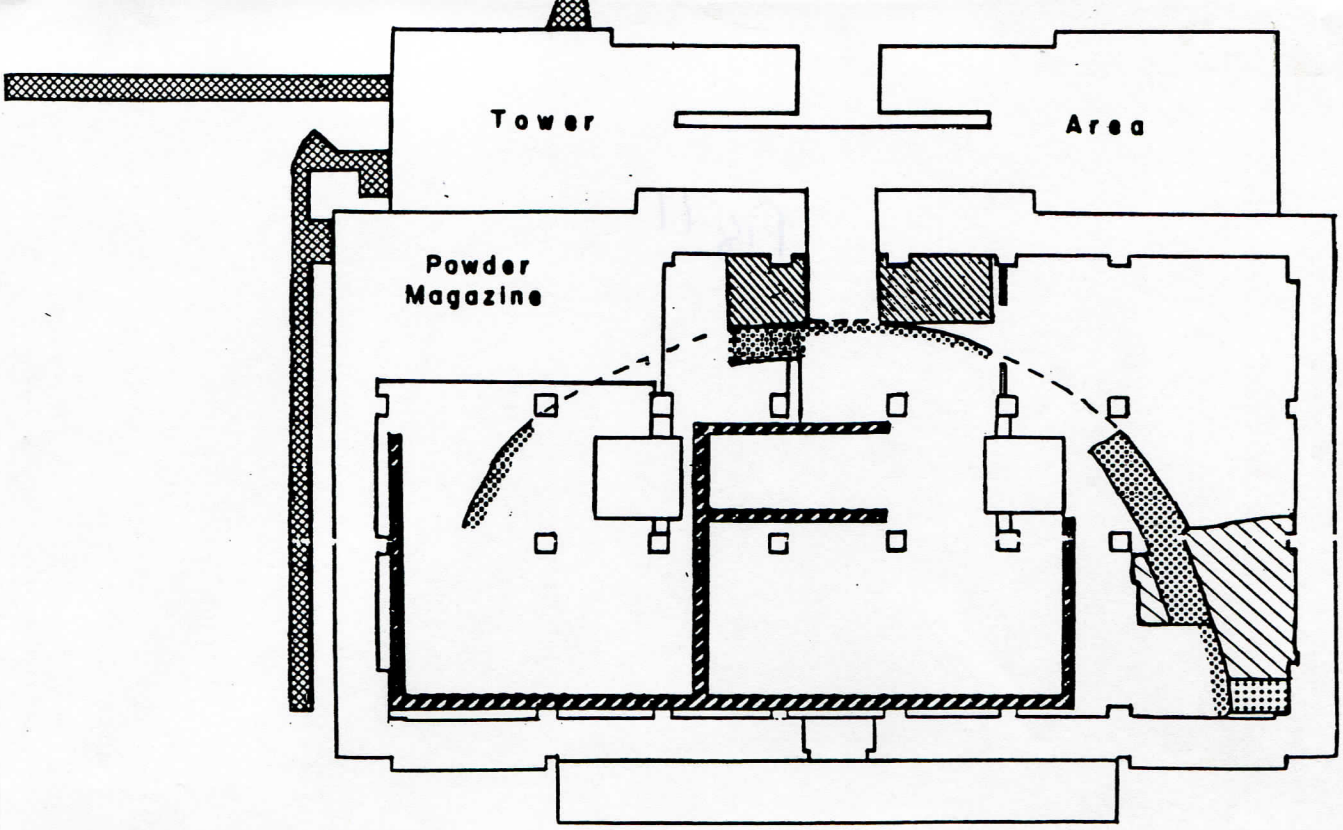


Figure 11

Map of the basement of the Exchange building,
showing location of 1780 magazine (from Herold 1981).
Photograph of the basement of the Exchange building,
showing the groin arches; the mannekins portray imprisoned patriots.

taxation. Commerce normalized rather quickly, but the withdrawal of the indigo bounty forced planters to consider other crops. But Carolina's fortunes would continue for some time, with the new tidal rice technology and the cultivation of sea island cotton.

Private Use

The last, intermittent documented use of the Powder Magazine for its intended purpose was in 1820; in the intervening years it had evidently seen service as a storage facility for relicts of the Royal era. Charles Fraser (1854) notes the following:

> "There were two fine pictures left in it, which no doubt, had been removed from the hall of the Assembly, on the breaking out of the revolution, as being symbols of royal authority. They were the whole length portraits of George I and his queen, in their robes of majesty. I first saw them about the year 1800, leaning face to face against the wall, with an old coach wheel pressing on them and covered with dust. My recollection of them is, that they were admirable paintings, and, no doubt, the work of Sir Godfrey Kneller. I went there again, some years afterward, with permission, to see them, and in hope of restoring them; but some base trespasser had, in the meantime, cut the canvass out of the frames, and no trace has been ever had of them since." (Davis 1942:193).

Despite this semi-public use of the building, the heirs of Peter Buretel were already using the surrounding property. "In 1801 the Magazine was found in the possesion of the Hon. Ralph Izard, on the following plat annexed to his deed to John Lewis Poyas" (CCRMCO F-7:115; Davis 1942:193), who reconveyed it in 1804 to Mr. Izard, to whose heirs and devisees it then passed, and then by partitions and family settlements in Equity to Mrs. Margaret Izard Manigault, Mr. Clarence Izard Manigault, and his son Dr. Gabriel E. Manigault. It was still Manigault family property a century later.

The 1801 plat (figure 12) graphically demonstrates the gradual encroachment of urban development on the powder magazine. When the structure was built, it was deliberately placed against the city wall in the least developed portion of the city, situated on the center of a large open lot. The 1739 map suggests that this was still the case at this time. Dr. Shecutt noted in 1819 "from these buildings (the magazine and the Trott house on its west side) down to Church-street, was a spacious grove of Sweet and Seville oranges, which remained to the year 1756, and it is believed, that some of the trees were preserved as late as the year 1781, in the vicinity of said magazine" (Shecutt 1819:7). By the late 18th century (as reflected on the 1788 Petrie map), the market street creek had been filled considerably, creating a new block of high land north of the magazine property. With the city wall long gone, a new street was created in 1787 (Wragg alley), widened and renamed Cumberland Street in 1788 (Burton files). The 1801 plat shows the trott house and outbuildings immediately west of the magazine, and implies further development on the remaining western portions of the tract. The eastern portion was unimproved at the time of platting, but divided into a series of lots fronting Church street, ready for building. This plat also

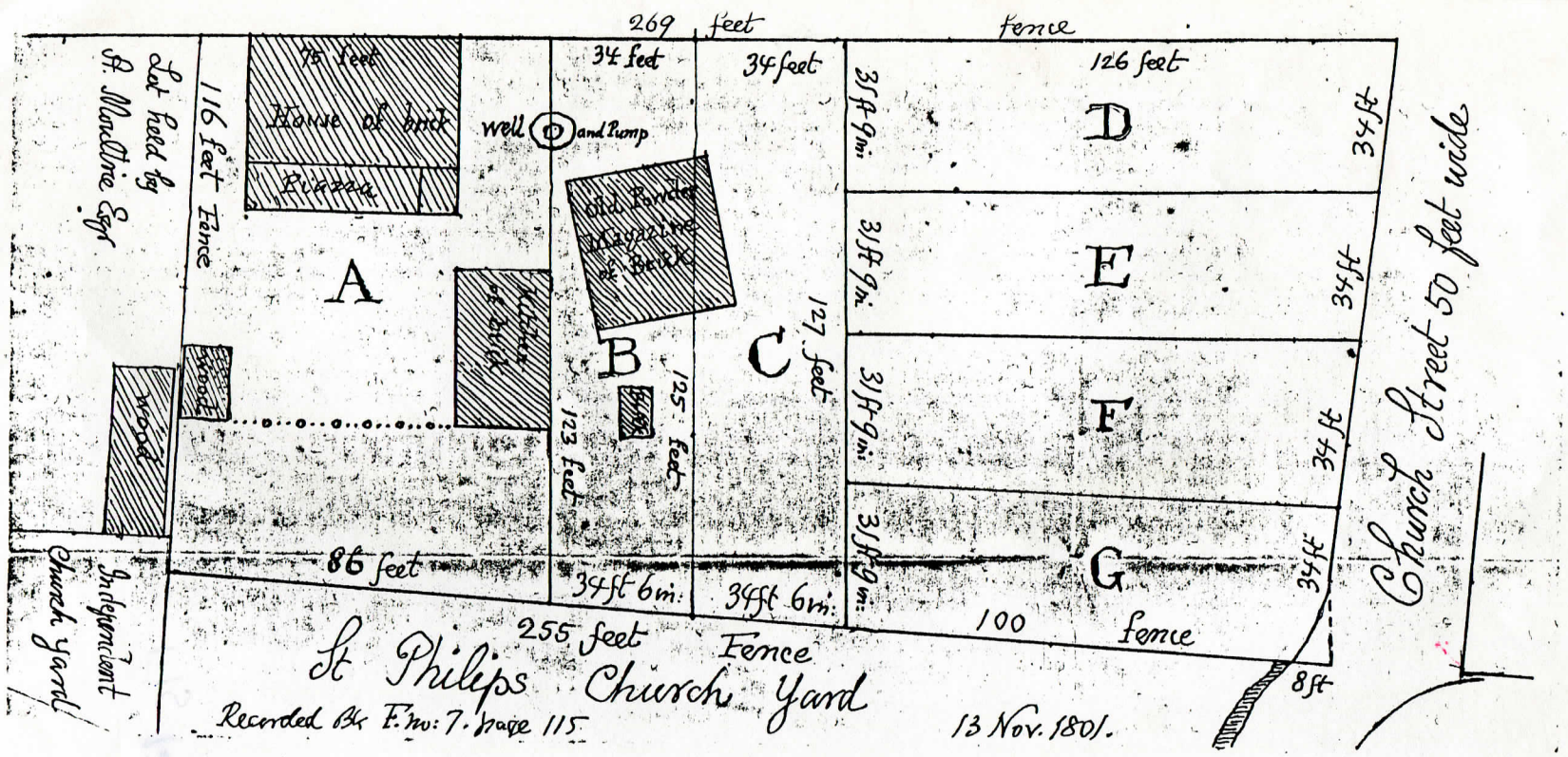


Figure 12

1801 plat of subdivisions of the magazine property
The property was in the possession of Ralph Izard.

shows a small structure of brick directly behind the magazine, and a well and pump on the lot line shared with the Trott property.

Our next composite view of this area is the 1852 Bridgens and Allen map, a city map remarkable for its detail and the accuracy of that detail. This map suggests that the single house directly behind the magazine is extant; further, no property line is shown between this and the trott tract to the west. The eastern portion contains three new buildings, plus a larger structure on the corner. The Church street frontage is divided into smaller lots, with three narrow, contiguous buildings along that street (figure 13). These buildings seem to have survived into the late 19th century, for the 1884 Sanborn map shows a comparable configuration (figure 14). Most are dwellings or tenements; the corner structure was a grocery store, while the southernmost Church street property was a bakery. A large complex of sheds, ovens, and bake house are located along the rear property line, abutting the single house behind the magazine. By 1888, the long tenement had been foreshortened, and the bakery streetfront expanded to the north (figure 15). A dependency has been added to the rear of the remaining tenement, connecting it to the rear property line and wall of the magazine. Most notable is the configuration of the Cumberland street tenement abutting the magazine property. This shows a narrow structure abutting the street, with deck and staircases behind it leading to an attenuated rear yard with small dependencies. This balcony, stairs, and back yard are visible in a period photo, as are all of the features described above. This photo provides an excellent image of the congested nature of the block in the late 19th century (figure 16).

Throughout the 19th century, the magazine was owned by the Manigault family and used for a variety of purposes, most of them commercial. Though no dates can be determined, some secondary documents suggest that at least portions of the building were rented for a livery stable, a print shop, and a blacksmith shop. At least one of these enterprises required a chimney stack, placed in the front west gable, and later bricked in. The building reputedly served as a wine cellar for the Manigault family during this period, and indeed the 1888 Sanborn map lists the building as "store house". The documentary evidence, or lack of it, also suggests that the building stood vacant for periods of time.

While the magazine languished in use and upkeep during the nineteenth century, the surrounding neighborhood was growing and changing. The remainder of market street creek was filled, and in 1804 the market stalls were constructed (see figures 9 and 13); this market replaced the beef market at the corner of Broad and Meeting, lost in the 1796 fire. The new market followed the city's residential growth in the more northerly suburbs, and removed a nuisance from an increasingly professional main street of the city. Numerous houses, tenements, businesses and industries filled the blocks surrounding the magazine. But this overall physical development masked the slow, but steady economic decline of the city during the antebellum period.

By 1819, Charleston's economic bonanza years fell victim to the national depression (Greb 1978:18), which brought a halt to the commercial expansion of the city. Although the economy of Charleston stabilized thereafter, the city had begun a then–imperceptible decline. These forces

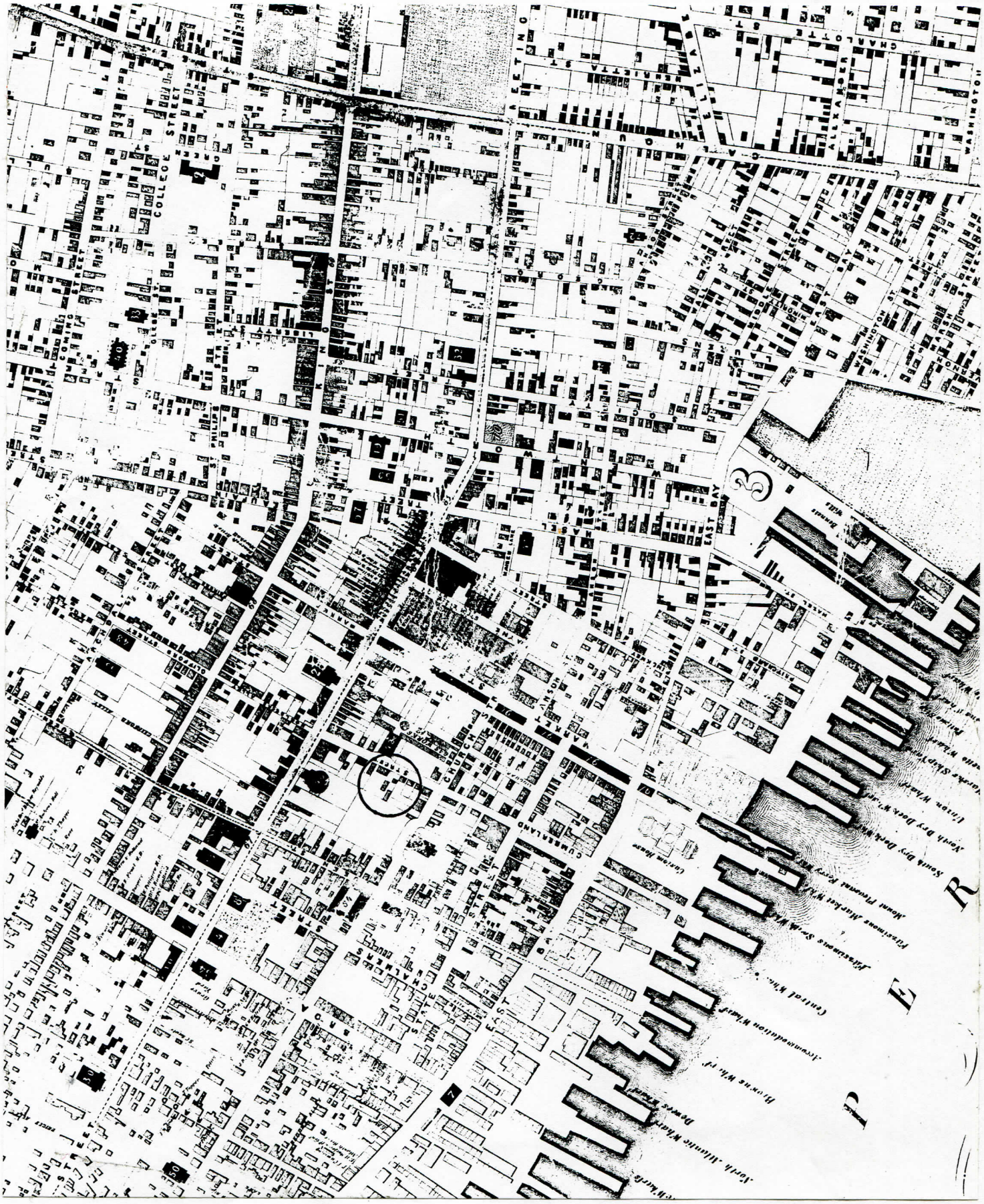


Figure 13

Portion of the 1852 Charleston map
The market stalls have replaced the creek to the north; the eastern half of the mazagine tract is now covered with buildings fronting Cumberland and Church streets; the single house is present behind the magazine.

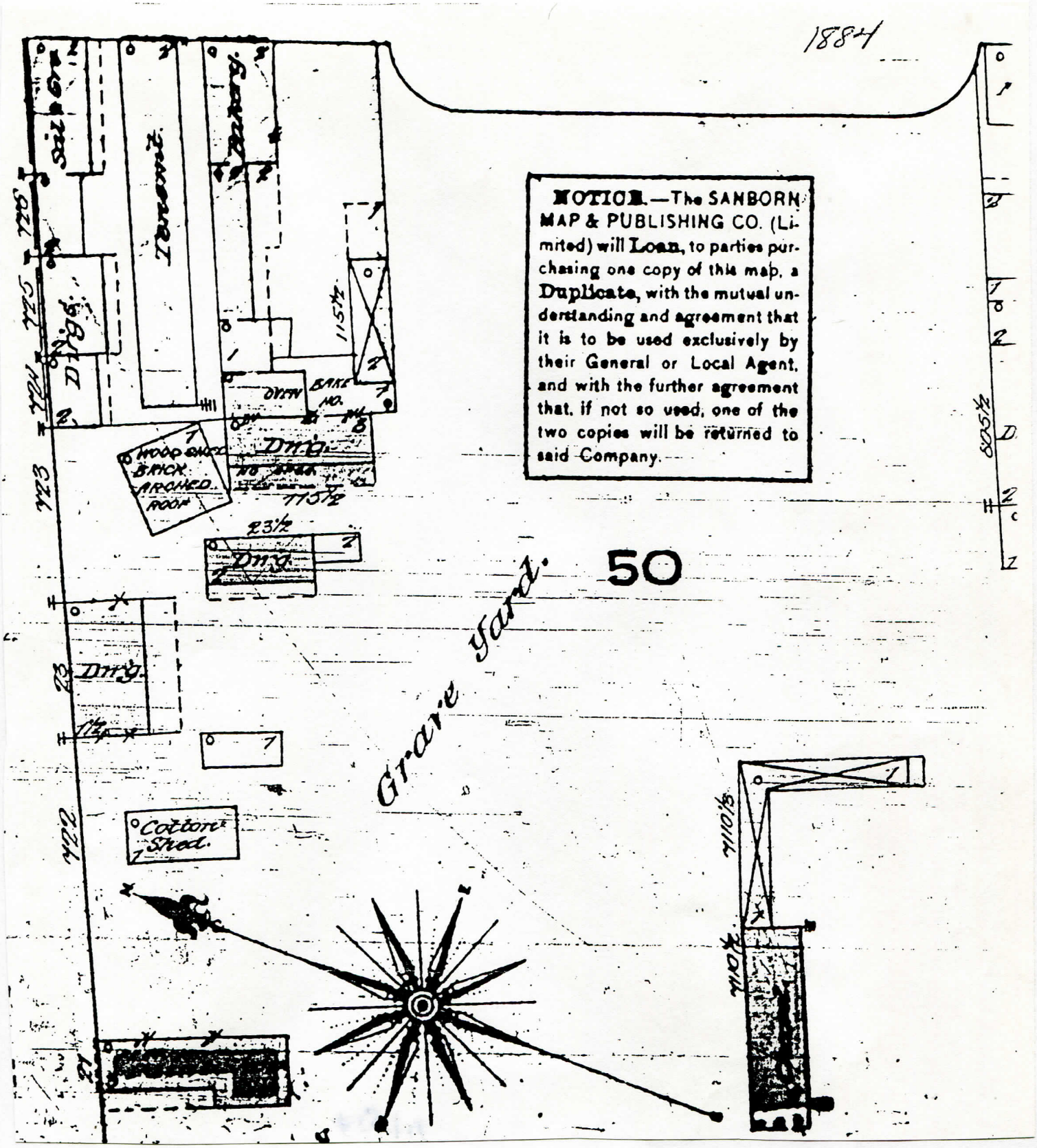


Figure 14

1884 Sanborn Fire Insurance Map
The powder magazine is listed as a "wood shed".

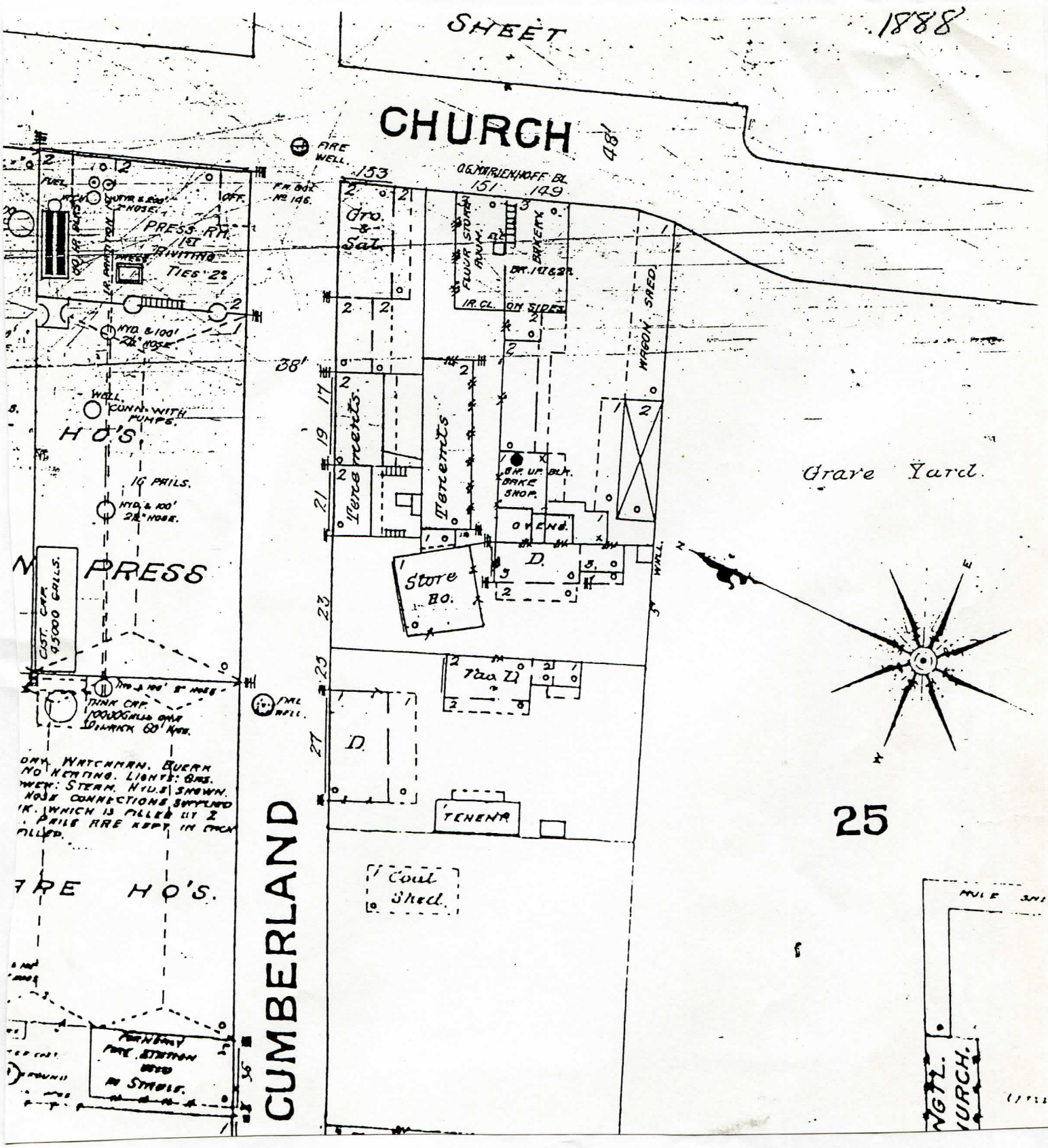


Figure 15

1888 Sanborn Fire Insurance Map
The magazine is listed as a "store house".

Figure 16

1880s photograph of the Magazine (courtesy The Charleston Museum)
The large crack from the earthquake is visible; the front yard is subdivided, and the property is surrounded by a high wooden fence. The Cumberland Street tenements and the Church street bakeries are visible in the left side of the photo.

were not yet visible to antebellum residents, however; during this period the city launched many improvement efforts, embodied in its public architecture (Severens 1988:267).

Though Charleston's economy was irrevocably linked to cash crops and the plantation system, progressive citizens encouraged diversification and industrialization. Many of these enterprises were located in Charleston's burgeoning suburbs on the Neck. The two antebellum railroads, the South Carolina Railroad and the Northeast Railroad, were built between King and Meeting Streets, and along East Bay Street, respectively. Open spaces, lower real estate values, relaxed building codes, as well as the railways, attracted large-scale manufacturing enterprises. In less than half a century, the Neck was transformed from the "country" to the center of Charleston's industrial future. These efforts were ultimately unsuccessful, however, as Charleston failed to live up to its proclaimed dedication to modernization. An increasing fear of the black population and perceived threats from northern states drove Charlestonians to embrace the past and ultimately be bypassed by the expanding rail network. Personal, rather than institutional, ties remained the fabric of Charleston's commerce (Pease and Pease 1985:223-224).

In Charleston, slavery was synonymous with labor. Most slaves were field hands, laborers, servants, or porters, but on plantations and in the city some served as coopers, blacksmiths, brickmakers, wheelwrights, carpenters, seamstresses, barbers, fishermen, pastry cooks, and in many other skilled occupations. Owners routinely "hired out" their slave artisans. A few won their freedom by buying it; masters "manumitted" others, especially house servants, in recognition of special services or in response to sometimes familial affection. The emerging class referred to as "free persons of color" congregated in Charleston. All social and ethnic classes lived side by side in the 18th and 19th century city.

The widespread employment of slaves in a variety of services for one's master and others prevented any real development of the mechanic arts among whites. The phychological conflict in white and black artisans competing for, and performing, identical tasks led to a deep aversion between the two groups. Many artisans came to scorn their work and hired out or bought slaves to carry on their business (Nevins 1947:491; Starobin 1970; Wade 1964). Others migrated to northern states where wages were lower but their social status higher (Sellers 1970:103). The resulting dependence on slave labor proved detrimental to the technological and industrial development of Carolina. In a situation where labor intensive methods were often not merely feasable but actually desirable, there was a disincentive to modernize the agricultural sector. Industry suffered from the same handicap, with the result that the South in general lagged significantly behind other areas in manufacturing techniques and results. Thus the withdrawal of mercantilistic laws following the Revolution, which had governed the productive capabilities of the colonies, had little effect on the economy of Charleston. Instead, the city continued to rely heavily on raw materials, at this point primarily agricultural, for its prosperity. The development of Charleston as a social center had stabilized its urban economy but offered few opportunities for expansion. The economic well-being of the town depended on the monetary success of the country society for which it was the center (Powers 1972:15).

By the middle of the antebellum period, most American cities were showing the effects of industrialization. Urban environments underwent radical changes between 1820 and 1860, as a national economy replaced local and regional economies (Goldfield 1977:52). Industrialized cities began to replace chaos with order; they featured a central business district, and functional differentiation in the use of space (separate areas for industries, businesses, and residences), innovations in intra-city transportation (the introduction of horse cars), rapid in-migration (Charleston became the terminus of German and Irish immigrants), increased specialization among the mercantile class, and centralized improvements (street paving, sidewalks, lighting, drainage). Some cities moved faster in these directions than others. During the early years of the industrial movement, Charleston kept pace with the rest of the country; by the end of the 19th century, however, the city lagged behind other commercial centers in many areas of development.

Physical improvments and services ultimately determined whether or not cities would attract new businesses and residents. Basic services such as fire fighting, police protection, water, lighting, and disease prevention were necessary if a city was to grow or prosper. Few visitors or customers would be attracted to a fire-prone, disease-ridden city (Goldfield 1977:67). The safe and efficient movement of people and goods depended on road improvement and street lighting. Lighting of the major thoroughfares, including Meeting, first by oil and later by gas, was a top priority. By 1837, the lower city contained 1,722 lamps, maintained by private contract. After 1848, the Charleston Gas Light Company serviced the streets with gas lighting. This modern amenity soon followed in many of the well-to-do homes.

Civic improvements were small protection from the natural disasters that ravaged the city with frightening regularity throughout its history. Recovery and rebuilding from hurricanes, fires, tornados, and even earthquakes all shaped the city. Situated on a narrow peninsula, traversed by marshes and creeks, this low-lying area was surrounded by the sea, and vulnerable to sickness and floods. The city's residents spent time on Sullivan's Island, in the pine flats, and in the mountains, hoping that the breezes would cure the lowcountry's many diseases. These efforts to guard against infection proved ineffective, as did efforts to protect the city from the ravages of ocean-bourne storms. The city's lack of elevation made it vulnerable to flooding during the many hurricanes, and the floodwaters rushed up the numerous creeks. Debris and wreckage gradually filled these areas and transformed the city's terrain, but storms continued to plague the city and leave their mark on the town's architecture (Calhoun 1983:2).

Though the fires which gutted major sections of the city in the colonial and antebellum periods indirectly offered opportunties for urban planning and improvements, these plans were only sometimes realized. Fear of fire and attempts to prevent it are a major theme in Charleston's history. Major fires devastated the city in 1740, 1778, 1796, 1835, 1838, and 1861. Crowded streets filled with wooden buildings were seen as a major source of trouble, and legislative attempts to end building with wood appeared after each disaster. Within a few years, however, enforcement of these restrictions lapsed; a notable exception is the almost exclusively brick suburb of Ansonborough, rebuilt after the 1838 fire. Fires struck the city year after year, and produced in the citizenry a paranoia concerning arson, inevitably focused on the slave population (Pease and Pease 1978).

One of Charleston's most devastating, and its most unusual, natural disasters was the earthquake of 1886. This quake, centered in Summerville, was felt as far away as Boston and Chicago. There had been warnings all summer in the form of small tremors, but these had attracted little notice. A "decided shock" had been felt in Summerville on August 27 and August 28, but only the second was noted in downtown Charleston. The afternoon of August 31 was unusually sultry and quiet; at 9:50 p.m.,

> "there was suddenly heard a rushing, roaring sound compared by some to a train of cars at no great distance, by others to a clatter produced by two or more omnibuses moving at a rapid rate over a paved street; by others to an escape from a steam boiler. It was followed immediately by a thumping and beating of the earth underneath the houses, which rocked and swayed to and fro. Furniture was violently moved and dashed to the floor...and every moveable thing was thrown into extraordinary convulsions. The greatest intensity of the shock is considered to have been during the first half, and it was probably then, during the period of greatest sway, that so many chimneys were broken off at the junction with the roof." (Dr. Gabriel Manigault, quoted in Stockton 1986:20).

Though its arrival at night made the quake even more terrifying, the lateness of the hour probably saved many lives. Still, panicked Charlestonians rushed from the quaking buildings to the street, with many injuries and deaths resulting. Most citizens spent the rest of the night in city parks and other open areas. By dawn's light, many hastened indoors and dresssed quickly, but,

> "Exactly at 8:25 a.m. came another of those dreadful premonitory growns which betokened the approach of another wave...After this the whole city once more took to the open, and the public parks and squares and vacant lots, as well as the street corners were soon occupied... Tents of bed sheets and awnings were improvised..." (News and Courier September 3, 1886, quoted in Stockton 1986:35).

The otherwise impervious powder magazine suffered a good bit of damage after the quake (see figure 16). Though architects have determined that the large, stylistically unusual "earthquake bolts" in th powder magazine are earlier, damage from the quake was nonetheless profound. Most noticable was a large crack in the front gable over the door. A photograph taken after the earthquake (figure 16) shows a decrepit, rather neglected–looking building; other documents suggest that the building remained vacant after the quake (Powder Magazine files, SCHS).

In his detailed study of the Charleston earthquake, Robert Stockton (1986) has noted that the greatest damage occurred to buildings constructed on "made land", the areas of former marsh filled to create real estate. An ironic consequence of the earthquake was a new–found dislike and distrust of brick buildings, which had fared less well than those of wood. State and local regulations which had prohibited the erection of wooden buildings in certain parts of the city were amended to reduce these restrictions (Stockton 1986:92) Many of the damaged buildings were repaired with earthquake bolts, long iron rods placed through the building to pull walls together. Controversial at the time, this innovative method of architectural repair has become part of Charleston's historic lore; architect Robert Stockton notes that while most of such repaired

buildings still stand, they have not been tested by another quake (1986:96).

The earthquake was only one of many disasters which marked the late 19th century. Though the 1861 fire had dealt a much harsher physical blow to the city, the Civil War dealt the final economic blow. The city's economy, dependent on the cotton market, became vulnerable to international market fluctuations. While the prosperity of Charleston was irrevocably linked to that of the agrarian system it served, the success of railroads and steam elsewhere exacerbated the city's economic recession and encouraged the growth of rivals. By the 1850s, Charleston's dreams of civic destiny were waning (Severens 1988:265). The cotton economy was a credit economy, and this, coupled with the loss of the labor force following emancipation, forced a new order of things (Rosengarten 1986).

After the War, Charlestonians returned to the city, patched their houses, and made do. The antebellum fixation on cotton and rice production was followed by economic collapse, and a loss of the enslaved labor force. The phosphate boom of the 1870s provided only temporary relief to the city's economic stagnation (Shick and Doyle 1985). And a series of natural disasters following the earthquake struck devastating blows. Particularly, a number of hurricanes struck the South Carolina coast between 1893 and 1911, decimating the rice dikes and leading to the death of commercial rice production in 1927. By the early 20th century, Charleston's Board of Health was demanding municipal improvements; this time it was lack of funds, rather than lack of interest, that kept Charleston's civic leaders from moving ahead.

The economic stagnation of the late 19th century was reflected in a lack of construction. The old houses and buildings remained, and most gradually decayed. The descendants of colonial power brokers lived in 'genteel' poverty, shared their townhouses with boarders and tourists, and seemed complacent in their lack of change. But it was the threat of destruction of perceived architectural and historical treasures such as the powder magazine, the Heyward–Washington houe, and the Joseph Manigault house, that gave birth to the preservation movement early in the 20th century.

Though for years he had preserved it as "an interesting relic of the past" (figure 17), in 1897, owner Gabriel Manigault felt that "the time has come when the Magazine must be removed altogether". The response to Dr. Manigault's suggested demolition was the first effort in Charleston to preserve a historic building (News and Courier 1897). In 1902 the South Carolina chapter of the National Society for Colonial Dames purchased the building; they restored it and used it as their headquarters and later as a museum (figure 18). Throughout the 20th century, the magazine was much celebrated as a tourist destination, and a symbol of patriotism. The 1942 Sanborn map reflects this new function (figure 19). The Dames also purchased the single house behind the magazine, and connected the two with an adjoining hallway. By this time the tenements next door had been razed, replaced by a large two–story brick commercial structure, which further dwarfed the magazine (figure 20). By the 1940s, this had been removed, the outlines of the connecting tenements and bakery now visible in the walls of the single house ; they remain visible today (figure 21)

But the moisture problems that began in 1713 continued unabated to 1993. At that time, Historic Charleston Foundation acquired the building on long-term lease and embarked on an ambitious regimen of restoration, research, and reinterpretation. The building will reopen to the public, with new exhibits under a 40-year lease agreement.

Sitting rather incongruously among lofty church spires and modern parking garages, the powder magazine remains an almost single emblem of Charleston's Proprietary period, its styles and priorities. The role and value of the magazine has evolved with the city, and no doubt the magazine will continue to serve a symbolic function for the city in years to come.

HARPER'S WEEKLY.

A JOURNAL OF CIVILIZATION

VOL. IV.—No. 204.] NEW YORK, SATURDAY, NOVEMBER 24, 1860. [PRICE FIVE CENTS.

Entered according to Act of Congress, in the Year 1860, by Harper & Brothers, in the Clerk's Office of the District Court for the Southern District of New York.

SCENES IN CHARLESTON, S. C.

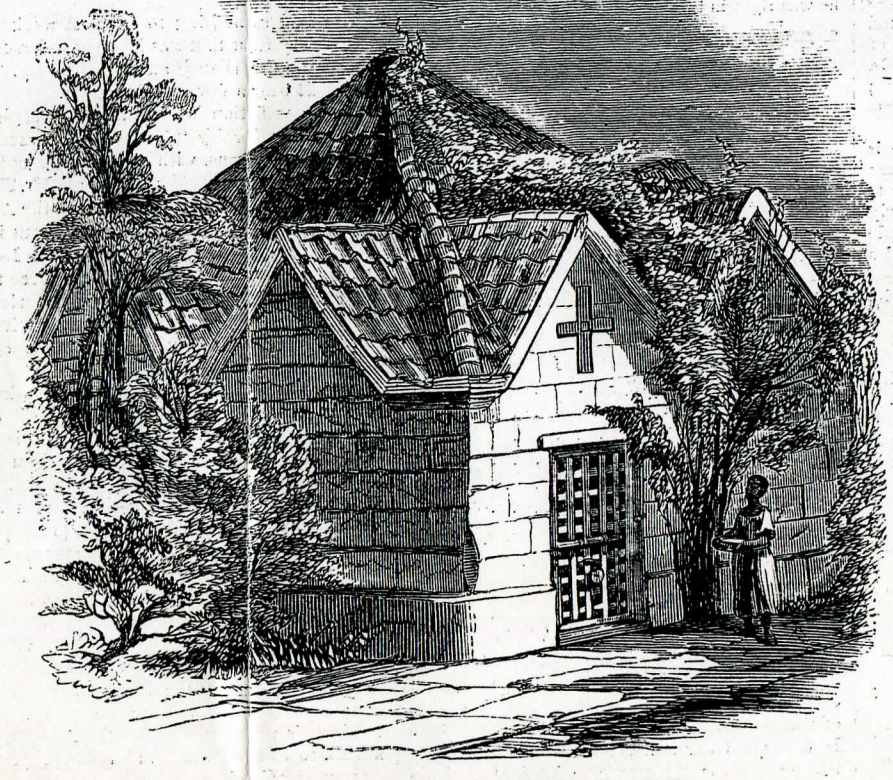
WE give herewith an engraving of the Tomb of Hon. JOHN C. CALHOUN, South Carolina's greatest statesman. The obelisk in the left of the picture is a Monument to the memory of ROBERT J. TRUMBULL, "the intrepid and successful asserter of the Rights of the States, author of the Address of the Convention to the People of South Carolina, and other able productions in support of Constitutional Liberty." He was born 14th January, 1774, and died 15th June, 1853.

We give also an engraving of the OLD POWDER MAGAZINE in Cumberland Street, Charleston—one of the relics of the Revolutionary War. Here, previous to the surrender of the city to the British, in 1780, powder was stowed to the amount of about 100,000 pounds. By order of the American general in command it was taken from this place before the surrender, and secretly walled up in the Custom-house vaults, where it remained safe from discovery during the time the enemy held the city.

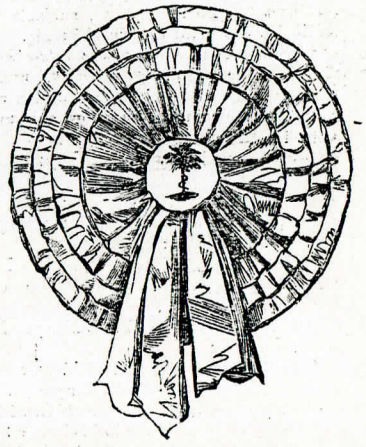
This relic of the past is still in good preservation, and is one of the most notable ancient buildings at present remaining in the city.

The reader will find also an engraving of the PALMETTO FLAG, which has been recently hoisted by vessels in the harbor, and in the streets of Charleston, during the secession excitement. And of the famous COCKADE worn by the citizens of South Carolina generally. The last is of blue silk, with a button in the centre, on which is represented a palmetto-tree.

THE PALMETTO FLAG.



THE OLD POWDER MAGAZINE, CUMBERLAND STREET.



THE PALMETTO COCKADE.

Figure 17

1863 View of the Powder Magazine, from Harper's Weekly Newspaper

Figure 18
Post Card Views of the Powder Magazine

a) c. 1902, before the Dames renovate the building; the landscape is similar to figure 16.
b) c. 1920 exterior view, showing the front yard garden and Revolutionary War cannon.
c) Interior view of magazine furnished for Dames' meeting room.
(Courtesy The Charleston Museum)

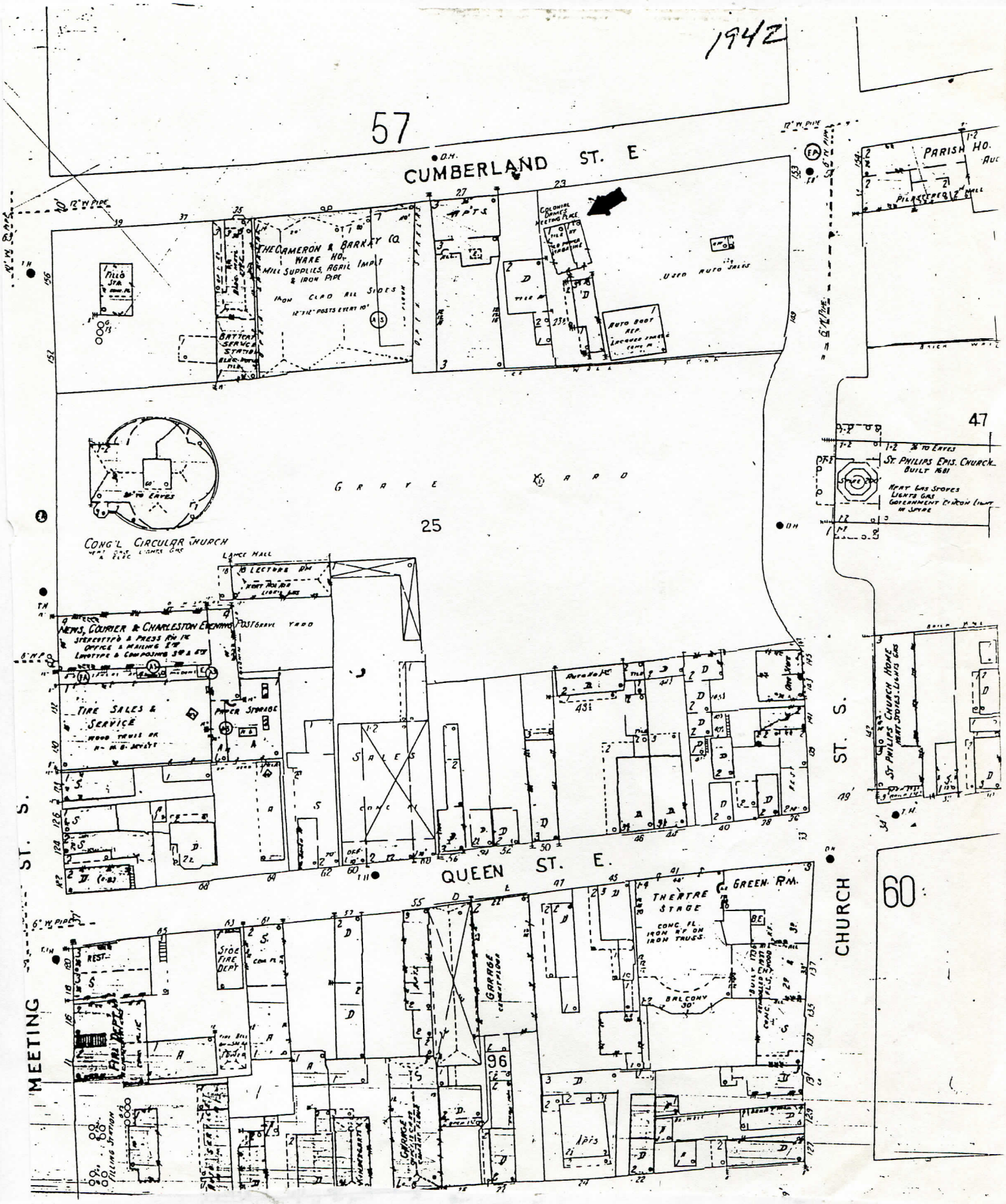


Figure 19

1942 Sanborn Fire Insurance Map
The magazine is listed as "Colonial Dames Meeting Place."

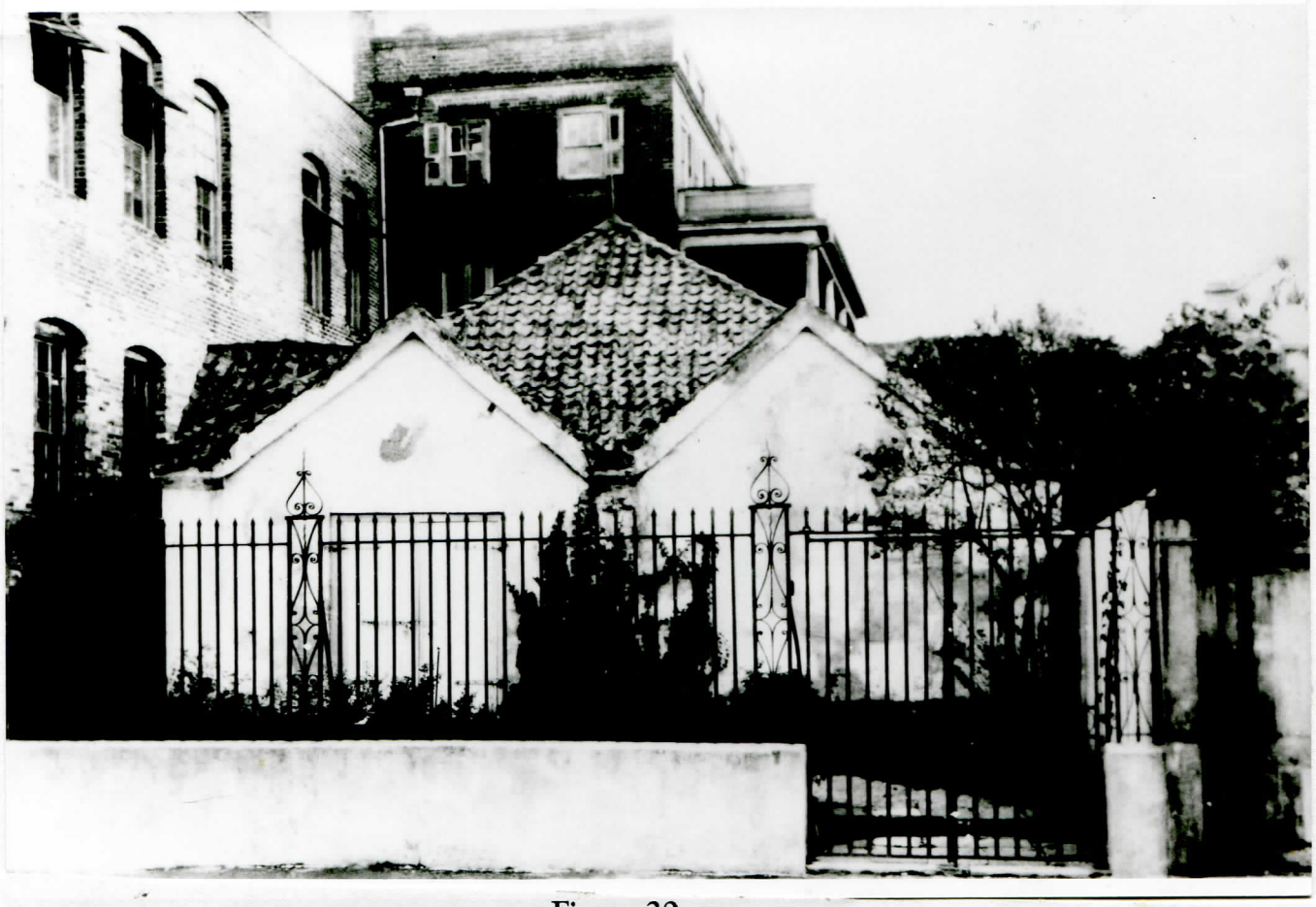


Figure 20
c.1930s photograph of the Magazine
The tenements and bakery have been replaced by a large two–story industrial building; the front yard has been landscaped and the wooden fence replaced.
(Collections of the South Carolina Historical Society)

Figure 21
c.1940s photograph of the Magazine
The two–story industrial building has been razed.
(Courtesy, The Charleston Museum)

CHAPTER III

Fieldwork

Site Description

The Powder Magazine is a low brick structure measuring 33 feet square on the exterior. When it was built in 1712, the northern portion of the frontier city was sparsely occupied. Thus the magazine was constructed on a large open lot just inside the city wall, oriented parallel with it. As the subsequent street grid did not follow the plane of the old city wall, the magazine sits today at a seemingly odd angle to Cumberland Street. So too has the original lot been truncated and the surrounding properties used for public buildings for a number of years, so that the magazine is now dwarfed by surrounding 19th and 20th century architecture. Further, very little of the yard remains for exploration.

The only open yard on the present magazine property is the current front, or north, side. This area measures roughly 30 by 36 feet, and is surrounded by a wrought iron fence with brick foundation. This fence features three gates along Cumberland Street. The fence is flush with the northwest corner of the magazine, and a narrow brick path, 6 feet wide, runs outside this front fence along the west side of the magazine to the c. 1840 single house behind it. This house is also the property of the Dames and serves as their headquarters. The western property line is secured with a chain link fence, which runs from the front of the adjacent building (known as the Trott house) to the street. Along the south side of the magazine, the basement of the single house is connected to the rear of the magazine by a one–story hall, entered by a door to the west. The connecting hall and the paved walkway leading to it effectively sealed the southern portion of the building exterior from excavation. The lot to the east is an asphalt paved parking lot (see figure 21); this property continues to the wall of the magazine. These obstructions left only the northern yard available for study.

The powder magazine is a solid, square building with a pyramidal roof and pairs of low brick gables breaking out on each of the four facedes. The resulting irregular roofline is covered with heavily patched pantile. The walls are 3.5 feet thick, and each of the four walls evidence two openings, many of which have been altered to a point of confusion. The east wall currently features two windows; the south wall a window and an altered doorway; the west wall a large doorway currently gated with heavy wrought iron, and the north wall with a modern door and an enclosed large opening. Currently, the northern door on the east side is used as the principal outside entrance, and the south opening adjoins the connecting hallway leading to the Dames' house. The west door with the wrought iron is secured with an interior glass door.

The interior of the magazine features groin vaults arising from a single central column and eight additional English bond piers. At the time the work began, the floor was covered with red

and black clay tiles, placed by the Dames in 1923. Other interior features included an antiquated baseboard heating system, humidifiers, and electric lights.

When work began in October 1993, the northern entrance to the magazine had served as the public entrance, and the front lawn was landscaped for visitor traffic. Two large Revolutionary War cannon are mounted on either side of the doorway; these remained in place throughout the project. The remainder of the front lawn featured a semicircular flagstone walkway from both gates to the entrance. This was set in concrete and edged in brick. The walkway was lined on both sides with holly bushes and the remaining area was lawn. Three flagpoles set in concrete highlighted the lawn area (figure 22). First order of business was removal of these features. The flagstone lifted fairly easily and was stacked inside the building. The holly bushes were removed and stacked alonside the wall; the cannon and flagpoles remained. These tasks were completed on the first day.

Excavation Methodology

The project was designed to investigate several architectural aspects of the property, as well as a series of broader issues. The project was large enough to allow for the exposure of broad areas across the site. The six weeks of field time was evenly divided between the building interior and exterior (figure 23).

Excavations began with the exterior. Within the framework of broad site coverage, we determined to excavate contiguous 5 foot squares which would bisect the front yard north/south and east/west, to provide continuous stratigraphic cross–sections. Inside, we determined to completely excavate the northwest quadrant of the building, plus contiguous units to the south and west, completely exposing the center column. This resulted in excavation of about 1/3 of the total interior space. It also left a broad passage of the current floor on the south and east sides, which facilitated visitor viewing and permitted flow of people and heavy items through the front door and front gate.

It seems that each urban site poses special physical challenges and opportunities, and the powder magazine was no exception. One of the biggest challenges was placement of backdirt. With the extensive excavations, the dirt pile soon became voluminous. And needed constant moving. The cannon provided further obstacles to excavation and movement on the site. For the exterior excavations, screening commenced behind the western cannon, in the southwest corner of the front yard. Screening also took place behind the eastern cannon. Soil from the exterior excavations was wheelbarrowed to these locations. Brick and mortar rubble from the screen, and directly from the excavation, was piled separately in front of the western gate (see figure 28a). When excavations moved to the interior, the soil was screened inside, and then the backdirt was periodically removed to the outside pile. Eventually, the dirt piles covered both cannon, to a height of 5 feet (figure 25). Plastic sheeting was placed on the wrought iron fence to the west to keep the dirt from falling through onto the sidewalk. Likewise, the rubble pile soon threatened to roll through the gate onto the sidewalk. Some of the midden samples were

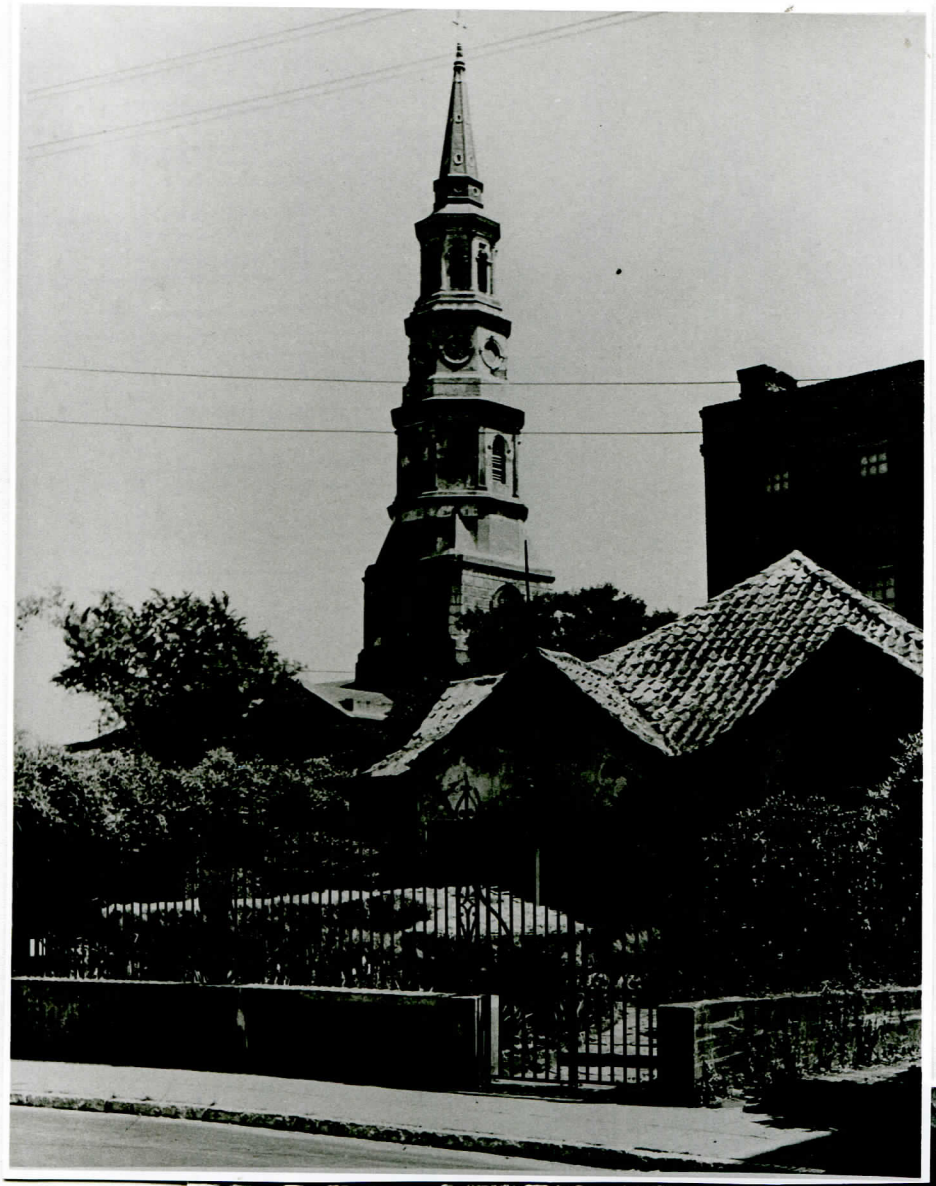


Figure 22
The Powder Magazine before excavation, with paved walk and hedge of boxwood.
(photo courtesy South Carolina Historical Society)

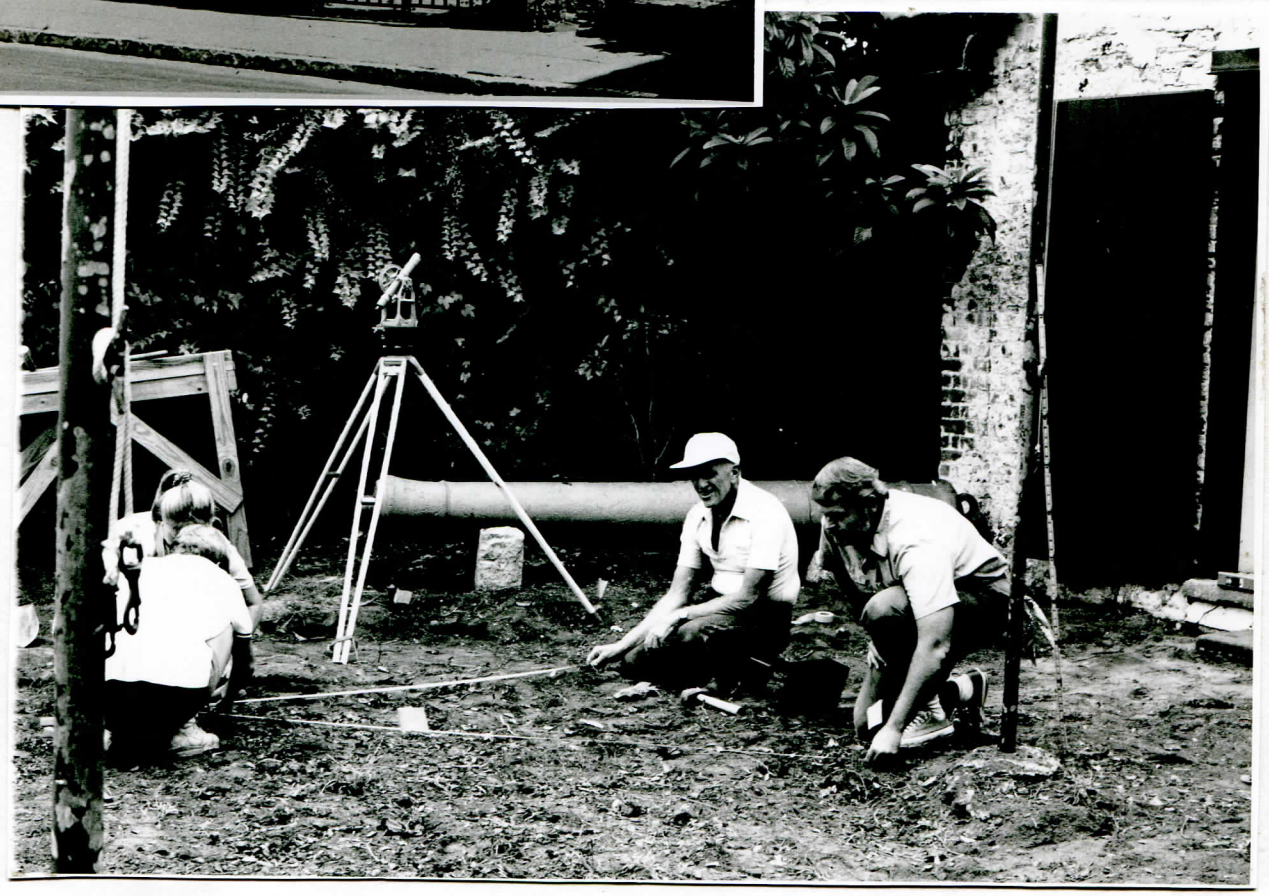


Figure 23
Laying in the grid after landscaping removal

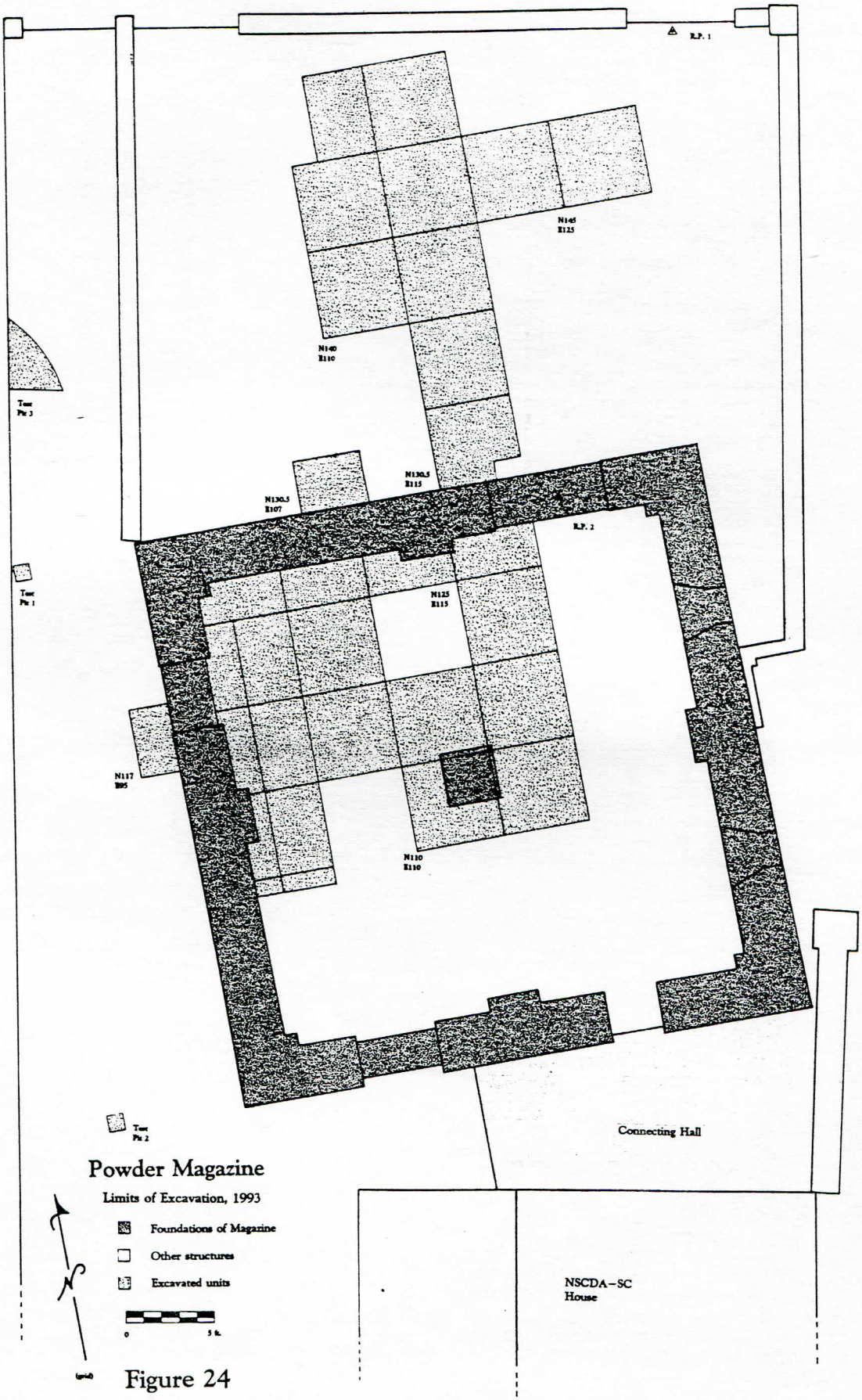

B.P. 1
N145
E125
N140
E110
Test
Pit 3
N130.5
E115
N130.5
E107
B.P. 2
Test
Pit 1
N125
E115
N117
E95
N110
E110
Test
Pit 2
Connecting Hall
Powder Magazine
Limits of Excavation, 1993
Foundations of Magazine
Other structures
Excavated units
0
5 ft.
NSCDA–SC
House

Figure 24

waterscreened in the northeast corner of the front yard, and the resulting mud runoff required special attention.

A further note on the backdirt: near the end of the project, it was determined that the excavations, both interior and exterior, would be left open for tours. Consequently, Historic Charleston Foundation decided to remove the backdirt from the site. This was accomplished the last days of the project by Mr. Ben Wilson and his crew of preservation craftsmen interns. In subsequent weeks it became apparent that leaving the exterior units open for tours was impractical. The plastic covering, however carefully placed, held rainwater, and this bred mosquitos and promoted weed growth. Trash was thrown in through the fence and landed in the plastic abyss. And, despite the creful covering, the units degraded and would require extensive cleaning and troweling before each presentation. The exterior units were therefore backfilled with imported sand in April 1994.

An additional logistical consideration – and opportunity – was the proximity of excavations to a very public street, and our ongoing work at a premier tour destination. We therefore had a steady stream of visitors – out of town tourists, school groups, carriage tours, local businesspeople, next door construction workers. We capitalized on this opportunity by preparing outdoor signage, and enlisting the aid of volunteer docents. These great people spoke to visitors about the ongoing work, and gave the archaeological crew and opportunity to work uninterrupted (figure 26).

Proximity to the public street was also an issue with the backdirt. The yard was higher than the sidewalk, and with any rain or water, mud ran onto the sidewalk creating a pedestrian hazard. Trenching and baulking minimized this problem, and we washed down the sidewalk or set up barricades around the muddy place, as necessary.

The interior excavations held special logistical considerations, as well. First was lighting, for working as well as photography. The use of a variety of artificial lights was made even more challenging by the highly compromised condition of the wiring. In the end, Ecktachrome film was substituted for kodachrome slide film to counteract the yellow tendencies in the photos. The low vaulted ceilings made use of the stadia rod difficult, while the slippery tile challenged the stability of the transit. The greatest challenge, however, was the settling and cracking of the central column following excavation in this vicinity and a flooding rain, which caused rising groundwater and erosion of underlying sands. The interior location, though, also held certain advantages. Excavations could continue irrespective of weather, a big plus in a rainy, cold fall. The equipment and artifacts were stored on site, as the building was very secure. And the interior excavations remained open and undisturbed for two years, facilitating numerous public and private tours of the building. The interior units were backfilled in the spring of 1996, as renovation of the structure began.

Generally, excavations at the powder magazine followed the standard field methods used on Charleston sites in the past decade. Horizontal and vertical control was maintained with transit and tapes, measuring in feet and tenths. The site presented special challenges to establishing an

Figure 25: Accumulating backdirt buries the cannon

Figure 26: Proximity to the sidewalk facilitated interpretation for visitors

overall site grid; small areas to work, odd angles, narrow openings, and solid tile paving across the building interior, a slippery surface that would not support the transit legs. On Charleston sites, grid north has traditionally paralleled a street frontage or lot line. At this site, orienting the grid to the magazine building seemed the best way to follow architectural details. The grid was 12 degrees west of magnetic north.

An imaginary grid point was established in the interior southwest corner of the structure, and was designated N100E100; however, establishment of the grid began on the building exterior, in relation to the exterior northeast corner of the structure. This alone presented special challenges, as the brick of the building is quite worn and presented no true corner. Tapes were used to establish a grid point 10.0 feet north of the corner. This then carried the grid coordinates N140E130, estimated and measured from the interior corner. From this point, the transit was used to establish points at 5 foot intervals north, south, and west. Units were triangulated with tapes from these grid points.

Vertical control was maintained with use of the transit. Two reference points were established for daily reference. R.P. 1 was established on the centerpoint of the easternmost front gate. R.P.2 was a mark (X) placed in the center of the front door jamb of the magazine building. Elevtions were taken on a daily basis in reference to one of the two points, primarily R.P.1. These two points were then measured in reference to the known elevations on the Ruscon construction site of St. Phillips church. The elevation point provided by Ruscon was accepted, as we could not check this independently.

All excavations were conducted by hand using shovels for zone deposits and trowels and other small tools for feature excavations. All materials were dry screened by hand through 1/4 inch mesh. The preferred screening method for Charleston sites is water screening, but this is messy and creates large mud puddles. The restricted size of the site and proximity to heavily traveled thoroughfares precluded water screening. Studies by both field archaeologists and zooarchaeologists such as Betsy Reitz have suggested that the screen size is a more critical sampling factor than is screening method.

Along with the cultural materials recovered from the screen, all faunal material was retained from each provenience. Oyster shell and charcoal samples were retained from most proveniences, as well. All of the architectural rubble remaining after screening was weighed, described, and discarded. In addition, samples of any architectural material encountered were retained. One quart soil samples were collected from a variety of proveniences, and 3–gallon flotation samples were retained from organically rich proveniences.

Field records included narrative notes and a variety of field forms. Planview and profile maps were prepared for each unit. An overall site map, showing the location of all features, was maintained. Photographs were taken of all work in progress in both black and white (Tmax 400) and color slides. Kodachrome 200 was used on outdoor shots; Ecktachrome Tungsten 160 film was used for interior shots.

Dating Techniques

All encountered archaeological deposits were dated on the basis of stratigraphic point of initiation and Terminus Post Quem. Terminus Post Quem, or TPQ, is the principal which states that no provenience can be deposited earlier than the invention date of the latest dating item in the provenience. A provenience can be deposited any time after that date; therefore, date of deposition is rarely the same as TPQ date.

Stratigraphic point of initiation is based on the Law of Superimposition, the geological principal that soil gradually accumulates on sites of human occupation. Therefore, the deepest deposit is the earliest, with deposits occurring later as one approaches the top of the ground. Relative dates are therefore assigned according to the profile map and the level of the top (or point of initiation) of each deposit. Thus the date of deposition assigned to each archaeological provenience is based on both techniques and is determined by considering each provenience relative to those around it.

On sites in Charleston where dispersed test units are excavated, additional emphasis is placed on recognizing stratigraphy, in terms of dating, depth, artifact content, and physical soil characteristics, across broad areas of the site. Following a determination of date of deposition for each provenience, appropriate temporal divisions are determined for a site. In Charleston, site assemblages may be subdivided temporally according to changes in site ownership or usage, general historical events within the city, or changes in technology. After the parameters for appropriate temporal subdivision are determined, each individual provenience is placed in the appropriate group. These temporal subdivisions then form the basis for discussion of artifact patterns (found in Chapter IV) and for intersite comparison (found in Chapter V).

In addition to these dating systems, a new absolute dating system was employed for the Powder Magazine proveniences. Dr. Douglas Frink has developed a procedure based on the biochemical degradation of organic carbon. This procedure, termed the "oxidizable carbon ratio" or OCR produces age estimates comparable to 14C age estimates. Frink notes (1994) that the interdependent dynamics of climate, biota, relief, parent material, and time affect the evolution of soils and archaeological materials within the soil. Chemical analysis of archaeological charcoal deposits demonstrate that charcoal is subject to environmental degradation, and changes through time. The OCR procedure describes this change by simple chemical carbon analyses to determine the ratio of total carbon to readily oxidizable carbon, and the environmental factors influencing the rate of biochemical degradation. In simple procedural terms, an OCR date is derived from small soil samples obtained from carefully controlled excavations.

This relatively new procedure was first applied to selected soil samples from the Nathaniel Russell house excavations (Zierden 1996), and 60% of the dates compared favorably with, or helped revise, those projected from archaeological data and historical documentation. Dr. Frink has cautioned that the complexities of urban formation affect the OCR process in as-yet undefined ways. Of particular concern are the "mixed" soils of builders trenches, those deeply-dug features that contain soil from at least two previously discrete layers, now mixed together.

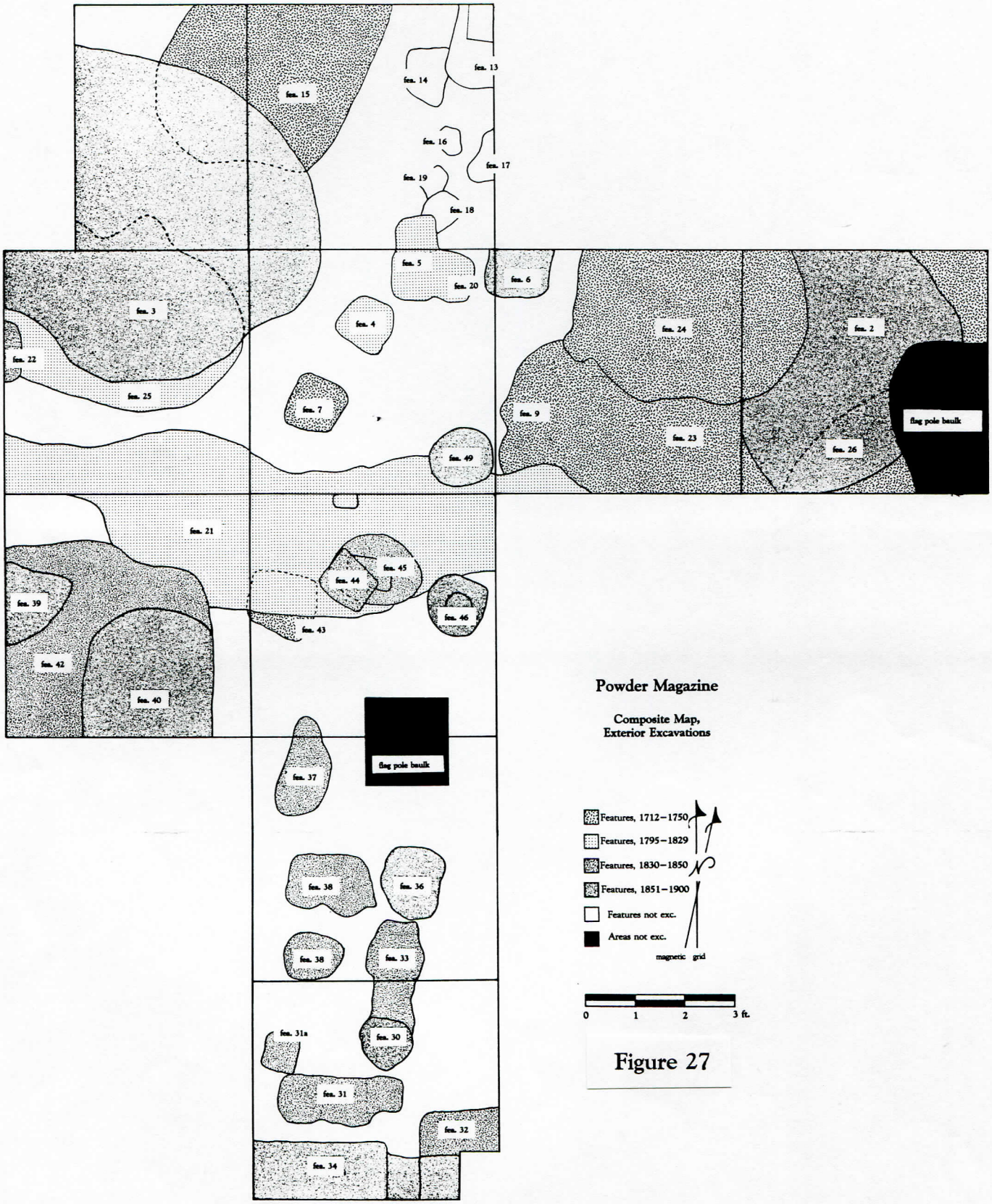
Nonetheless, the results from Russell were encouraging. Fourteen samples from the Powder Magazine project were submitted. Again, these were from a range of proveniences, spanning the temporal, functional, and physical limits of the site. Most compared favorably with the projected dates, though the range of difference was generally greater for the powder magazine samples. These dates are listed at the end of this chapter and in Appendix III.

Results of Excavations

Thirteen units were excavated on the building exterior (nine 5x5 and four smaller units) and fourteen on the interior (seven 5x5 and seven smaller units), for about 35% of the total site area. Excavations began on the building exterior, with unit N145E120, in roughly the center of the yard. From this point, contiguous units were excavated east to west along the N145 line, and north to south along the E115 line, to provide cross sections of the site. Other contiguous units were excavated to follow significant features (figure 27). Stratigraphy across the front yard was relatively homogenous, relatively shallow (for urban sites), and complicated by a large number of features which intruded into sterile subsoil (figure 28). Dates of deposition ranged from the early 18th through the early 20th centuries. For the remainder of this section, the overall stratigraphic sequence will be described for the block of units as a whole, followed by individual feature description on a unit–by–unit basis. This will be followed by an interpretive summary of the outdoor deposits. The reader is referred to figures 27 and 45, and table 1 for a listing of each of the units excavated and their contents by grid point.

Excavation of the first unit, N145E120, revealed two zone deposits that were contiguous across the site. Zone 1 was an imported black topsoil (10YR2/1), virtually devoid of artifacts and averaging .6 feet in depth. The soil appears to have been brought to the site for landscaping, considerably later than the 1902 purchase of the building by the Dames. After the first unit, this soil was discarded to the top of zone 2. Zone 2, also contiguous over the site, was a dark grey sand (10YR3/1) with quantities of architectural debris and cultural material, as well as coal. While the TPQ varied from unit to unit, overall stratigraphy indicated that this was a uniform deposition from the second half of the 19th century. One sample produced an OCR date of 1866. Sterile subsoil was encountered at about 1.5 feet below surface. A few of the features initiated at the top of zone 2; the majority were defined at its base (figure 29). With their tops truncated, TPQ was the principal tool used to date these; however, similarity of fill and shape were also considerations.

In many ways, the first unit (N145E120) was the most complex, as the upper zones were compromised by the presence of water pipes, and the features were large and superimposed, covering almost the entire unit. Zone 2 level 2 contained quantities of terra cotta roofing tile and red brick. Artifacts from all time periods were present in quantity. At 1.4 feet below surface, a water pipe was visible. The trench for the pipe, designated feature 1, was visible in the west profile but not in the east. Excavation of feature 1 then continued with removal of an additional level of soil. This revealed a second pipe to the east, and soil around and beneath the two pipes was excavated to .5 feet below the pipes as feature 1. At this point the soil became slightly lighter, and more significantly, the artifact content changed to larger fragments of mid–18th century material.



Powder Magazine

Composite Map,
Exterior Excavations

Features, 1712–1750
Features, 1795–1829
Features, 1830–1850
Features, 1851–1900
Features not exc.
Areas not exc.
magnetic grid

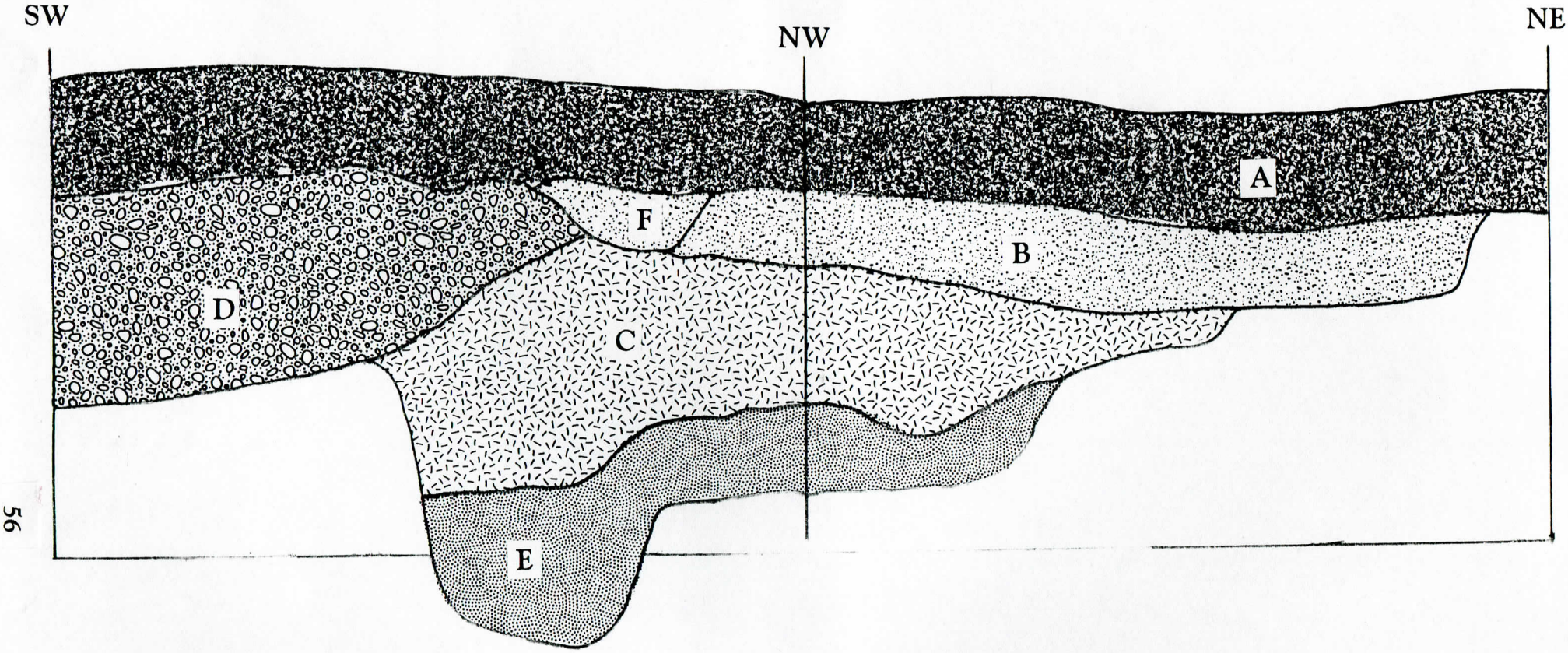
0 1 2 3 ft.

Figure 27

Figure 28a: Excavation of features in progress

Figure 28b: Aerial view of exterior block after excavation

Figure 29
N150E115, North and West Profiles



A – Zone 1; black topsoil
B – Zone 2; medium brown–grey sand with brick and mortar rubble
C – Feature 15 lev 1; medium tannish brown sand with sparse brick, tile, artifacts
D – Feature 3; highly mottled drk grey brown and gold sand
E – Feature 15 lev 2; medium tannish brown sand with heavy pantile and artifacts
F – Feature 48, pipetrench; medium grey–brown sand

It also appeared that sterile sand was visible at this point in the unit; this was surprising to us given the usually deeper nature of Charleston sites. In order to better assess the situation, two contiguous units were established to the east and west, and excavation commenced to the base of zone 2. Unit N145E115 revealed a relatively shallow zone 2, clearly visible sterile subsoil, and numerous small features intruding into it. It was at this point that the basic stratigraphy of the site was defined. Unit N145E125 was, in contrast, more complex, with zone 2 disturbed by a large rubble-filled pit from the late 19th century. This was designated feature 2. The unit was further compromised by a baulk for a flag pole, set in concrete, in the southeast corner. Feature 2 was a shallow pit of dark soil with an undulating bottom. The tan sand beneath this was excavated as zone 3, but it was more likely part of a poorly-defined feature. Three possible postholes, features 10, 11, and 12, were defined at the base of zone 2, but they may in fact be residual feature 2 (figure 30).

From this point, then, the discussion will abandon unit boundaries and discuss each of the features (1-49) separately and mostly consecutively. Where pertinent, discussion of associated features and strata of a particular unit are included. Following this, the features are grouped by temporal affiliation and function in an overall interpretive discussion.

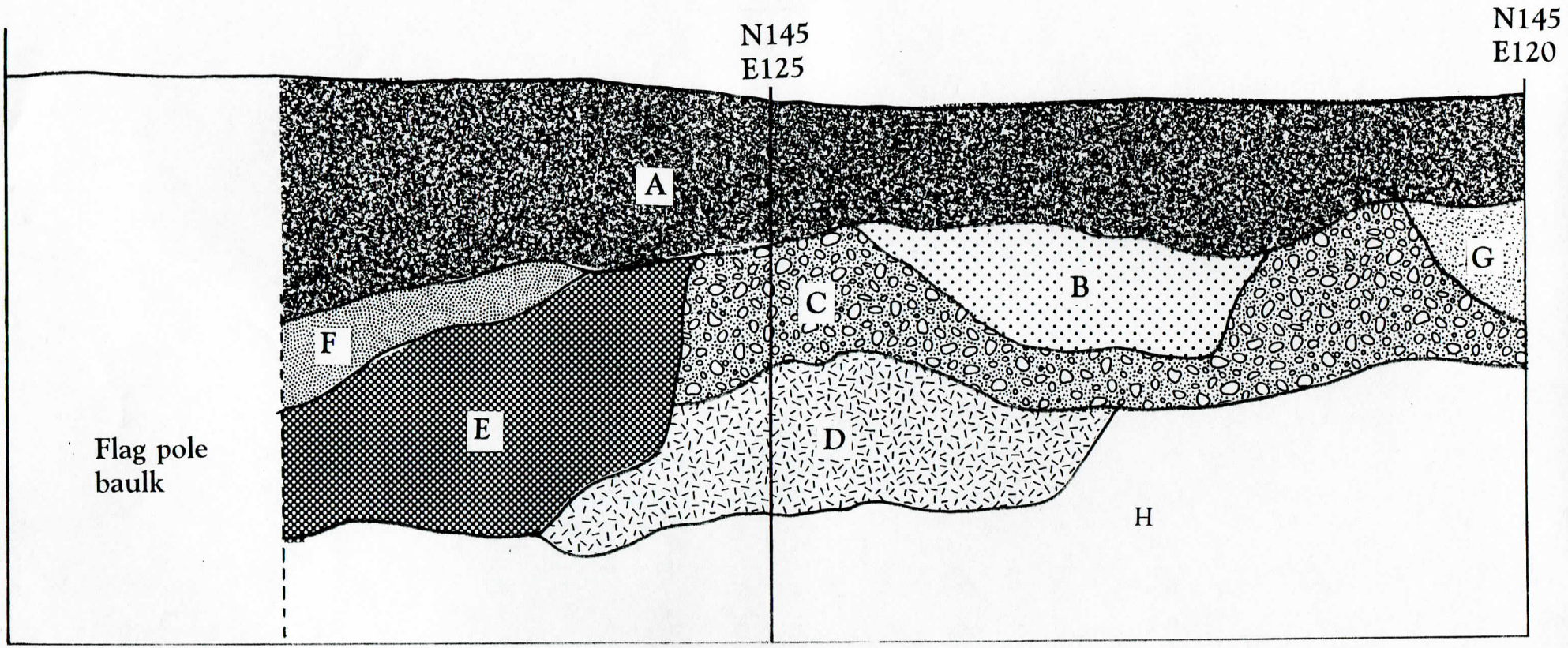
Feature 1, as previously discussed, was an early 20th century pipe trench; however, the feature had a TPQ of 1760. Thus, the artifacts were principally redeposits from the features below. The ill-defined feature was actually trenches for two pipes, laid at different times. The base of feature 1 was encountered 2.1' below surface (see figures 30 and 33).

Feature 2 was a large, roughly rounded pit of dark grey-brown sand with large brick fragments and terra cotta roof tiles. This large trash pit initiated at the top of zone 2, encompassing most of this zone in N145E125. The feature was a trash pit from the late 19th century, and contained tin cans, section of sheet (roofing?) tin, and a variety of debris. It had an uneven bottom, which was about 2.0 feet below surface. It was necessary to completely excavate this feature, to avoid contamination of earlier deposits; however, a portion of this feature remained in the baulk of the flag pole. Feature 2 had a TPQ of 1870, provided by milk glass (see figure 30).

Feature 3 was a very large, well-defined pit feature, first encountered in the northwest corner of N150E115. It was further exposed in N145E115, N145E110, and N150E115; the western edge was not encountered. This large pit thus measured at least 6 feet in diameter, and was two feet deep. The feature fill consisted of highly mottled yellow and dark grey-brown sand. The colors and characteristics of the soil would suggest that this feature actually initiated in, and contained soils from, zone 1, mixing topsoil with underlying sterile, but there was no profile evidence for this. Feature 3 was first defined in zone 2, and excavated in quadrants, according to the units. Artifacts in this feature were relatively sparse (per cubic foot of soil), and they dated to the mid-19th century, with a TPQ of 1851 from wire nails. This 19th century artifact assemblage supports the interpreted point of initiation in zone 2 (figure 31; see figures 29 and 39).

Features 4 through 7 were a series of square postholes encountered in N145E115. Feature 4 was roughly square, oriented at a 45 degree angle to the building. The fill of this feature was

Figure 30
N145E120, N145E125, South Profile



A – Zone 1; black topsoil
B – Feature 1; dark grey–brown sand with chunks of brick and coal
C – Feature 8; tan sand with concentrations of brick and white mortar
D – Feature 23; yellow/tan sand mottled with grey sand
E – Feature 26; mottled and swirled dark grey–brown and gold sand with heavy rubble
F – Feature 2; gold soil mottled with dark grey–brown sand
G – Zone 2; medium brown–grey sand with brick and mortar
H – golf sterile sand

a light grey sand; the feature exhibited straight sides and a rounded bottom, and was 1.1 feet deep. The posthole had a TPQ of 1795, provided by transfer printed pearlware. Comparable in date, but slightly different in terms of soil fill, was feature 5. Originally defined as a single possible post, upon excavation the feature proved to be a series of three superimposed postholes. The feature was, however, excavated as a single provenience. A fragment of transfer printed whiteware provided a TPQ of 1820. The shallowest of the three posts was .9 feet deep, and the deepest was 1.2 feet deep. Feature 5 was filled with slightly darker brown–grey soil mottled with gold sand, suggesting that it was a separate event from the filling of feature 5 (figure 32).

Feature 8 was an irregular, roughly linear area of medium tan sand with a concentration of brick and mortar. Originally defined as a narrow strip along the south wall of N145E115 (figure 30), it was ultimately combined with feature 21, which will be described in detail later.

Feature 9 was one of the earlier features on the site, and its defined limits were unclear. Feature 9 was an irregular, roughly circular area of highly mottled tan, brown, and dark grey sand. Like the adjacent mid–18th century features (23 and 24), feature 9 contained coal, brick, and roofing pantile. Unlike the adjacent feature 23, this deposit was relatively shallow with an undulating bottom, with a primarily tan sand fill. Feature 9 contained creamware, providing a TPQ of 1760 (figures 27 and 33).

Features 10, 11, and 12 were small, roughly rectangular areas at the base of feature 2. Each of these features, originally considered possible postholes, proved to be part of feature 2; they were filled with the same dark brown–grey sand. These, in turn, intruded into a deposit defined as zone 3; however, this light tan sand may be part of feature 24. Features 10 and 11 contained no artifacts; feature 12 contained creamware.

Features 13, 14, 16, 17, 18, and 19 were very small, irregular sand deposits in unit N150E115. Most were not excavated. Feature 13 was an irregular area of dark brown–grey sand; this proved to be the builders trench for the wrought iron supports from the front fence, a 20th century addition. The rest of the small features were not excavated (figure 27).

Feature 15 was one of three large mid–18th century deposits. This feature was filled with mottled tan and yellow sand. This deep feature (1.6 to 2.1 feet deep) actually contained two zones and was excavated in two separate layers. The homogenous sand fill of level 1 covered an uneven layer of granular grey–tan sand with brick, pantile, plaster, ceramics and bone. Feature 15 contained white saltglazed stoneware and creamware, suggesting a 1750s date of deposition. Feature 15 underlay zone 2, and was further truncated by the overlying feature 3 (see figures 31 and 34).

Feature 20 was one of the three postholes originally defined as feature 5. Each of these three were excavated separately; the easternmost, defined as feature 20, contained transfer printed pearlware (TPQ 1795), comparable to other postholes of feature 5. It could, however, be a feature which significantly predates the remaining two posts of feature 5.

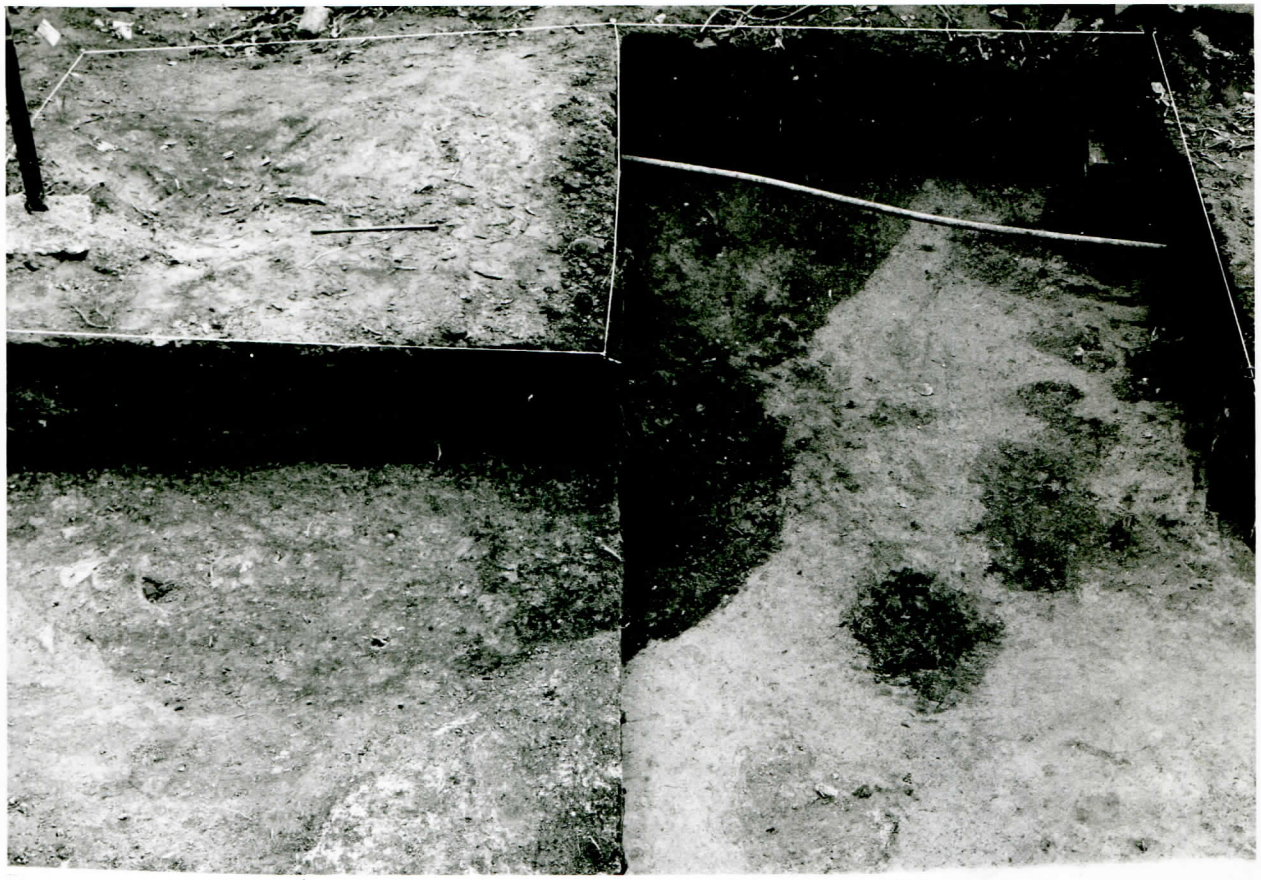


Figure 31: Feature 3 intruding into feature 15, before excavation

Figure 32: N145E115, features 4, 5, 6, 7, and 20 before excavation

Figure 33: N145E120, feature 24 excavation in progress

Figure 34: N150E115, figure 15 after excavation

Feature 21 was first defined in unit N145E110 as an irregularly shaped area of tan sand with mortar and brick rubble. When excavation of the contiguous units was completed, feature 21 was the same as feature 8, a roughly linear area of tan sand and brick rubble. Transfer printed pearlware provided a TPQ of 1795. Feature 21 has been tentatively interpreted as the remains of the surrounding brick wall indicated on the 1739 map (figure 8). No intact foundations were encountered, but the linear feature contained quantities of brick rubble and a few whole bricks; the feature is in an appropriate location and of the appropriate shape. It appears that this wall was either robbed or totally demolished in place, accounting for the irregular edges of the feature and the lack of intact brick. The dense rubble was fairly compact, and sloped upward toward the south, suggesting the wall was pushed over, or that the trench filled in toward the building. Feature 21 was encountered in N140E110, N145E110, N140E115, and N145E115. Though a very small portion of this feature was present in N145E120, the concentration of rubble was clearly visible in the south profile of the unit and in that of N145E125, supporting the tentative interpretation of this feature as a wall. Several later postholes intruded into feature 21 (figures 27, 30, 35, 36).

Feature 22, located in N145E110, was a small, roughly rectangular area of mottled grey–brown soil; only a small portion of this feature was visible in the west wall of the unit. It has been interpreted as a small pit or possibly a post. The feature fill contained red transfer printed whiteware, providing a TPQ of 1830. Feature 22 also intruded into feature 25, a c. 1800 deposit. Feature 22 initiated at the base of zone 1, and was 1.6 feet deep.

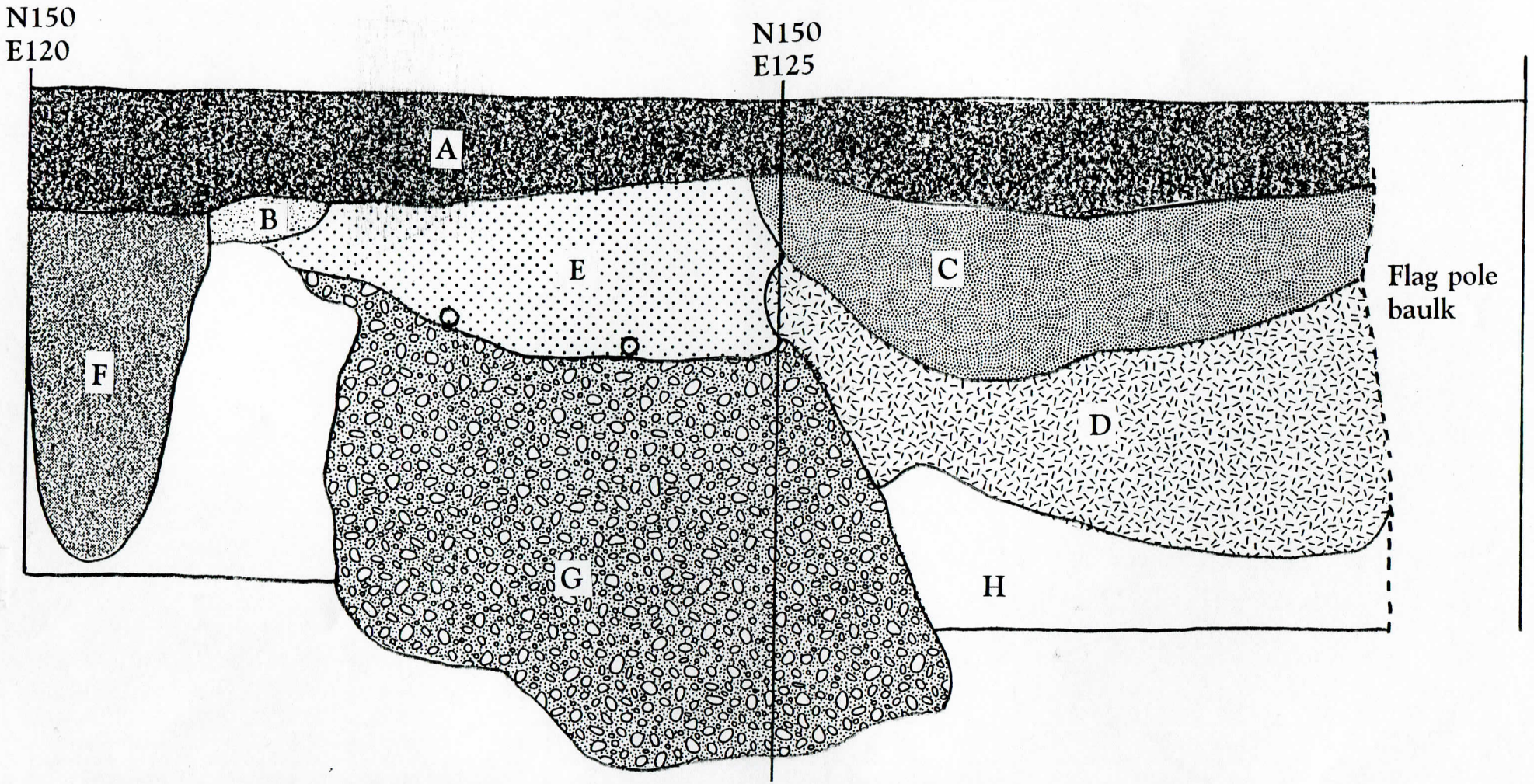
Feature 23 was the second of three large mid–18th century pits, located in N145E120. It was very difficult to define the true edges and shape of this feature, as its top had been truncated by a number of deposits, including features 1, 2, 8, and 26. Feature 24, a large pit of comparable age, further truncated feature 23, as did the limits of the 5 foot square. The excavated portion of feature 23 was 1.7 feet deep with an almost flat bottom. The shape of the sides was difficult to determine in the constricted space, but appeared to be gradually sloping. The majority of the artifacts appear to be from the first half of the 18th century. A few later materials were recovered; these have been interpreted as deposits from the overlying features (figure 37; see figure 33, 38).

Feature 24, apparently intrusive into feature 23, was the final large mid–18th century deposit, and the most distinctive. The top of the feature was disturbed by the pipe trenches defined as feature 1, but upon complete excavation of this intrusion, feature 24 was clearly visible as a large circular pit of dark grey soil, filled with oyster shell and heavy coal concentrations. Feature 24 was 2.8 feet deep and intruded into sterile clay subsoil. Feature 24 was excavated in four levels; however the homogeneity of the fill suggests it was a single event. Most interestingly, the pit had a vertical west side, but the eastern wall undercut the surrounding sterile clay, so that the pit was 2.8 feet wide at the top and 4.1 feet wide at the bottom. This anomalous shape necessitated excavation of a block of surrounding clay subsoil to clearly define the feature as excavations proceeded. Based on the unwritten field law that "features are never shaped like this" it was only because of the distinctive fill that we were able to follow the shape of this feature. In addition to coal and oyster, the pit contained quantities of architectural refuse, particularly terra

Figure 35: N145E120, south profile showing brick rubble concentration in feature 8/feature 21

Figure 36: N140E115, east profile showing slope of feature 21

Figure 37
N145E120, N145E125, north profile



A – Zone 1; black topsoil
B – Zone 2; medium brown–grey sand with brick and mortar rubbler
C – Feature 2; gold soil mottled with dark grey–brown sand
D – Feature 23; yellow/tan sand mottled with grey sand
E – Feature 1; dark grey–brown sand with chunks of brick and coal
F – Feature 6; dark grey–brown sand with some gold mottling
G – Feature 24; dark grey soil with heavy oyster and coal concentration
H – gold sterile sand

cotta pantile. Of particular significance is the fact that these three colonial features – 15, 23, and 24 – contained this pantile exclusively. It was not found in other deposits. This will be discussed further in the interpretations (figures 37 and 38).

Feature 25 was another large pit, this one deposited a half century later. This pit of tan and yellow sand was located in the northwest corner of N145E110; it measured 4.8 by 3.3 feet as contained within that unit. The feature was 2.5 feet deep, and the majority of the top of the feature was truncated by the overlying feature 3. Artifact content in the sand fill was relatively sparse. The feature was excavated in three levels; transfer printed pearlware provided a TPQ of 1795. A reconstructed creamware mug was recovered from the bottom of the deposit; stylistically it dates to c. 1800 (figure 39).

Feature 26 was one of the first features encountered, though it received a separate feature designation somewhat later, and one of the most enigmatic. It was located at the base of feature 2, and contained comparable soil. The edges of the above feature 2 were difficult to define, and this was further complicated by the baulk of the flag pole in this location. Feature 26 may be part of feature 2, but the south profile suggests some separation of the two, with the majority of feature 26 excavated as feature 2. They may be separate depositions in the same feature. The dates of deposition (after 1870) and artifact content are comparable. Feature 26 in turn intruded into the earlier features, 8 and 23 (figure 30).

Feature 27 was the first of the late 19th century features located adjacent to the magazine structure itself. Feature 27 was a thin, irregular deposit of medium tan–grey sand and mortar within the matrix of zone 2. This may be architectural residue from some type of repair. Feature 27 had a TPQ of 1780, provided by shell edged pearlware; however the underlying zone 2 level 2 contained red transfer printed whiteware, providing an overall TPQ of 1830.

Features 28 and 29 were comparable to feature 27 in location and stratigraphic position. Feature 28 was a small squarish pocket of crushed brick. Its precise function is unknown but it appears to be renovation or repair debris. It was located within feature 29, a circular area of black soil. Feature 28 contained undecorated whiteware, and feature 29 contained whiteware and rockingham. Given these artifacts and the stratigraphic position of features 27, 28 and 29, they may be related to repair of the building after the 1886 earthquake.

Several additional features were recognized beneath the remainder of zone 2 in this unit, N130E115. Features 30, 31, 33, and 36 were a series of square postholes. They all appeared to be of similar construction and date of deposition, and may reflect a series of internal fence posts, such as those shown on the late 19th century photo (figure 16). Each post was approximately one foot square and 1.3 to 1.6 feet deep. They featured straight sides and a flat bottom, and were filled with a mottled grey and brown sand. Feature 30 was clearly a replacement post that intruded into the southernmost of the two posts that comprised feature 33. All of the posts contained artifacts that would suggest depostion in the second half of the 19th century. Feature 30 contained white porcelain (TPQ 1851), the various sections of feature 31 contained brown transfer printed whiteware and annular whiteware (TPQ 1830), while feature 33 contained purple

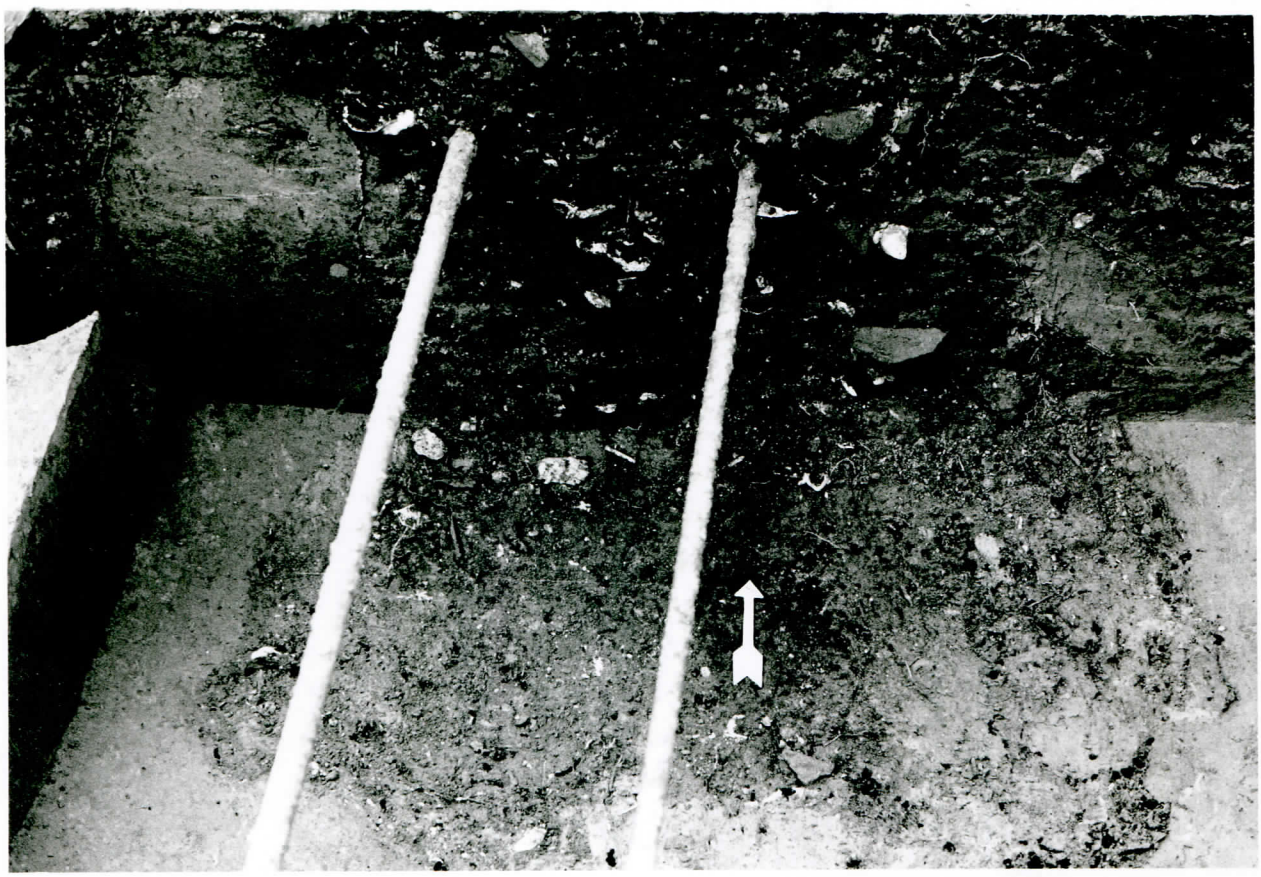


Figure 38: closeup of profile feature 24, top level 6

Figure 39: N150E115, west profile, showing stratigraphic position of feature 3, feature 25

transfer printed whiteware. Feature 36 may have been the last post in this group, containing gilded white porcelain (TPQ 1880–1890). An OCR date for feature 33 was 1874 (figure 40; see figure 27).

Features 32 and 34 were all builders trenches associated with the building exterior or the steps to the current front door. The deposits associated with these architectural features were difficult to decipher and define, and in the end proved to be evidence of post–1886 earthquake repair. Feature 34 was a linear area of dark grey–brown sand, 1.2 feet wide and adjacent to the north wall of the building. The feature appeared to be an original construction trench. It was further complicated by its interface with feature 32, an irregular area of mottled tan and grey sand adjacent to the step. Feature 32 was removed to reveal a squarish area of dark dirt and mortar adjacent to the step. Upon excavation this proved to be a trench for an iron water pipe, running parallel to the step.

Work then resumed on feature 34 which, because of its confusing nature, was ultimately excavated in four levels. This first level also contained some of the mottled soils of feature 32. Level 2 was dark dirt as well, and excavation of this revealed the spread footing for the foundation. An .8 foot wide portion of this foundation shelf was missing, however, and the linear builders trench was interrupted in this vicinity. There was also a concentration of half–bricks in this area. Excavation then commenced separately on the portions of the feature on either side. This excavation incrementally exposed more and more of the foundation itself. The missing portion of brick proved to be a rather large repaired crack in the foundation. When feature 34 was completely excavated, 1.4 feet below it point of inititation, there remained a small semicircular area of dark grey–brown sand and brick rubble. This deposit received a separate designation, Feature 41. This feature continued an additional 1.2 feet below its point of initiation, following the repaired foundation crack. Feature 41 contained white porcelain, providing a TPQ of 1851. This artifact content further supports a post–1886 date of repair (figures 41 and 42).

Features 37 and 38 were located in N135E115, adjacent to the line of postholes, features 30–36. These features, however, appeared more amorphous in shape. Feature 37 was rather shallow, and remained amorphous. Feature 38, in contrast, quickly resolved into two postholes, excavated separately. Feature 38a contained brown transfer printed whiteware (TPQ 1830), while feature 38b contained polychrome hand painted pearlware (TPQ 1780). The disparity in dates may indicate that A was a replacement for B some years later, or that the two may be much closer in age than the artifact content indicates.

Feature 39 was a small pit located in N140E110, and was a late 19th century feature initiating within zone 2. It intruded into zone 2 level 2 and feature 42. This small pit was 1.5 feet deep and filled with dark brown–grey sand mottled with orange sand, containing brick, mortar, and moderate amounts of coal. The pit also contained white porcelain and a yellow and brown transfer printed whiteware. This, plus the stratigraphic position suggests a late 19th century date of deposition (figure 43).

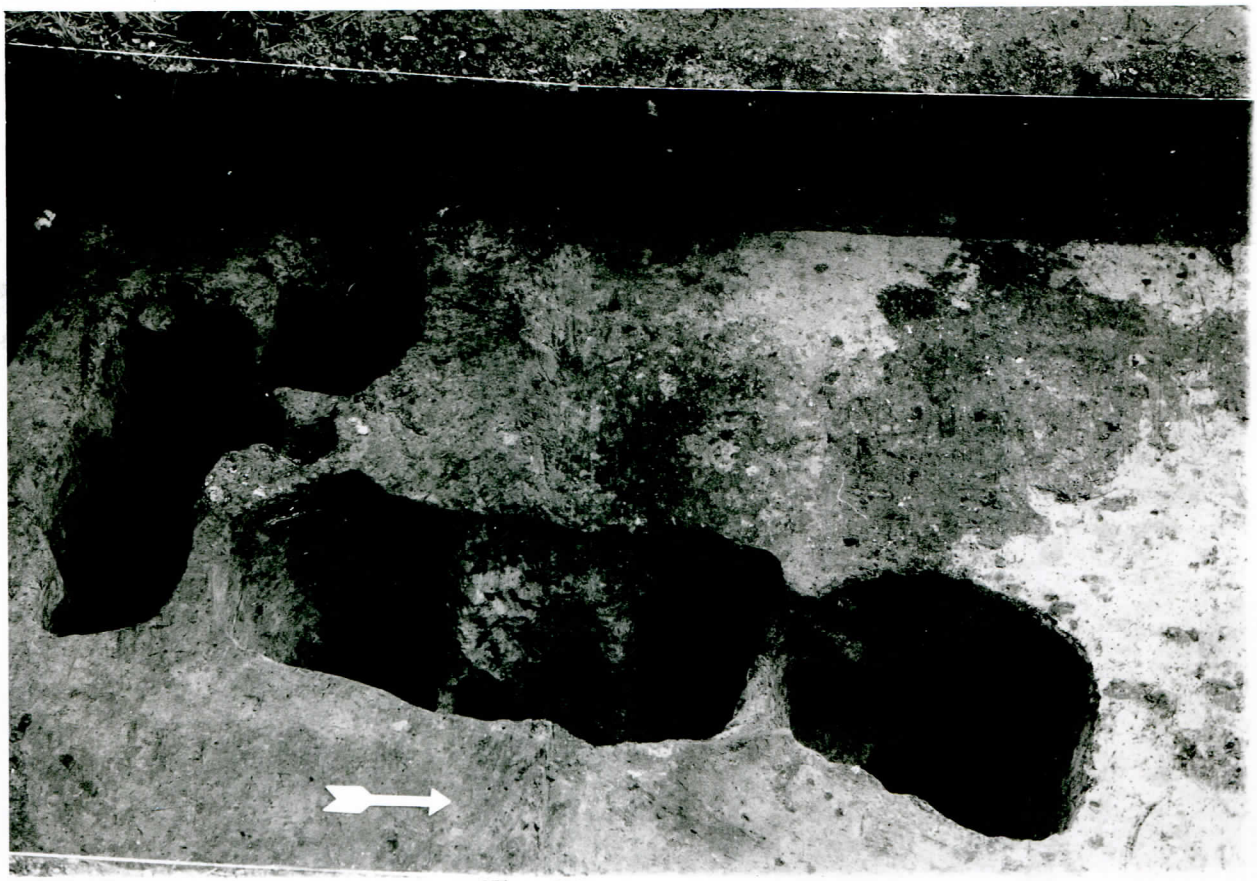


Figure 40: N130E115 and N135E115, features 30, 31, 33, 36 after excavation

Figure 41: Wall of magazine exposed in feature 34, showing repaired crack in foundation

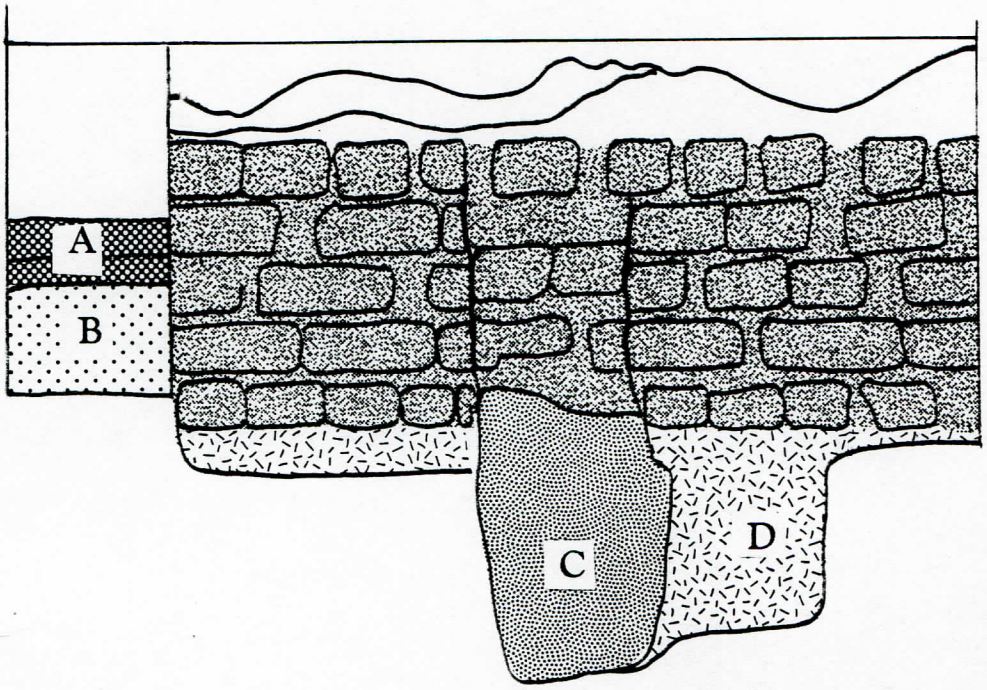


Figure 42
N130E115, South Profile

A – grey and brown mottled sand with brick
B – Feature 32; highly mottled gold, tan and grey–brown sand
C – Feature 41; friable grey sand with orange mottled sand and brick halves
D – Feature 41a; orange and yellow sand mottled with grey sand

Feature 40 was located in the same unit and also initiated at the base of zone 1. This circular pit was 2.0 feet deep and also intruded into feature 42. The pit was solid coal ash with a top cover layer of brown sand. Feature 40 contained a few artifacts, including a wire nail and transfer printed whiteware (figure 43).

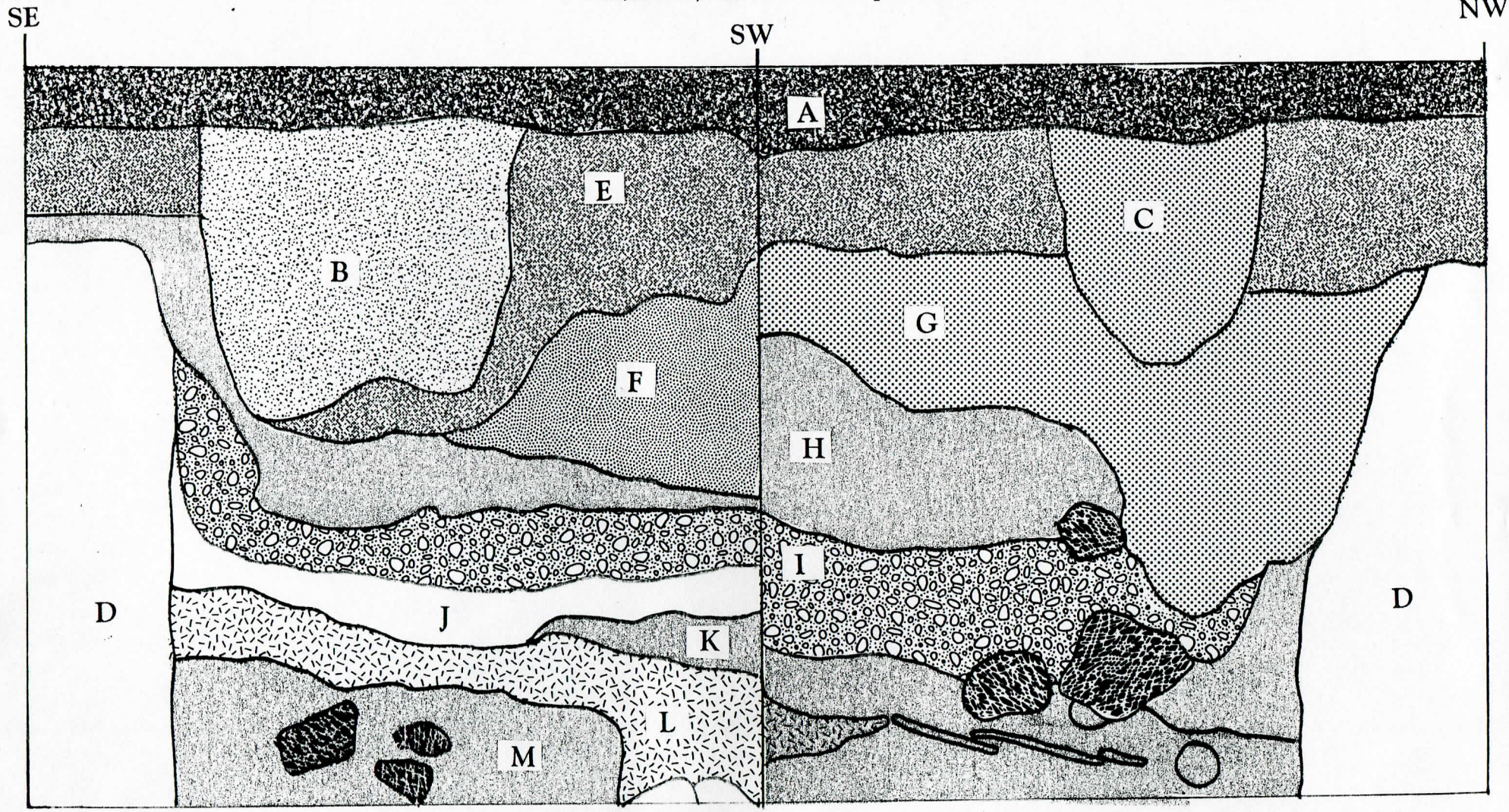
Features 39 and 40 were intrusive into the largest, deepest, and most complex feature encountered on site. Feature 42 was exposed in N140E110, intruding into the south and west walls. The exposed portion measured 4.1' by 4.2'. The portions contained in the three adjacent units, then, are of unknown size. Feature 42 was 4 feet deep, initiating 1.0 feet below the surface. It exhibited straight sides, sharp corners, and a flat bottom. The feature contained seven distinct zones and was excavated in ten separate levels. The exact function of the pit is unknown; several of the layers contained dense architectural rubble. It is possible that this large pit was deliberately dug to discard the architectural debris following renovation, or it could have previously existed for another purpose. Its size and shape suggest an unlined privy pit, for example; however the soil was not typical of privy fill, and an unlined pit would have been difficult to clean completely.

The upper levels of the feature contained areas of yellow sand and brown–grey sand mottled with orange, containing some coal. Below this was sections of medium grey–brown sand with brick chunks. Architectural rubble increased with the next deposit, a .7 foot layer of brick rubble and loose, crumbly white mortar. Beneath these levels of brick rubble, the brick content decreased and quantities of roofing slate appeared (excavated as level 8). The crushed mortar appeared to be clinging to all of the sides of the feature. More mortar was below the slate (excavated as level 9), except for the northwest coner, where a patch of dark grey–brown soil was visible. Beneath this mortar, and contained in the dark soil, was a concentrtion of large ceramics and glass. This final deposit, as much as 1.0 feet thick, was excavated as level 10.

Levels 8, 9, and 10 contained green transfer printed whiteware, blue transfer printed whiteware, and green glass bottles in a style consistent with an 1820s date of manufacture. The latest artifact in these layers was a green transfer printed plate, which initially appeared to be a late 19th century style but was dated to c. 1820–1830 by Ms. Ottilie Bentz (personal communication 1994).

The levels of soil above the rubble concentrations appear to be from the same time period. Beginning with level 1 and continuing through level 7, the levels contained undecorated whiteware, transfer printed whiteware, blue transfer printed whiteware, portobello ware, and transfer printed wares. All of these provide a TPQ of 1830. These consistent dates suggest that the feature was filled relatively quickly, perhaps in a few months. To test this idea, two physically separated levels were submitted for OCR dating. Level 5 produced a date of 1840; level 9 produced a date of 1851. Either could be correct, as the TPQ suggest tht the pit was filled after 1830 and some documentary evidence suggests it was filled before 1860 (figure 43, 44; see figure 17).

Figure 43
N140E110, south and west profiles



A – black topsoil; zone 1
B – solid coal ash with top cover of brown sand; feature 40
C – dark grey–brown sand mottled with orange; feature 39
D – gold sterile sand
Feature 42 deposits:
E – medium brown/grey sand with some mortar
F – yellow sand
G – brown–grey sand mottled with orange
H – medium grey–brown sand with large brick fragments
I – loose crumbly white mortar with bricks
J – orange clay
K – same as H
L – K mixed with I
M – medium grey–brown sand with brick chunks

Figure 44a
N140E110, feature 42 west profile

Figure 44b
feature 42, south profile

The final features encountered on the building exterior were all postholes, located in N140E115. Feature 43 was a shallow rectangular posthole, truncated by feature 21 which overlay it. Feature 43 was similar in size, soil content (tan and gold mottled soil with mortar), orientation, and probably age, to feature 7. Like feature 7, feature 43 did not contain any datable artifacts, and very few artifacts of any kind. This supports a suggested early date for these features; the inititation of feature 43 beneath feature 21 further supports this idea.

Features 44, 45, 46, 47, and 49 were all later posts, intrusive into feature 21. Feature 44 further intruded into feature 45, making feature 44 one of the latest in this group. This date of deposition was not reflected in the artifact content, as hand painted pearlware provided a TPQ of 1780. Feature 44 was rectangular and relatively shallow; its function is unknown. Feature 45 beneath it was a circular posthole with a square postmold stain, excavated separately as features 45a and 45b. Feature 45 in turn intruded into feature 46, also a round posthole with a distinctive post. Feature 45 contained annular pearlware (TPQ 1795) and black transfer printed whiteware (TPQ 1830). Feature 46 contained the latest artifacts, blue transfer printed whiteware, white porcelain, and a pink and blue decorated whiteware, suggesting a c.1900 date of deposition.

Like feature 44, feature 47 was a rectangular feature with no defined central post; further, it was rather shallow and so its function is not known. Feature 49 was another well preserved postmold-in-posthole; the center contained preserved wood. This feature was orignially defined as an 'area' and appeared rather amorphous in the top levels. Upon further excavation it proved to be well defined and quite deep. The feature contained white porcelain (TPQ 1851), again supporting at least a late 19th century date of deposition. Feature 48 was the designation given to a water pipe trench in unit N150E111.5.

After each of the contiguous units were opened, the features were excavated. The deepest levels of feature 42 were the final proveniences excavated. The entire exterior block was cleaned and photographed, both from the ground and from the powder magazine roof (figure 28). Profile maps were drawn, and some groups of features were re-mapped. This was particularly necessary for features 30-36, where amorphous oval stains proved to be clusters of two to three postholes. Finally, the exterior block was carefully covered with overlapping black plastic, designed to protect profiles and feature outlines, and to funnel rainwater to locations where it could be easily bailed.

Excavations then moved to the building interior, where stratigraphy was radically different but the artifacts the same. Again, the discussion will begin with excavation methodology and the reason for the choice of units. This is followed by a general description of the stratigraphy and then discussion of features.

The first, and in some ways the most difficult, task was to 'bring the grid inside'. The first step in the interior work was removal of the 20th century tile floor. These were removed with a concrete saw, and an underlying slag and gravel layer was removed and discarded as well. The underlying tan sand was designated zone 1 and was the top excavating surface. Under the advice of architects Phillips and Opperman and Historic Charleston Foundation staff, approximately one

third of the floor was removed, beginning in the northwest corner. This rectangular area completely exposed the northwest quadrant of the building, plus portions of three other quadrants, including the entire central column. It also left sections of flooring along the east and south walls, which effectively served as a place for visitors to view the building and the excavations (figure 45).

Bringing the grid inside was challenging. We began by setting the transit over the N140E120 nail outside. This nail was not originally established with the transet, but was triangulated from those that were; however, it was the best point available, given the space restrictions for setting up the transit and shooting through the front door. So the transit was set up, with one leg on the flag pole baulk. The transit was lined up on the N155E120 nail, and the barrel flipped. The continuation of this line into the building corresponded almost exactly to the edge of the removed paving, making it difficult to lay the grid. Due to the herringbone design of the floor, remnant concrete and sometimes pavers themselves remained in some places, and precluded placement of the nails. Further, the entrance and floor level was higher than the outside ground level, so the tape had to be held on an elevated level. With this system in place, pins were established at N120E120, and N115E120. From the N120E120 point, the transit was set up again, and turned to the west to establish additional points. From these points (N120E115, E110, E105, and E102), the remainder of the contiguous units on the building interior were triangulated.

Excavation began arbitrarily with N120E105. The tan sand exposed beneath the tile floor was designated zone 1; this was excavated with the shovel. This soil was filled with chips of dressed stone, including granite and marble. Many of these fragments had at least one polished side and often exhibited pencil markings. A variety of tools and other artifacts were recovered from the deposit, as well. Zone 1 was contiguous across the entire building interior, and appears to be an imported soil, possibly from a stoneworking location. Louis Nelson (formerly of Historic Charleston Foundation) has suggested that the source of this soil was the site of White's stoneyard, at the corner of Meeting and Cumberland streets. Alternately, it is possible that such an undocumented industry was in operation here.

Directly beneath zone 1 in unit N120E105 was a solid brick floor, laid in running bond that ran north/south. The bricks were large, hand made examples, though they do not match those of the building itself. The brick floor was designated Feature 50. Zone 1 in adjacent units was subsequently excavated, in attempt to delimit feature 50; N120E102, N115E105, and N115E102 were excavated, exposing an 8' by 10' area. Feature 50 was contiguous throughout the units (figure 46; see figure 45). Visible in the exposed area, however, were two narrow strips, linear areas .4' wide and 6' long, where bricks were absent. These may be area walls or floor joists, supporting dividing walls or some other type of internal superstructure. These two areas were designated Features 51 and 52. They also offered the first opportunity to excavate beneath feature 50 to determine its originality or age. Excavation of the top portion of the soil in feature 51 proved it to be remnant zone 1 to the base of the bricks. Here the underlying soil was a dark grey–brown, and contained bright red brick fragments, mortar fragments, and artifacts. This apparent midden soil clearly warranted further attention, so a small sample of the feature 50 brick, north of feature 51 and within N115E102, was removed. This sample area measured 2'

north/south by 3' east/west. It revealed that the feature 50 brick was set in a pad of yellow mortar. It also revealed that the dark midden soil was contiguous beneath feature 50 and so was designated zone 2. Zone 2 was .5 feet thick and contained brick and mortar, finish-coat plaster, creamware and pearlware. This, plus the yellow mortar pad soon demonstrated that feature 50 was a 19th century addition and that extensive 18th century evidence was preserved below it.

Beneath zone 2 was a narrow zone of hard-packed reddish-brown soil with small artifacts. This thin zone was designated zone 3, and dated to the first half of the 18th century. Below this were areas of white mortar, and a smooth hard-packed dark brown sand surface, containing some charcoal flecks but no artifacts. This was designated zone 4, and rather quickly changed to orange sterile sand. This basic stratigraphy continued over the western half of the building interior, as exposed during the current excavations (figures 47 and 48).

At this point, architects and Foundation staff were consulted, and it was determined to remove feature 50 in the units adjacent to the north and west walls of the building, to more fully explore the 18th century stratigraphy. This included N110E102, N115E102, N120E102, N125E102, and N125E105. Further, the E102 units were extended westward 1.5 feet to the interior walls. These 5' by 1.5' units were excavated separately as "west extensions" of their associated units (figure 45). Excavation of the western extension of N120E102 revealed an additional 20th century feature. There was a step of the black and red tile adjacent to the western door (the one that features the heavy iron grill work). This was designated Feature 57. This step was probably filled, and the floor made level, at the time that the interior plexiglass door was installed.

With this interior fill removed, excavation of the eighteenth century stratigraphy in these units commenced. Beneath zones 2 and 3, it was discovered that certain areas were paved with patches of poured mortar and areas of scrap brick. In these paved areas, the thin hard-packed zone 3 was found clinging to the brick (figure 49). The brick and mortar paving, designated Feature 56, was located in N120E102, adjacent to the western door, and in more damaged condition in N125E105. It was clearly evident that there had never been such paving in other areas. The patterning of the brick and mortar is random. It appears from the stratigraphy above and below (zones 3 and 4), that feature 56 is early, but perhaps not original. There are several characteristics to zone 4 that suggest this hard-packed earthen surface served as the floor for the magazine for at least a while. The homogenous surface was intruded upon by the builders trench to the magazine walls and foundation, as well as other features. An OCR date of 1700 and other characteristics of the soil led Dr. Douglas Frink to suggest that this was a period feature, rather than simply an earlier ground surface. The feature 56 paving may have been placed in areas of heavy traffic, and the dirt floor maintained in others (figure 50).

While the 18th century stratigraphy was contiguous over the entire excavated area, the 19th century strata were not. Feature 50, the brick floor, covered only the western half of the building and had a finished edge of running bond along the center line of the building (figure 45). On the eastern side of the building, the same zone 1 soil (tan sand with marble chips) was encountered, but was thicker here. In place of feature 50 there were two zones; these received

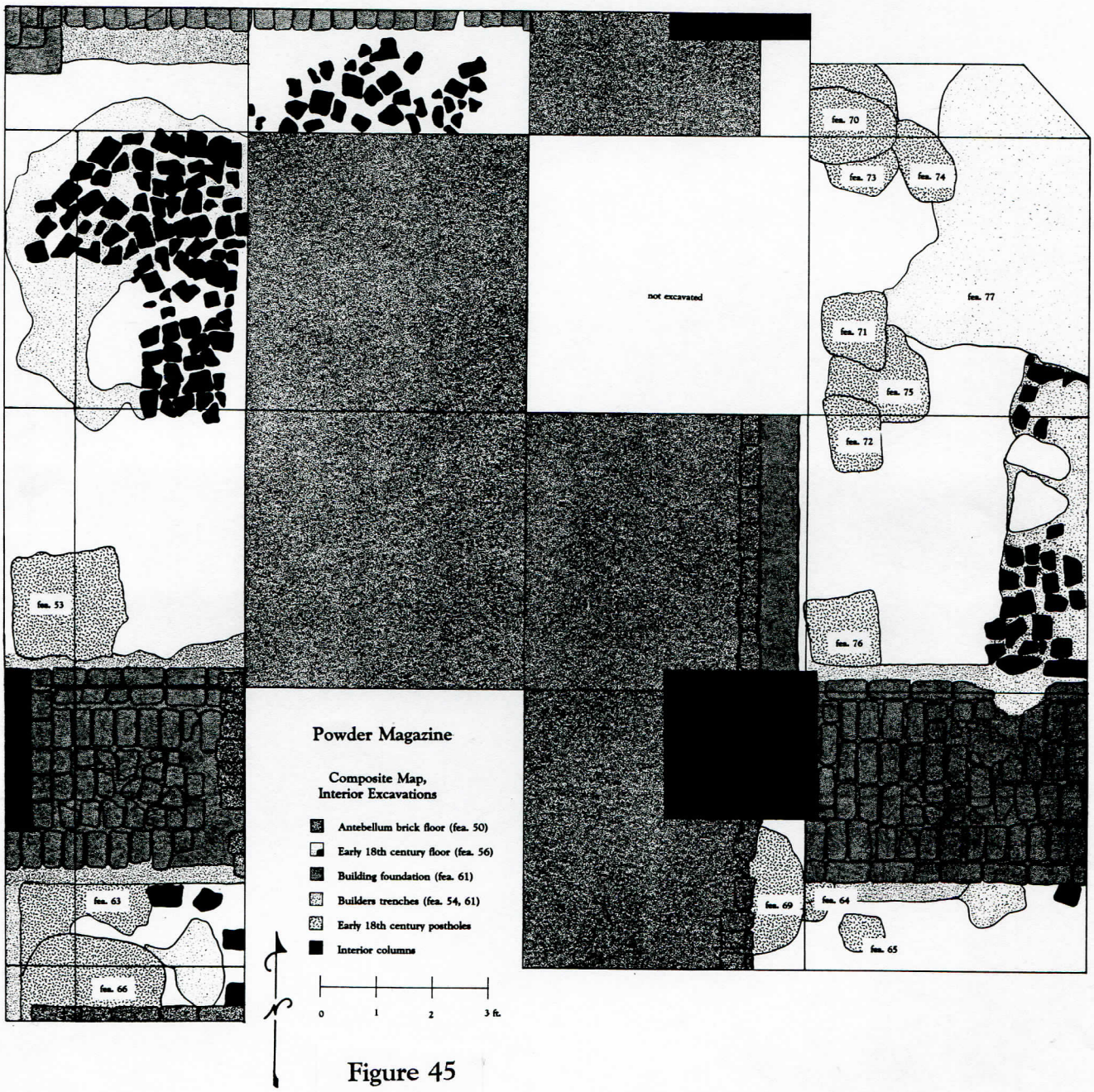

not excavated
fea. 70
fea. 73
fea. 74
fea. 77
fea. 71
fea. 75
fea. 72
fea. 53
fea. 76
fea. 63
fea. 66
fea. 69
fea. 64
fea. 65
Powder Magazine
Composite Map,
Interior Excavations
Antebellum brick floor (fea. 50)
Early 18th century floor (fea. 56)
Building foundation (fea. 61)
Builders trenches (fea. 54, 61)
Early 18th century postholes
Interior columns
0
1
2
3 ft.

Figure 45

Figure 46
Feature 50, antebellum brick floor
a) N20E105; b) N115E105, N120E102, N115E102

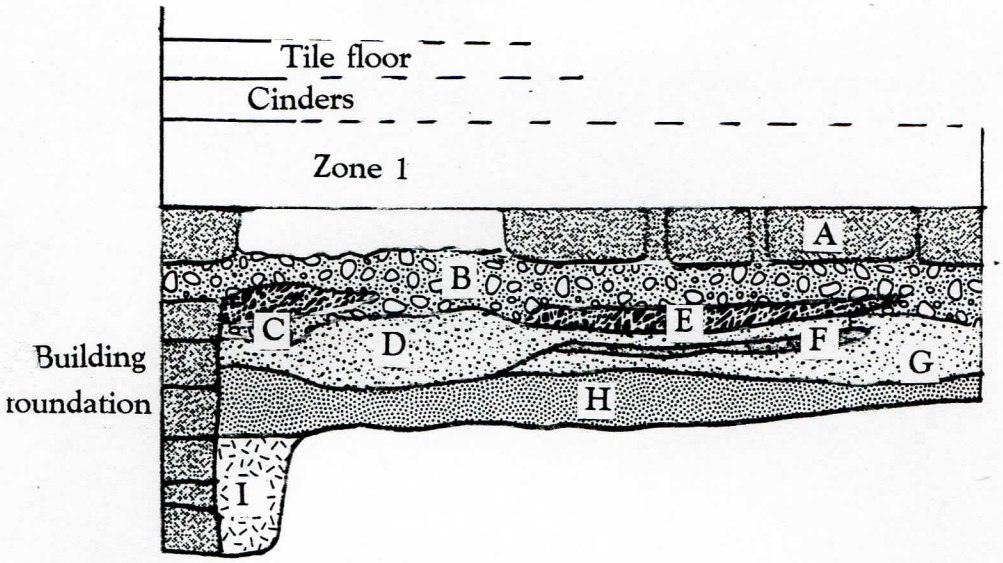


Figure 47
N120E102+west Ext, North Profile

A – brick paving; feature 50
B – dark brown–grey sand with mortar; zone 2
C – brick and mortar rubble; zone 2
D – compact medium brown–grey dirt with coal
E – coal lense
F – mortar lenses
G – reddish brick dust in matrix of medium brown–grey sand; zone 3
H – hard–packed, virtually sterile brown–grey sand; zone 4
I – H mottled with yellow sand; feature 54

Figure 48: N120E105, South profile

Figure 49: N120E102, zone 3 overlying feature 56

Figure 50: feature 56 exposed in same unit

the designations 1a and 1b, because the previously designated zone 2 was expected beneath them. Zone 1a was a band of very dark brown, almost black organic soil. Directly beneath this was a band of the same soil, but containing quantities of brick and mortar rubble. The interface of zone 1a and zone 1b was quite clear, indicating that they were separate deposits. These zones contained whitewares, suggesting that they were deposited in the first half of the 19th century, after 1820. OCR dates were calculated for each of these; zone 1a dated to 1849 and zone 1b to 1818. Zones 1a and 1b and feature 50 have been tentatively interpreted as evidence for use of the building as a horse stall, but this idea will be discussed further later (figures 51 and 52).

Beneath these zones, the 18th century stratigraphy continued as previously defined. Zones 2, 3, and 4 were present and, again, certain areas were paved with brick and mortar. Here, the paving was concentrated in the eastern half of N115E115, in line with the current front entrance. A second area of brick rubble, in N120E115, was designated Feature 77 but appears to be the same feature, but more trampled and disturbed. Figure 45 shows the location and distribution of the paved areas, as well as the limits of excavation below feature 50.

Several additional features intruded into zone 4, and predated zone 3. These will now be described. Excavation of N110E102 and N110E115 revealed a major architectural feature, located beneath feature 50 and a thin lense of zone 2. Feature 61 was a cross-bracing foundation of bright orange brick and white mortar, two bricks deep. Feature 61 ran east-west, beneath the central column, and slightly off-center from it; the north side of feature 61 was flush with the central column, while the south side continued beyond the limits of the column .7 feet. Feature 56, the brick floor, seems to have been laid at the same level as feature 61, so that in fact feature 61 could have served as a paved walking surface (figure 45).

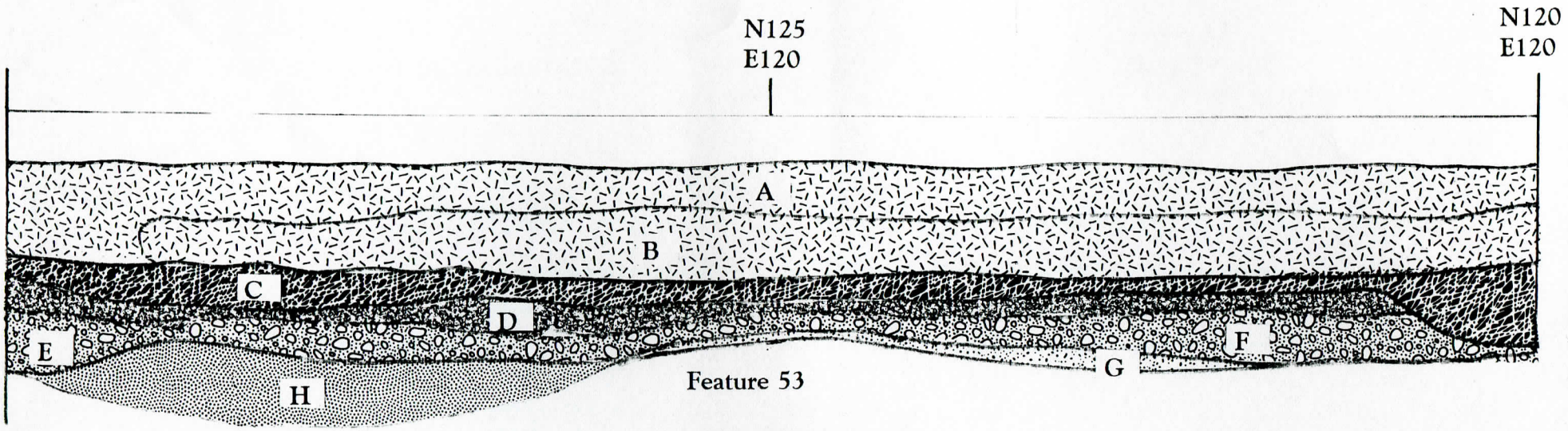
An additional, important architectural feature was the magazine's builders trench, Feature 54. This extremely well defined feature was visible as a linear area of brown and gold mottled sand. The trench was visible along the north wall, in N125E105, and along the west wall in N110E102. Further, the builders trench continued unbroken around both sides of feature 61 from the side walls, reinforcing the interpretation that feature 61 was an integral part of the structure's foundation, and that it and the outside walls were built as a single event. The intrusion of feature 54 into zone 4 further supports the contention that zone 4 was an original living surface, predating construction, and then an interior floor. Both zone 4 and feature 54 contained no artifacts, in keeping with initial activities on a previously-unoccupied site (figure 53; see figures 47 and 56).

Other features intruding into zone 4 seem to date to the early 18th century, but to some time after construction of the magazine, as they do contain some artifacts. Further, some of them clearly intrude into feature 54. Most of these early 18th century features appear to be large postholes, though none exhibited any postmold stains. The features were filled with a mostly yellow, mottled sand, some containing lenses of crumbly mortar. The features were roughly square or rectangular, with straight sides and flat bottoms. Feature 53 in N115E102 was the first such feature excavated; it was also the largest, 2.0 feet across and 2.5 feet deep, requiring a 'special spoon' to excavate. Feature 53 also clearly intruded into feature 54 along feature 61. The most comparable feature was feature 66, located in a similar position on the south side of feature 61,

Figure 51: N115E115, east profile

Figure 53: N125E102, feature 54 along north wall

Figure 52
N125E120, N120E120, East Profile



A – tan sand with marble chips; zone 1
B – same as A, but a separate layer; excavated as zone 1
C– very dark brown–grey organic sand; zone 1a
D – same as b, with large fragments of brick and mortar; zone 1b
E – medium brown–grey sand with architectural rubble; zone 2
F – same as E, but less architectural rubble; zone 2
G – compacted brown–grey sand with brick dust; zone 3
H – homogenous brown–grey sand with lenses of yellow sand; zone 4

in N110E102. Feature 66 was 2.0 feet deep and 2.4 feet wide, and exhibited the most distinctive bands of mortar in the fill (see figure 53).

Somewhat smaller features, with comparable fill, were located just east of the central column, running in linear fashion north to the front door. Feature 69 and Feature 76 wre discrete deposits on either side of the central column. Features 71, 72, and 75 were an overlapping cluster of three posts, as were Features 70, 73, and 74 adjacent to the north wall. All of these most easterly posts were difficult to define, as their tops had been truncated by late 19th century repairs to the building. Feature 73 was smaller, with a post 1.5 feet wide and 1.2 feet deep. These features have been interpreted as posts for scaffolding, or posts for powder barrel racks. Given the artifact content of the features, the latter seems more likely. Excavation of a larger portion of the building interior to the top of zone 4 would be necessary to ascertain the function and configuration of these posts (see figure 45).

Following this early burst of activity, there were very few feature–creating activities on the building interior. The later features were concentrated around the eastern side of the central column, and many of these were associated with Feature 67, a row of bricks running north/south from the central column to the north wall. This feature may have originally been associated with feature 61, but it evidently sustained heavy repair after the 1886 earthquake. Some deeper builders trench evidence (Feature 58) suggests that the lower brickwork dates to the 18th century, but a topcoat of mortar and added boards date to the late 19th century (TPQ 1841 from Lusterware). Feature 58 was shallow, undulating, and difficult to define; it was also difficult to segregate from the mottled posts below. The upper levels of feature 58, plus Features 67 and 68 appear to be late 19th century repairs. Feature 58 appeared to continue from beside feature 67 to the side of feature 61. Beneath this feature was an area of darker grey sand with coal and bricks. Its edges were amorphous, and so it conservatively received a separate feature designation, Feature 59. This feature contained no datable material (figures 54 and 55).

Three features on the south side of feature 61 date to the 18th century but are later than the initial line of posts. Feature 62 was a squarish pit with a sloping bottom that seemed to be a continuation of zone 2; the soil and artifact content were quite similar. Feature 62 was, however, .7 feet deeper than the adjacent zone 2 and in profile appeared to be a separate deposit. Feature 62 contained undecorated pearlware (TPQ 1780). Feature 64 was a small rectangular posthole full of grey granular sand and mortar. It intruded into the feature 61 builders trench and thus postdates these earliest features. The soil color and texture, though, is consistent with later 18th century deposits. Feature 65 was also a square postmold, in the same stratigraphic position, and again contained no datable material. The soil content was slightly different from feature 64, but was still consistent with 18th century fill; grey–brown granular sand with heavy mortar inclusions. These posts may be associated with repairs to the building in the late 18th century. Feature 63 in N110E102 appeared to be of the same vintage. This irregular area of dark grey–brown granular sand was also on the south side of feature 61. Again the fill was similar to that of 64 and 65, and the feature contained delft as the most datable artifact (figure 56).

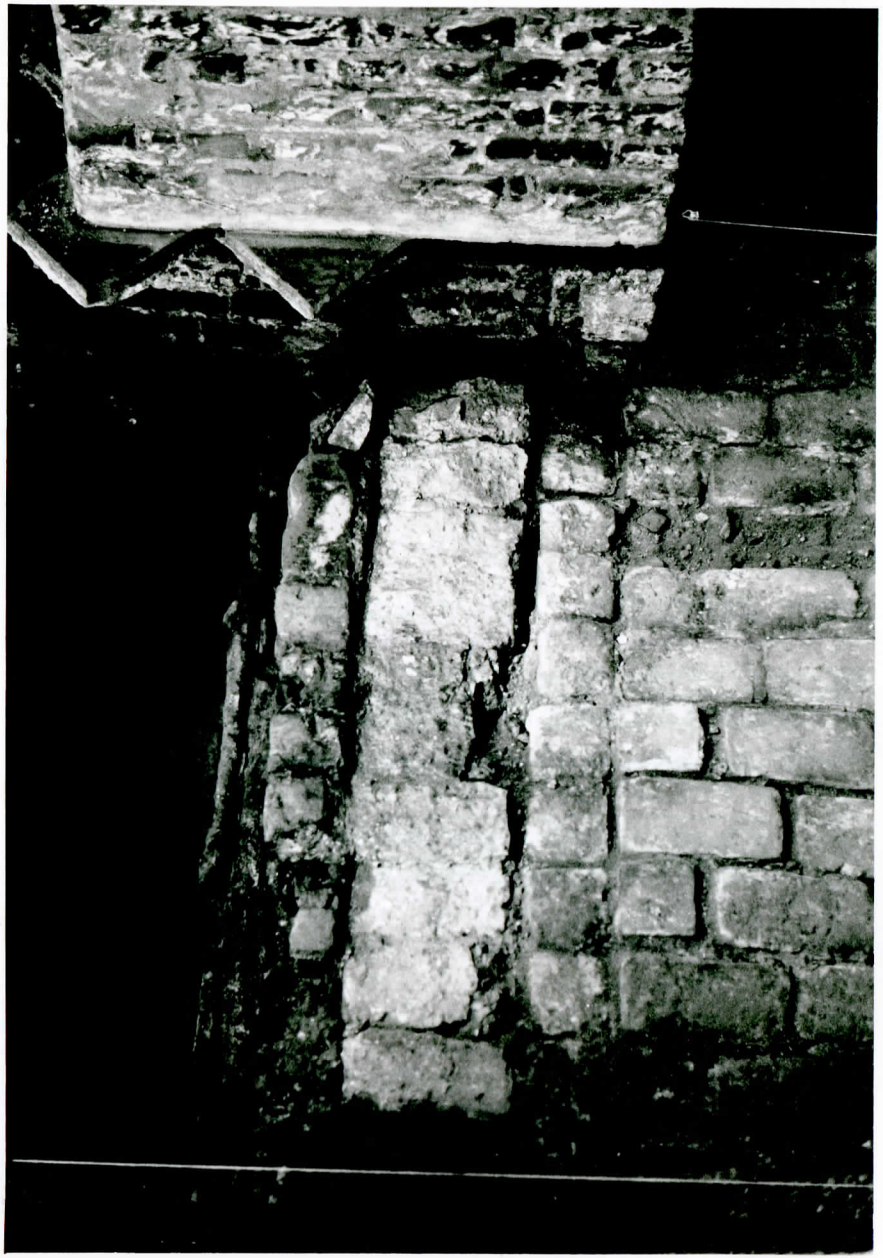


Figure 54: N115E110, edge of feature 50 on top of feature 67

Figure 55: Later timber and mortar repair to feature 67

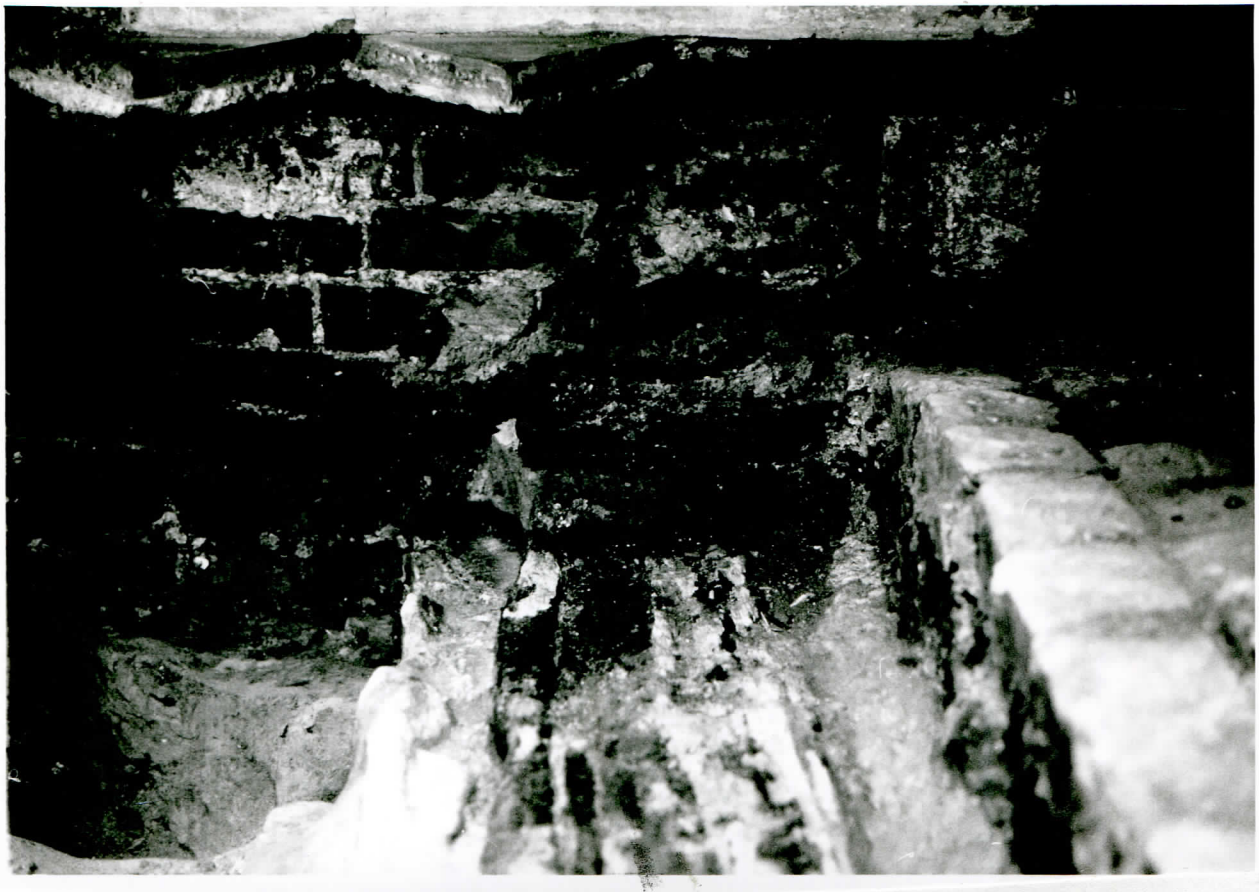


Figure 55a: Eroded support timber at base of column

Figure 56: N110E115, builders trench to feature 61, plus features 64, 65, 69

In addition to these interior and exterior block excavations, five dispersed test unit were excavated on the building interior. Two of these were tied to the grid and received gridpoint designations; the other three targeted specific locations and received test pit designations. Two units were located adjacent to exterior walls to examine possible doorway locations. Unit N130.5E107 was a 2 by 4 foot unit, later expanded to 3 by 4. This was located to examine the brick alteration, or closed opening, on the west side of the north wall. Zone 1 was excavated and discarded to a depth of .8 feet. Screening began with zone 2 below. Two pipes were discovered adjacent to the building, in a matrix of zone 2 soil. This was a terra cotta sewer pipe and an iron water pipe. While these features destroyed any builders trench in the upper zones, they further obscured any intact builders trench below and made access impossible. Several features were encountered at the base of zone 2, intruding into sterile. Feature 84 was a linear deposit 2.1 feet wide and .5 feet deep, possibly reflecting some building activity. The feature contained whiteware (TPQ 1820), possibly reflecting construction of this opening or closing of this opening. There was no obvious evidence of earlier construction activity. Four possible posts were located adjacent to feature 84 (Features 85–88); these were not excavated.

Unit N117E95 as a 4 by 2 foot trench located adjacent to the western entrance to the magazine, again designed to search for a builders trench and date construction of the door. Here, a brick walkway laid in running bond continues to the edge of the building. Beneath these bricks was dark grey–brown loamy sand, similar to zone 2 (there was no zone 1 topsoil in this vicinity). This zone 2 was rather shallow here, and quickly gave way to a tan mottled sand with yellow sand, containing sparse amounts of brick and mortar. This was designated zone 3. Beneath this was a very soft yellow sand and a series of features. The latest was feature 79, an irregularly shaped area of mottled dark grey–brown sand. This feature contained shell edged pearlware (TPQ 1780). Beneath this, and on the west side of the unit away from the building was a square feature (80) of medium tan, dark grey, yellow and gold mottled sand. Feature 80 exhibited straight sides and continued to 2.1 feet below surface. The feature contained very sparse artifacts, including brown saltglazed stoneware (TPQ 1670). Two smaller features were located adjacent to the building. Feature 81 was a circular area in the northeast corner filled with mottled gold and dark grey dirt. It contained blue hand painted pearlware (TPQ 1780) (figure 57).

At this point, excavation of the unit was halted for the evening, before these features were photographed, and we arrived the next morning to discover that an extremely heavy downpour had completely ruined the unit. The water–washed sands were removed to expose the foundation for a photo. In the process of heavy troweling, we discovered remnants of a narrow (.25') builders trench. This was a light grey sand mottled with yellow sand. In keeping with the original trenches on the interior, this feature contained only mortar. It thus appears to be a 1712 feature.

The final unit excavated during this portion of the fieldwork was Test Pit 3 (figure 58), targeted to encounter the well shown on the 1801 plat of this property (figure 12). This plat suggests that a circular brick well was located on the western lot line, twenty feet from the street, in front of the magazine; indeed, the property line bisected the well and it was shared with the adjacent lot. Because of the specific nature of the location and the need to avoid modern features like an electric meter box and a flower bed, the unit was quarter–round shaped. The rounded

Figure 57: N117E95, feature 80

Figure 58: Excavation of Test Pit 3, facing north

edge followed the flower bed border, and was anticipated to follow the configuration of the well. The unit was roughly 3' by 3' on the straight sides.

The zone 1 topsoil was excavated without screening. Beneath this was a highly mottled soil which appeared to be a mixture of zone 1 and underlying zone 2. This was excavated and screened as zone 1b. Beneath this was a tan and grey mottled sand with large, displaced bricks, screened as zone 2. The builders trench to the proeprty wall was noted and screened as Feature 78. It contained milk glass, providing a TPQ of 1870.

Excavation of these deposits revealed an iron water pipe running parallel to the property line. Further excavation of the soil designated zone 2 revealed three additional pipes, including a second water line, a copper water line, and a terra cotta sewer pipe. The pipes made further excavation of this unit challenging, but excavation proceeded by hand for an additional .5 feet. This revealed articulated brick courses on the interior of the well. Thus the unit was successful in verifying the presence of the well feature. The brick appeared to be intact and the well is likely amenable to further research. The presence of the pipes made further work at this time impossible, particularly within the time limits of the present project. We were unable to determine a date of construction for the well, or for its filling. The soil around the pipes contained late 19th century artifacts, but this may be associated with laying the pipes rather than filling the well.

The final two units, Test Pits 1 and 2, were small shovel cuts excavated on the west side of the building in August, in anticipation of placement of a temporary roof. These revealed zones 1 and 2 and sterile, but were too small to reveal any meaningful features. The final bit of field assessment occurred in January '94, when Jon Poston notified me that the Colonial Dames headquarters required some electrical work. This entailed excavation of a trench 1 foot wide and 18 inches deep, from the single house to the street, along the western side of the magazine. This trench was monitored, features recorded and excavated. The trench exhibited the basic site stratigraphy; zone 1, followed by a relatively shallow zone 2, and sterile sand. This area contained numerous service pipes, most of them laid in the matrix of zone 2. This plus an absence of zone 1 soil mixed in the pipe trenches suggest that the zone 1 topsoil was a very recent addition to the site. Feature 89 was the designation given to a well-defined posthole, located 4.25' west of the magazine and 9.9' north of the southwest corner of the building. Feature 89 did not contain any artifacts and may be an early feature. A 5-foot wide concentration of dark soil and oyster shell was encountered. This initiated in zone 2, and was 1.8 feet deep. The shell, Feature 90, contained very few artifacts, with shell edged pearlware as the latest (TPQ 1780).

Site Dating and Temporal Subdivisions

The excavations revealed archaeological deposits spanning three centuries and reflecting a range of site activities. The building exterior revealed relatively shallow zone deposits from the 19th and 20th centuries, but a host of features in a variety of sizes, shapes, functions, and ages, ranging from the early 18th century to the early 20th century. The interior featured an alternating series of 18th and 19th century floors and zones, with several early 18th century features. For the

purpose of analysis, the proveniences from both areas were divided into four temporal subdivisions, corresponding with periods of varying site activity, and with general trends in technological change. The periods are from 1712 to 1750, covering construction of the magazine through the 1740s renovation. This group includes zone 3 and all of the early features on the interior. It also includes the early post holes and the three large debris–filled pits on the building exterior (features 7, 9, 46, and 15, 23, and 24. The next period, 1751 to 1820, covers the second period of use as a magazine through the Revolution and War of 1812, until the magazine was decommissioned and returned to private ownership. This period is most strongly reflected in the zone 2 interior midden, and a few small pits on the exterior, features 4, 5, and 25. Demolition of feature 21, the proposed brick protective wall, also occurred during this period.

The third period, 1821–1850, corresponds with the first period of private ownership, and probably construction of the interior brick floor. Zone 1b on the interior was deposited during this time, and outside a host of features were created; these include 11, 31, 33, 37, 38, 44, and 45. The final period, 1851–1900, saw little deposition on the interior, zone 1a only, but a great deal of depositional activity on the building exterior. This includes the zone 2 deposit plus a host of features, principally the postholes (features 2, 3, 6, 26, 30, 36, 39, 40, 46, and 49). Feature 42, the large rectangular pit of architectural debris, was originally analyzed with this latter assemblage bu later re–dated to 1830. These temporal subdivisions guided the laboratory analysis and the subsequent interpretations.

OCR Dating

In addition to the traditional interpretive dating techniques applied universally to historic sites, a new absolute dating technique was applied to fourteen selected proveniences. This procedure, developed by Douglas Frink of the Archaeology Consulting Team (Essex Junction, Vermont), dates soil samples based on the biochemical degradation of organic carbon. This procedure, termed the "Oxidizable Carbon Ratio" or OCR, produces age estimates comparable to those of Carbon 14. Frink (1994) reports that the interdependent dynamics of climate, biota, relief, parent material, and time affects the evolution of soils and archaeological materials within the soils. Chemical analyses of archaeological charcoal deposits demonstrate tht charcoal is subject to environmental degradation and changes through time. The OCR procedure describes this change by simple chemical carbon analyses to determine the ratio of total carbon to readily oxidizable carbon, and the environmental factors influencing the rate of biochemical degradation. The procedure accounts for site–specific factors, as well. The principal assumption is that the phenomena being measured are oxygen–dependent biochemical processes that cause a change in the relative oxidizability of the charcoal carbon. Deep deposits subject to fluctuating water tables and environmental barriers to oxygen diffusion in the soil (such as pavement) and barriers to solar radiation (i.e. inside deposits) have a presently incalculable effect on the rate of biochemical change (Frink 1994).

The relative precision of the OCR date is statistically linear. Thus the precision of the OCR procedure with recent (less than 500 years) samples makes the technique more appropriate

than radiocarbon dating for all European American sites. Though a relatively new procedure, Dr. Frink has found strong correlation with expected age estimates based on documented events, temporally diagnostic artifacts, and the resulting OCR date. Thus, the OCR offers accuracy and precision in results, significant cost savings relative to 14C, and meaningful age estimates for postmedieval sites.

The OCR technique has not, until recently, been applied to the complex stratigraphy of urban sites. The first such sample was from the Nathaniel Russell house (Zierden 1996:85), submitted in 1995. Of central concern was the precise origin of organic material within a given soil matrix. Is it an in-situ deposit, contemporary with the depositional event, or is it present as a result of redeposition of earlier materials in a subsequently dug provenience? To ameliorate this situation, a large number and variety of samples were submitted for analysis. Particularly problematic, unfortunately, are the 'mixed' soils characteristic of builders trenches, where the 19th century laborer dug through a contemporary topsoil into an earlier soil deposit, and refilled the hole with this mixed dirt. To avoid this, a careful attempt was made to select Russell house samples which stratigraphically "sandwiched" the event of interest, but were composed of highly organic, presumably primary refuse.

The results from the Russell house were mixed, but encouraging as well as intriguing. Seven of the twelve OCR dates corresponded well to proposed dates of deposition; the others disagreed by several decades and were easily dismissed. Based on this success, fourteen samples were submitted from the Powder Magazine. These samples posed some additional potential problems for analysis. First, two years elapsed between their excavation and their analysis, and the results of this storage was unknown. Secondly, the location on a building interior posed unknown problems for analysis of several of the samples. The results of the analysis were equally intriguing for the magazine samples. Unlike Russell, there was no clear division between 'good' dates and 'irrelevant' dates. The resulting OCR dates were more varied from the estimated dates of deposition at the magazine, but without clear pattern. They varied from the estimated date of deposition by twenty to forty years. Further, some were earlier and others were later than anticipated; this variation was noted for both interior and exterior samples. Thus, the OCR dates helped confirm the relative dating and stratigraphic sequence for the site, and was less helpful in pinpointing precise dates for site activities. Each of the samples are discussed separately, and presented in tabular form in Appendix III.

FS 133: A sample of the zone 2 soil from the building exterior was submitted from N150E111.5. Cumulative dating information from across the site suggests a c. 1870s date of deposition. This sample produced an OCR date of **1866.**

FS 88: Feature 34 was the builders trench adjacent to the north wall, presumably excavated to repair the building after the 1886 earthquake. Recovered artifacts suggest a depositional date from this same time period; however, the soil from the upper levels (level 1) of feature 34 produced an OCR date of **1912.** This may indicate that the upper levels of this feature were disturbed again, possibly by the iron water pipe, or the repair was not made for some time after the earthquake.

FS 89: Feature 33 was one of the rectangular postholes, filled at least by mid-century. Artifacts suggest a date of 1830 to 1850; the sample produced an OCR date of **1873.**

FS 134: Two samples from feature 42, the large rubble-filled pit, were submitted for comparative dating. The first was from level 5, presumed to have been deposited in the 1830s. Level 5 produced an OCR date of **1840.**

FS 149: The second sample from feature 42 came from level 9, the dark organic refuse-laden soil. This produced a date of **1851.**

FS 142: Feature 21 was interpreted as remnants of the surrounding brick wall; artifacts suggested possible demolition between 1795 and 1820. The sample submitted produced an OCR date of **1847.**

FS 139: Feature 25 was a large pit of tan sand with sparse artifacts. Those contained in it suggest that the feature was filled around 1820. Again, this sample produced a later date, **1852.**

FS 69: Feature 24 was one of three features containing terra cotta roof tile, apparently filled in the mid-18th century. A soil sample from level 2 produced a date of **1720.**

FS 136: Feature 15 was the second of three mid-18th century pits; the second level contained a concentration of debris. This second level produced a date of **1717.**

FS 165: Several of the interior zones were also sampled. The earliest, zone 4, produced a date of **1700,** in relatively good correspondence with its interpreted function as the original ground surface or original floor. Dr. Frink further suggests that the characteristics of the soil are those of a culturally derived feature, not a natural ground surface.

FS 254: Zone 3 was the thin, hard packed midden lense, apparently deposited in the first half of the 18th century. This produced a date of **1694,** however, too early for the depositional sequence.

FS 250: Zone 2 level 2 from N125E105 produced a dense midden assemblage from the second half of the 18th century; the presence of pearlware suggests that this midden was receiving materials after 1780. The soil produced a date of **1757,** which may correspond to the beginning of soil accumulation in this zone.

FS 187: Zone 1b in the eastern half of the magazine was the lowest of two 19th century zones corresponding with the brick floor. The rubble-filled zone 1b produced a date of **1818.**

FS 185: Zone 1a appears to be highly organic soil, perhaps deposited in the horse stalls. This soil produced a date of **1849.**

Table 1
Unit/Feature Summary

Exterior Units

N130E115
- feature 27
- feature 28
- feature 29
- feature 30
- feature 31
- feature 32
- feature 33
- feature 34
- feature 35
- feature 36
- feature 41

N135E115
- feature 33
- feature 36
- feature 37
- feature 38

N140E110
- feature 21
- feature 39
- feature 40
- feature 42
- feature 43

N140E115
- feature 21
- feature 43
- feature 44
- feature 45
- feature 46
- feature 47

N145E110
- feature 3
- feature 21
- feature 22
- feature 25
- feature 44

N145E115
- area A
- area B
- area C
- feature 3
- feature 4
- feature 5
- feature 6
- feature 7
- feature 8
- feature 20
- feature 21

N145E120
- feature 1
- feature 6
- feature 8
- feature 9
- feature 23
- feature 24

N145E125
- feature 2
- feature 23
- feature 24
- feature 26
- feature 10
- feature 11
- feature 12
- area A
- area B

Table 1, cont.

N150E111.5
- feature 3
- feature 15
- feature 25
- feature 48

N150E115
- feature 3
- feature 13
- feature 14
- feature 15
- feature 16
- feature 17
- feature 18
- feature 19
- feature 5

Interior Units

N125E115
- feature 58
- feature 73
- feature 74
- feature 77

N125E105
- feature 50

N125E102 + west ext.
- feature 50
- feature 54
- feature 55
- feature 56

N120E115
- feature 56
- feature 58
- feature 70
- feature 71
- feature 72
- feature 73
- feature 74
- feature 75
- feature 77

N120E105
- feature 50

N120E102 + west ext.
- feature 50
- feature 56

N115E115
- feature 56
- feature 58
- feature 59
- feature 60
- feature 61
- feature 68
- feature 72
- feature 76

N115E110
- feature 50
- feature 50a
- feature 67
- feature 68

N115E105
- feature 56

N115E102 + west ext.
- feature 50
- feature 51
- feature 52
- feature 53
- feature 54
- feature 56
- feature 61

Table 1, cont.

N110E115
- feature 61
- feature 62
- feature 64
- feature 65

N110E110
- feature 50
- feature 50a
- feature 62
- feature 66
- feature 69

N110E102 + west ext.
- feature 53
- feature 56
- feature 61
- feature 63
- feature 66

N110E102, south ext.
- feature 50
- feature 56
- feature 63
- feature 66

N117E95
- feature 79
- feature 80
- feature 81
- feature 83

N130.5E107
- feature 84
- feature 85
- feature 86
- feature 87
- feature 88

Test Pit 3
- feature 78

Table 2
Provenience Guide

FS#	Provenience	TPQ
1	Test pit 1, level 1	cement/marble
2	Test pit 1, level 2	gilded porcelain
3	Test pit 1, level 3	black transfer w.w.
4	Test pit 2, level 1	cement
5	Test pit 2, level 2	wire nail
6	Test pit 2, base lev 2	brick
7	N145E120, zone 1	1900, whiteware/plastic
8	N145E120, zone 2 lev 1	1900, pink & blue w.w.
9	N145E120, cleanup	1851, white porcelain
10	N145E120, zone 2 lev 2	1900, pink & blue w.w.
11	N145E120, fea 1	1851, white porcelain
12	N145E115, zone 2 lev 1	1851, white porcelain
13	N145E125, zone 2 lev 1	1851, white porcelain
14	N145E115, area A	1795, annular p.w.
15	N145E115, area B	1820, annular w.w.
16	N145E115, area C	1851, white porcelain
17	N145E115, zone 2 lev 2	1890, gilded w.w.
18	N145E125, zone 2 lev 2	1870, milk glass
19	N145E115, zone 2 cleanup	-- knife blade
20	N145E125, feature 2	1870, milk glass
21	N150E115, zone 2 lev 1	1900, pink & blue w.w.
22	N150E115, zone 2 lev 2	1830, red tr. print w.w.
23	N150E115, feature 3	1820, whiteware
24	N145E125, feature 10	-- brick
25	N145E125, feature 11	--
26	N145E125, feature 12	1760, creamware
27	N145E125, area A	1820, transfer print w.w.
28	N145E125, area B	1820, transfer print w.w.
29	N145E125, zone 3 lev 1	1820, whiteware
30	N150E115, cleanup	1851, white porcelain
31	N145E120, feature 1	1760, creamware
32	N145E120, feature 9	1760, creamware
33	N145E110, zone 2 lev 1	1830, red tr. pr. w.w.
34	N145E110, cleanup	1820, whiteware
35	N145E120, feature 6	1760, creamware
36	N145E120, feature 7	-- glass
37	N145E120, feature 6a	1851, white porcelain
38	N145E110, feature 21	1795, transfer print p.w.
39	N145E100, feature 22	1830, red tr. pr. w.w.
40	N145E110, feature 3	1820, whiteware

Table 2, cont.

41	N145E120, feature 6b	1820, transfer print w.w.
42	N145E115, feature 4	1795, transfer print w.w.
43	N145E115, feature 5	1820, blue tr. pr. w.w.
44	N145E115, feature 20	1795, transfer print p.w.
45	N145E120, zone 3	1670, delft
46	N145E120, feature 23, lev 2	1760, creamware
47	N145E110, zone 2 lev 2	1820, transfer print w.w.
48	N145E120, base fea 23	1900, pink & blue ware
49	N145E125, feature 24 lev 1	1740, white saltglaze st.
50	N145E125, feature 23 lev 2	1740, white saltglaze st.
51	N145E125, feature 23 lev 2	1820, whiteware
52	N145E110, feature 25	1795, annular p.w.
53	N145E110, feature 25 lev 2	1795, transfer print w.w.
54	N145E125, feature 26	1870, milk glass
55	N145E110, feature 25 lev 3	1795, transfer print p.w.
56	N145E125, feature 26 cleanup	1851, white porcelain
57	N145E125, feature 23	1670, slipware
58	N145E120, feature 24 lev 3	1700, Nottingham
59	N135E115, zone 2 lev 1	1870, milk glass
60	N145E120, feature 24 lev 3	1740, white saltglaze st.
61	N145E120, feature 24 lev 4	— —
62	N145E125, feature 23 level 3	1740, white saltglaze st.
63	N145E125, feature 23 level int.	1725, Astbury
64	N145E125, feature 26	—
65	N145E120, feature 23 lev 3	1740, white saltglaze st.
66	N145E120, profile	— —
67	N135E115, zone 2 lev 2	1900, aqua tint w.w.
68	N135E115, zone 3 lev 1	—
69	N145E120, feature 24 lev 4	1740, whieldon ware
70	N135E115, cleanup	1820, whiteware
71	N145E120, feature 25 lev 5	1740, whieldon ware
72	N130E115, zone 2 lev 1	1820, whiteware
73	N130E115, feature 27	1780, shell edge p.w.
74	N130E115, feature 28	1820, whiteware
75	N130E115, feature 29	1818, Rockingham
76	N145E120, feature 24 lev 6	1780, blue h.p. p.w.
77	N130E115, zone 2 lev 2	1830, red tr. pr. w.w.
78	N145E120, feature 24 lev 5	— —
79	N140E115, zone 2 lev 1	1851, white porcelain
80	N145E120, feature 24 lev 2	1740, whieldon ware
81	N140E115, zone 2 lev 2	1851, white porcelain
82	N130E115, base zone 2 lev 2	1818, Rockingham

Table 2, cont.

83	N130E115, feature 30	1851, white porcelain
84	N130E115, feature 31	1830, brown tr. pr. w.w.
85	N135E115, feature 36	1890, gilded white porc.
86	N130E115, feature 31a	1820, annular w.w.
87	N130E115, feature 35	1890, gilded white porc.
88	N130E115, feature 34 lev 1	1830, red tr. pr. w.w.
89	N130E115, feature 33	1830, purple tr. pr. w.w.
90	N130E115, feature 32, s half	1780, pearlware
91	N130E115, feature 34 level 2	1795, transfer print p.w.
92	N140E110, zone 1 lev 2	1870, milk glass
93	N140E110, zone 2 lev 1	1820, transfer print p.w.
94	N130E115, fea 34 profile	--
95	N140E110, feature 39	1851, white porcelain
96	N140E110, feature 40	1830, red tr. pr. w.w.
97	N140E110, zone 2 lev 2	1830, red tr. pr. w.w.
98	N130E115, feature 36 lev 3	1870, milk glass
99	N130E115, feature 34 lev 4, w1/2	1795, transfer print p.w.
100	N130E115, feature 34 lev 4, e1/2	1851, white porcelain
101	N140E110, feature 40 lev 2	1850, wire nails
102	N140E110, zone 2 lev 3	1830, red tr. pr. w.w.
103	N130E115, feature 24 lev 4 clean	-- glass
104	N130E115, zone 3	1820, hand paint w.w.
105	N140E115, feature 21	1780, poly hand paint p.w.
106	N130E115, feature 31b	-- nail
107	N130E115, feature 41	1851, white porcelain
108	N140E110, feature 40 lev 3	1820, whiteware
109	N130E115, feature 41a	1820, whiteware
110	N140E110, feature 40 lev 4	1795, transfer print p.w.
111	N150E115, feature 3	1795, annular p.w.
112	N150E115, feature 15	1740, white saltglaze st.
113	N140E110, feature 21 lev 2	--
114	N135E115, feature 37	1795, transfer print p.w.
115	N135E115, feature 38a	1830, brown tr.pr. w.w.
116	N150E111.5, zone 2 lev 1	1870, milk glass
117	N135E115, feature 38b	1780, poly hand paint p.w.
118	N150E111.5, feature 48	1830, red tr. pr. w.w.
119	N140E115, feature 47	--
120	N140E115, feature 44	1780, poly hand paint p.w.
121	N150E111.5, feature 3 lev 1	1830, red tr. pr. w.w.
122	N140E110, feature 42 lev 1	1820, whiteware
123	N140E115, feature 46a	1830, blue tr. pr. w.w.
124	N140E115, feature 46b	1900, pink & blue w.w.

Table 2, cont.

125	N140E110, feature 42 lev 2	1820, transfer print w.w.
126	N150E111.5, feature 3 lev 2	1820, whiteware
127	N150E111.5, feature 3 lev 3	1820, blue tr. pr. w.w.
128	N140E110, feature 39 lev 2	1870, brown+yellow tr. pr. w.w.
129	N140E110, feature 42 lev 3	1830, green tr. pr. w.w.
130	N140E110, feature 42 gen	1820, transfer print w.w.
131	N150E111.5, feature 3 lev 4	1851, white porcelain
132	N140E110, feature 42 lev 4	1825, portobello ware
133	N150E111.5, zone 2	1795, transfer print p.w.
134	N140E110, feature 42 lev 5	1830, red transfer print w.w.
135	N150E111.5, feature 15 lev 1	1740, white saltglaze st.
136	N150E111.5, feature 15 lev 2	1760, creamware
137	N140E115, feature 45a	1795, annular p.w.
138	N140E115, feature 45b	1830, black tr. pr. w.w.
139	N150E111.5, feature 25	1780, undecorated p.w.
140	N150E115, wall clean	1795, transfer print p.w.
141	N140E110, feature 42 lev 6	1830, red tr.pr. w.w.
142	N145E115, feature 21 west	1795, transfer print p.w.
143	N140E110, feature 42 level 7	1830, green tr. pr. w.w.
144	N140E110, feature 42 level 8	1820, whiteware
145	N145E115, feature 43	--
146	N140E110, feature 42 profile	1795, transfer print p.w.
147	N140E115, feature 21 east	1780, undecorated p.w.
148	N140E110, feature 42 lev 8	1830, green tr. pr. w.w.
149	N140E110, feature 42 lev 9	--
150	N140E110, feature 42 lev 10	1820, blue tr. pr. w.w.
151	N120E105, zone 1	1930, --
152	N120E102, zone 1	1930, annular
153	N115E105, zone 1	1930, --
154	N115E102, zone 1	1930, --
155	N115E102, feature 51 lev 1	1780, undecorated p.w.
156	N115E102, feature 51 lev 2	1795, transfer print p.w.
157	N115E102, zone 2	1795, transfer print p.w.
158	N115E102, zone 3	1780, hand painted p.w.
159	N115E102, zone 4	1780, pearlware
160	N115E102 w.e., zone 1	1930, --
161	N120E102 w.e., zone 1	1851, white porcelain
162	N125E105, zone 1	1930, --
163	N115E102, w.e., zone 2	
164	N115E102, w.e., zone 3	1795, transfer print p.w.
165	N115E102, zone 4	1670, coal
166	N125E102 w.e, zone 1	1930

Table 2, cont.

167	N125E102, zone 2	1795, transfer print p.w.
168	N115E102, feature 53	1670, brick
169	N115E102, feature 53 lev 2	1670, slipware
170	N125E102, zone 2 lev 1	1780, blue hand paint p.w.
171	N125E102, zone 2 lev 2	1780, poly hand paint p.w.
172	N115E102, feature 53 lev 3	––
173	N125E102, zone 3	1740, white saltglaze st.
174	N115E102, feature 54	1712, mortar
175	N115E102, feature 53 west	––
176	N115E110, zone 1	1930, tile
177	N115E102, profile	1760, creamware
178	N125E102, feature 55	1670, delft
179	N120E102, zone 2	1827, yellow ware
180	N120E102, zone 2 level 2	1780, undecorated p.w.
181	N115E115, zone 1	1930 ––
182	N120E102, zone 3	1740, white saltglaze st.
183	N120E102, zone 2 lev 3	1740, white saltglaze st.
184	N120E102, zone 2 lev 4	1670, slipware
185	N115E115, zone 1a	1830, red tr. pr. w.w.
186	N120E102, zones under fea 50	1795, transfer print p.w.
187	N115E115, zone 1b	1820, whiteware
188	N115E115, zone 2	1841, luster ware
189	N110E102, zone 1	1930
190	N115E115, zone 2	1795, transfer print p.w.
191	N115E115, zone 2 lev 2	1760, creamware
192	N115E115, zone 2 lev 2	1795, transfer print p.w.
193	N115E115, feature 58	1841, lusterware
194	N115E115, profile	1760, creamware
195	N110E115, zone 1	1930
196	N110E102, zone 2	1795, transfer print p.w.
197	N115E115, feature 59	––
198	N115E115, feature 59	––, green glass
199	N115E115, feature 60	––
200	N110E102, zone 3	1795, transfer print p.w.
201	N110E115, zone 1a	1820, undecorated w.w.
202	N110E115, zone 1b	1820, hand paint w.w.
203	N110E102, feature 56 + zone 3	1670, lead glaze e.w.
204	N110E102, feature 53 lev 1	1670, slipware
205	N110E115, zone 2	1780, hand paint p.w.
206	N110E102, zone 2 lev 2	1780, shell edge p.w.
207	N110E115, zone 2 lev 2	1795, tranfer print p.w.
208	N115E110, zone 2 below fea 50	1795, annular p.w.

Table 2, cont.

209	N110E102, feature 63	––, glass
210	N110E115, feature 62	1780, undecorated pearlware
211	N110E102, wall clean	1760, creamware
212	N110E115, wall clean	––
213	N110E102, residual zone 3	1670, colono ware
214	N110E102, feature 63 east	––, window glass
215	N110E110, zone 1a	1820, whiteware
216	N110E110, zone 1b	1820, whiteware
217	N110E110, zone 2 lev 1	1795, transfer print p.w.
218	N115E110, feature 67	––
219	N110E110, feature 62	1780, undecorated p.w.
220	N110E110, zone 1	1930
221	N110E102 s.e., zone 2	1780, undecorated p.w.
222	N110E102 s.e., zone 2 lev 2	1780, undecorated p.w.
223	N110E102 s.e., zone 3	1760, creamware
224	N120E115, zone 1a	1890, gilded porcelain
225	N110E102, cleaning	––, mortar
226	N110E110, feature 69	1670, lead glazed e.w.
227	N120E115, zone 1b	1820, panel bottle
228	N110E115, feature 64	1670, brick
229	N110E102, feature 63 lev 2	1670, delft
230	N120E115, zone 2	1795, transfer print p.w.
231	N110E115, feature 65	1670, brick
232	N110E115, feature 61 trench	1670, mortar
233	N110SEE103, feature 50 west wall	1780, undecorated p.w.
234	N110E102, feature 66	1670, slipware
235	N120E115, feature 58	1760, creamware
236	N115E102, feature 61 trench	1670, brick
237	N120E115, zone 1b	1780, undecorated p.w.
238	N115E102, feature 53/61	1670, nail
239	N115E110, feature 67	1670, nail
240	N115E110, feature 68	1670, brick
241	N115E102, feature 53, south lev 2	1670, slipware
242	N115E115, floor clean	1760, creamware
243	N120E115, feature 71	1670, lead glaze e.w.
244	N125E105, zone 2	1780, poly hand paint p.w.
245	N1156E102, feature 54a	––, bone
246	N115E102, feature 54a	––
247	N115E115, feature 76	1670, nail
248	N125E105, feature 50	––
250	N125E105, zone 2 lev 2	1780, shell edge p.w.
251	N120E115, feature 72	––

Table 2, cont.

252	N120E115, feature 75	1670, pipe bowl
253	N125E105, zone 2 lev 3	1795, transfer print p.w.
254	N125E105, zone 3	1700, westerwald
255	N120E115, feature 75s	1670, porcelain
256	N120E115, feature 75n	1670, lead glaze e.w.
257	N125E105, cleanup	−−
258	N120E115, feature 70	1670, porcelain
259	N125E105, south profile	1740, white saltglaze st.
260	N120E115, feature 73	1670, pipestem
262	Test Pit 3, zone 1b	1851, white porcelain
263	Test Pit 3, feature 78	1870, milk glass
264	Test Pit 3, zone 2	1870, milk glass
266	N119E95, zone 2	1795, transfer print p.w.
267	N119E95, zone 3	1830, purple tr.pr. w.w.
268	N119E95, feature 79	1780, shell edged p.w.
269	N119E95, feature 80	1670, brown saltglazed st.
270	Test Pit 3, pipe trench	1902, crown cap
271	N119E95, feature 81	1780, blue hand paint p.w.
272	N119E95, zone 4	1795, transfer print p.w.
273	N119E95, feature 83	1670, mortar
274	N130.5E107, zone 1 lev 2	1870, milk glass
275	N130.5E107, zone 2	1880, agate ware door knob
276	N130.5E107, profile	1890, bisque porcelain
277	N130.5E107, feature 84	1820, whiteware
278	N130.5E107, areas of pipe	1820, transfer print w.w.
279	N130.5E107, zone 2	1830, red tr. pr. w.w.
280	N130.5E107, feature 88	1670, slipware
281	N130.5E107, feature 87	−−, glass

CHAPTER IV

Analysis of Recovered Artifacts

Laboratory Methods

During the course of the fieldwork, the recovered artifacts were stored at the Magazine. Following excavation, all materials were removed to The Charleston Museum where they were washed, sorted, analyzed, and conserved. Conservation procedures included reconstruction of ceramic and glass vessels, where possible, and stabilization of metal artifacts. Ceramic and glass vessels were restored with conservator's glue, B-72 soluble in acetone. Ferrous materials were separated during washing and stabilized by placing them in successive baths of distilled water to remove chlorides; they were then oven-dried, bagged and boxed separately. Stabilization of iron from downtown Charleston sites usually requires at least one year of soaking. Several ferrous and all non-ferrous metal items were selected for further treatment through electrolytic reduction. The ferrous items were placed in electrolysis in a weak sodium carbonate solution with a current of six ampheres. Upon completion of electrolysis, ranging from a few weeks to a few months, they were placed in successive baths of distilled water to remove chlorides and dried in ethanol. Finally, the materials were coated with a solution of tannic acid and phosphoric acid, and dipped in 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 artifacts was usually accomplished in one to two days. They were then placed in distilled water baths to remove surface chlorides, dried in ethanol, and gently polished before being coated with Incralac to protect the surfaces.

Faunal materials were washed, separated from other materials, and weighed by provenience. They were then shipped to Dr. Betsy Reitz of the University of Georgia for analysis. Her report appears as Appendix I. Soil samples were inventoried, and portions of select samples were rebagged for shipment to Dr. Karl Reinhard of the University of Nebraska-Lincoln for pollen and parasite analysis. His study appears as Appendix II. Other selected soil samples were air-dried and shipped to Dr. Douglas Frink of Archaeology Consulting Team for OCR date calculations. His analysis appears as Appendix III. The remainder of the soil samples were double-bagged and boxed for permanent curation.

Historic Charleston Foundation and the National Society of Colonial Dames of America-South Carolina Chapter decided that permanent curation of the collection at The Charleston Museum was appropriate, and donated the collection to the Museum; it was accessioned as 1994.14. All excavated materials are curated in The Charleston Museum's storage facility according to museum collection policy. Artifacts are packed by provenience in standard-sized, low-acid boxes, labelled, and stored in a climate-controlled environment. Special study and exhibit pieces are labeled and stored separately in Interior Steel drawers. Field records and photographs are curated in the Museum's archives in acid-free containers in the security section. Archivally stable copies are available in the general research section of the library. Artifacts and

photographic records are available for exhibition by Historic Charleston Foundation and the Colonial Dames through an annual loan agreement.

Analysis

The first step in the analysis of materials was the identification of the artifacts. The Museum's type collection, Noel Hume (1980), Stone (1974), Brown (1982), Ferguson (1992), and Deagan (1987) were the primary sources used. Other references were consulted for specific artifacts. Lorrain (1968), Huggins (1971), Kechum (1975), and Switzer (1974) were used to identify bottle glass. Epstein (1968) and Luscomb (1967) as well as South (1964) were used in button identification, and Fontana and Greenleaf (1962) were consulted for nails and tin can fragments.

For basic descriptive purposes, the Powder Magazine temporal assemblages were sorted into functional categories, based on South's (1977) model for the Carolina Artifact Pattern. South's methodology has been widely adopted by historical archaeologists, allowing for direct intersite comparison; all of the Charleston data have been organized in this manner. For nearly twenty years archaeologists have attempted to classify the artifacts they recover by function, or how they were used in the everyday life of their owners. Artifacts are quantified in relative proportion to each other within eight broad categories. Broad regularities, or patterns, in these proportions prescribe the average retinue of activities on British colonial sites. While some have criticized this methodology as being too broad, it has been widely adopted by historical archaeologists working in the eastern United States. In Charleston, it is used as an initial organizing tool.

Following this exercise, the relative proportions of various artifact types were examined, based on the work of King (1990, 1992) and others in the mid-Atlantic. This recent exercise (Zierden 1993, 1994) has provided more details on proportions of consumer goods and how they were used by Charlestonians. These proportions will be described below, and further analyzed in Chapter V.

Over 19,300 artifacts were recovered from 280 proveniences during the fieldwork. They are divided among the four temporal subdivisions. These are shown in comparison to each other, to Charleston averages, and to South's Carolina Artifact pattern in tables 5 and 6. Each subassemblage will be discussed separately, in order of functional category. All artifact illustrations and tables are grouped at the end of this discussion for convenient use; references to the various illustrations are found throughout the text.

Summary of the Assemblages

The Powder Magazine revealed a large number and variety of artifacts spanning the 18th and 19th centuries. The early 18th century proveniences exhibited very sparse artifact assemblages, while those dating to the second half of the century were relatively dense. So too

were materials from the 1820s to 50s. While a few military items were recovered, the majority of the materials were domestic debris. This included ceramics, glass, pipes, animal bone, sewing implements. Many ceramics recovered from interior middens cross-mended with those from exterior features. Likewise, matching artifacts of all types were recovered in these proveniences. The four temporal subdivisions span various uses of the building, and agree with general historical trends for the city. The 1712-1750 group includes construction of the magazine, its early occupation, and the first round of major repairs. The 1750-1820 group includes the later colonial period, intermittent use and repair of the building, until its last documented use as a magazine. The two 19th century groups, 1820-1850 and 1850-1900 cover the multitude of private uses during the 19th century, and arbitrarily divide the century based on general historical events and changes in glass and ceramic technology. The early 19th century assemblage includes another round of major changes to the building's floor and roof, while the late 19th century period covers the major damage from the earthquake and changes to the landscape associated with the Dames' acquisition.

1712-1750 Assemblage

This first assemblage includes zone 3 and all of the early postmolds and construction trenches on the building interior. Zone 3 contained a moderate amount of very small, well-trampled artifacts, while the features exhibited very sparse artifact groups. Exterior proveniences from this early period included three large trash pits and three postholes. The three features contained relatively large artifact assemblages. The deposits yielded an average of 54 artifacts per provenience (2799 artifacts from 51 proveniences). The exterior features produced 594 ceramics, the interior zones 197 ceramics, and the interior features only 35 ceramics. The group included a relatively large number of architectural items compared to kitchen artifacts; still, the asemblage was overwhelmingly domestic.

Kitchen materials comprised 45.08% of this early assemblage, and two thirds of these were glass. Nearly half of the ceramics were utilitarian earthenwares and stonewares. Colono wares comprised an additional 21%. The colono wares were evenly divided among the Yaughan and Lesesne Lustered. The finer River burnished wares comprised only a small portion of the early colono wares. Several fragments to a Lesesne Lustered vessel were recovered from features 23 and 24. The vessel was too fragmentary for reconstruction, but appeared to be a globular jar with at least one strap handle (figures 61 and 62). These low-fired earthenwares of local origin have long been of interest to South Carolina archaeologists, as they are found in great quantity on Lowcountry sites of the 18th century. Most scholars believe that the bulk of these wares were manufactured on plantations by enslaved African Americans (Ferguson 1992). Some of the wares may be the product of itinerant Catawba Indian traders. The manufacture and distribution network of these wares is poorly understood and is currently receiving some attention (Crane 1993). Colono wares form a major component of 18th century lowcountry plantation sites above Charleston (as much as 50%), and to a lesser degree planter sites. They seem to be far less common on plantations south of Charleston (Steen 1996). They are also consistently present on Charleston sites, averaging 5% of the ceramics. They are often more numerous in the early 18th

century, and decline rapidly after the turn of the 19th century. Three subtypes, as defined and refined by Ronald Anthony (1986) are recognized in the Charleston collection. Yaughan is the coarsest, and features a porous, crudely smoothed or unsmoothed surface with a grainy texture, both inside and out. The most common is Lesesne lustered, with a lustrous, well smoothed surface that often has a waxy feel. The finely made River Burnished wares are thinner and harder fired, and the clay is often micacious. In Charleston, these wares often exhibit surface painting in red or black, presumably from sealing wax.

The utilitarian wares were dominated by combed and trailed slipware, which was manufactured and used in great quantity throughout the 18th century. Most common were fragments of the small handled cups, which exhibit a thin paste and a clear lead glaze on both the interior and exterior (figure 64). The exterior is decorated by brown dots and combed lines. Other common wares include buckley earthenware, black leadglazed redware, and earthenwares with a variety of glaze colors; orange, rust, brown, dark green. Buckley is a thick crockery of red and yellow swirled clay, with a thick black lead glaze. The unidentifiable lead glazed wares were large preparation bowls, and small bowls or cups for food consumption. They were most likely the products of English potters.

Utilitarian stonewares were also recovered. These include Westerwald stoneware and brown saltglazed stoneware (figure 63). Miscellaneous saltglazed vessels, unidentifiable as to type, were also recovered. Colonial stonewares were manufactured in the Germanic region and dominated the stoneware market in the 17th and 18th centuries; they were declining in popularity by the 1760s. Westerwald stonewares of the 18th century were typically jugs or chamber pots, and this is reflected in the present assemblage. Most of the brown saltglazed stonewares of this post-bellarmine era were large jugs and crocks of varied sizes. Some of these wares were later produced in British factories.

Though smaller in total numbers, a wide variety of table ceramics were recovered. Most common were chinese porcelains, principally the blue on white underglazed variety; only a single fragment of overglazed porcelain was noted. Chinese porcelain was the most expensive and the most sought-after ceramic. It was relatively scarce in the 17th century and thus indicative of wealth. By the second half of the 18th century, Chinese porcelain had become more readily available in the colonies, particularly in major ports such as Charleston. White saltglazed stoneware was equally common, and included a reconstructable plate from feature 15 (figure 59). This vessel featured a plain, round rim. One of the most distinctive ceramic products of the 18th century, white saltglazed stoneware was durable and attractive, but expensive. Dipped wares, first manufactured about 1720, are distinguished by a band of brown slip around the rim. Sometimes the rather cream or grey colored glaze is thick and distinct from the paste. The later elaborately molded white table and tea wares were first developed in 1740. These were manufactured into the 1770s, when they were rapidly replaced with refined earthenwares (Martin 1987). Other stoneware tableware included a single sherd each of scratch blue and Littler's blue. Extremely rare, Littler's blue features a glossy, cobalt exterior glaze. The final stoneware was four sherds of

Nottingham, a delicate table ceramic developed in 1700. This ceramic features a grey stoneware body and a lustrous brown glaze over a white slip. The vessels often feature distinctive incised decorations.

Also recovered were two fragments of Astbury ware and a single sherd of Jackfield. Developed in 1725, Astbury ware features a fine redware paste with clear lead glaze, and decorations of white pipe clay under the glaze. John Astbury, for whom the ware was named, was actually one of many potters producing this ceramic in the second quarter of the 18th century (Noel Hume 1980:123). Jackfield exhibits a thin red or dark grey paste and a very fine, almost oily black lead glaze. It was manufactured from 1740 to 1780. The latest tablewares were the refined earthenwares. Twenty two fragments of Whieldon ware, developed in 1740, were recovered. Many of these mended to a small teacup. The teacup was yellow and green, molded in the form of a cabbage or lettuce. The finish was slightly overfired, giving it a speckled, metallic look (figure 59). Such a finish has been noted on a number of wares recovered from the John Bartlam pottery in Cainhoy, excavated by Stanley South (1993), and may be the best clue to his wares. It is possible that this cup is a Bartlam ware. Six sherds of the later creamware, developed in the 1750s, were the latest ceramic in the early assemblage. In contrast, the earliest tableware was delft, a coarse earthenware with a soft yellow to buff paste, and a chalky tin–enamelled glaze; 77 fragments were recovered from early proveniences. Delft came in undecorated vessels, or featured hand painted designs in blue or a palette of colors, classified as polychrome. The tin enamelled wares of the 17th and early 18th century were not very durable, and rapidly declined in popularity in the second half of the 18th century. Delft was produced in a variety of table and tea wares.

The remaining third of the kitchen materials were glass, and the vast majority of these (315) were dark olive green. These hand–blown bottles evolved from squat, "onion" bottles in the 17th century to tall, cylindrical bottles in the early 19th century. Fragments of these containers litter every colonial site. Other bottle glass fragments in minor numbers were clear, aqua, amber, and pale green. Three fragments of table glass were recovered; the table glass also included four goblet fragments and a leaded glass stopper. Four cutlery items were also recovered, including a bone handled fork. Other kitchen materials include a kettle fragment and a possible grinding stone.

Architectural materials comprised nearly 44% of the early assemblage. Window glass was less numerous than on other sites – 157 fragments – while the vast majority of the quantified architectural artifacts were nails. Only one brass nail (for slate roofs) was recovered. Other items included 8 spikes, 3 pieces of door hardware, and four tile fragments.

Seemingly in contrast to the purpose of the building, arms materials comprised .1% of the assemblage. This included two gunflints and a lead shot (figure 81).

Clothing items comprised .85% of the assemblage, and again the vast majority of these items were from exterior units. The unit included a number of buttons and other fasteners that could have been lost from garments, but also items for clothing manufacture; two straight pins, a thimble,

and a scissors handle. The other clothing items included a brass buckle, 5 iron buckles, 11 brass buttons, and two bone buttons. The brass buttons were plain discs.

Personal items comprised .1% of the assemblage and included two slate pencils and a silver Spanish coin. The coin, dated 1778, was recovered from the top level of feature 23, at the interface with feature 1 (figure 87).

Furniture items were more numerous, surprisingly, and they comprised .32% of the assemblage. Thse included a small hinge, a drawer pull, and 6 upholstery tacks. As is typical of early 18th century assemblages, tobacco pipes were fairly numerous; they comprised 6.3% of the assemblage. Activities items were also relatively numerous. They comprised 3.25% of the assemblage. This group included a large number of iron wire and tool fragments, which may be appropriate in this group. More readily identifiable were 17 barrel strap fragments (figure 89). Though such items are commonly recovered from domestic sites and represent storage containers, the large numbers may have been remnants from powder barrels. More commonly domestic items include four clay marbles and 19 flower pot fragments.

1750–1820 Assemblage

The late 18th century, Revolutionary War assemblage was best represented by the dense zone 2 midden on the building interior. Excavation of multiple 5 foot units on the building interior produced numerous cross–mended ceramics across the building interior, and with some of the outside proveniences. Exterior proveniences from this time period were less numerous; they included zone 3, where present, and features 4, 5, 21 and 25.

Kitchen materials comprised a larger proportion of the artifacts relative to architecture than did the early assemblage. Kitchen materials were 62.5% of the total assemblage (total number of artifacts were comparable for the two assemblages at 2800 and 2960, respectively). Ceramics were 61% of the kitchen group, followed by 38% glass. Tablewares increased dramatically relative to utilitarian wares, rising to 72%. Most of this rise was due to the large quantities of refined earthenwares added to the ceramic group.

A revolution occurred in earthenware manufacture in the 1740s to 1750s, when Josiah Wedgwood developed a refined earthenware with a cream colored glaze, which he called cream coloured ware, or creamware. Perfected in the 1760s, it rapidly became immensely popular due to its durability, affordability, and availability in a wide variety of vessel forms and matched sets. Wedgwood matched his potting abilities with marketing savvy; by the 1770s creamware was "the rage" and could be found in every corner of the world (Martin 1994). According to Ann Smart Martin, Wedgwood managed to compress the cycle of luxury–to–common consumption into a very short time period. By continually introducing new styles, Wedgwood satisfied both the middle class consumer eager to display knowledge of table manners aand the fashionably wealthy who sought to distance themselves from the nouveau. In the 18th century, the upper class often chose

creamware for an everyday china. After 1820, it was common in large, utilitarian forms such as bowls and chamber pots, and was considered the least expensive ceramic.

The late colonial assemblage at the powder magazine contained quantities of creamware (16% of ceramics) and particlularly pearlwares (31% of the ceramics). The later whitewares comprised only 5% of the ceramics. Noticably absent are the earlier whieldon Wares: in the early assemblage, whieldon and creamware comprised 2% of the ceramics each. This group of late 18th century refined earthenwares contained a few reconstructable vessels. Feature 25 contained a tall creamware mug (figure 72), while the interior zone 2 contained fragments of a blue annular ware bowl with a black and white checkerboard design (figure 71). The pearlware group contained the range of decorative designs; those developed in the 1780s (shell edging, hand painting) were equally common (105) with those developed in 1795 (annular, transfer printing)(106). This suggests accumulation of the zone 2 midden in particular in the years immediately following the Revolutionary war.

Josiah Wedgwood continued to experiment with production of whiter ceramics; in 1779 he introduced "pearl white" china. By adding cobalt to the lead glaze to negate its natural yellow tint, the vessel took on a bluish–white cast. A variety of decorative motifs – hand painting in blue or polychrome, shell edging in blue or green – were introduced in 1780. Still others – transfer printing, annular designs – were introduced in 1795. Thus the presence or absence of various creamware and pearlware types are important in dating archaeological deposits. Some of these decorative motifs are associated with specific vessel forms and relative costs (Miller 1980, 1991; Otto 1979). Transfer printed wares came in a range of hollow and flat forms, and in complete sets for table or tea; these were the most expensive. Annular ware, with its variety of stripes, were always unmatched bowls and mugs. Designed for casual dining and one–pot meals, these were the least expensive decorated wares. The hand painted wares were most often tea wares, and the handleless cups, saucers, cream pots, and small pitchers came in a large, but finite, number of floral and geometric designs. The shell edged wares were predominantly flatware (soup bowls and plates in various sizes). These were moderately priced (Miller 1980, 1991).

Oriental porcelains were far less numerous; they comprised 5% of the ceramics. Other tablewares included white saltglazed stoneware (2.8% of the ceramics; figure 66) and minor amounts of other 18th century table and tea wares: Elers ware (an elegant unglazed red stoneware, 1763–1775), Nottingham stoneware, Astbury ware, Agate and Jackfield ware. Delftware comprised 7% of the ceramics (figure 65).

Utilitarian wares comprised 18% of the assemblage, comparable with other domestic assemblages of this period. Combed and trailed slipwares were most common (53)(figure 64), followed by brown and grey saltglazed stonewares and Westerwald stoneware (62 total). The stonewares were principally jugs and chamber pots, while the slipwares were shallow bowls or small cups. Also present were a large number of lead glazed earthenwares, many of which mended across zone 2. In particular was small cup of black lead glazed redware (figure 60), and a slightly larger bowl of dark green lead glazed redware (figure 70). Several other lead glazed redware vessels

were recognizable, as well, but only the small black cup was successfully reconstructed (figures 67–60).

Colono wares comprised 9.2% of the ceramics, above the domestic average for this period (5%). The wares were fairly evenly divided between Yaughan and Lesesne lustered varieties. Zone 2 contained a reconstructable Yaughan bowl; this mended with large fragments from feature 26 on the building exterior (figure 60).

Container glass comprised 38% of the kitchen group, and most of these were 18th century hand blown glass. Again, olive green glass dominated the glass and was probably from alcoholic beverage bottles. Olive glass was 26.5% of the kitchen group, nearly identical to 27.3% for Charleston domestic sites. Other 18th century glass was possibly for condiments or medicine. These vessels were aqua, greenish–clear, amber, or medium green glass. Slightly less clear glass was recovered here than at other domestic sites (4.6% vs. 6.6%). Blue, purple, and brown glass were from containers developed in the 19th century.

Table glass included fragments of wine goblets and tumblers, and even a fragment of etched glass. Table glass comprised 1.9% of the kitchen group, comparable to elite sites in the city. The final artifacts were a kettle fragment, an iron knife blade, and two other cutlery fragments (figures 77 and 78).

Architectural materials comprised 33% of the assemblage. Window glass was more strongly represented in this group, comprising 36% of the architecture group. The remaining 2/3 of the group consisted of nails. Most of the nails and fragments were unidentifiable; however, most of those that could be identified were machine cut (256). Only 6 hand wrought nails were represented. All of the nails manufactured before 1780 were hand wrought, and they continued in use well into the 19th century. Hand wrought nails feature a shank that is square in cross–section, tapering to a point or a spatulate end. The head is applied separately. The first machine–produced nails were developed in 1790; these featured shanks that were sliced by machine from sheet iron and heads that were shaped individually by hammering. In 1815, the head was also machine made, though the nail was "waisted" below the head until 1830. Wire nails, with their now–common round cross–section were perfected in Europe and then manufactured in New York by 1850. The late colonial nail assemblage may reflect refitting the magazine prior to the Revolution, or postwar repairs, or both. The group also included six spikes, or framing nails. A single brass nail, for slate roofing, was recovered. Three delft tiles, three miscellaneous hardware fragments, and a shutter pintel completed the group.

Arms material comprised .5% of the assemblage, slightly more common than the earlier assemblage. The group included 9 flint chips, a gunflint, 2 cartridge shells, and a lead shot. The one cannon ball recovered from the site came from zone 2 level 2. This cannon ball was about 5" in diameter (figure 80). Two other artifacts were counted in the personal group, but may be military items; both were recovered from interior zone 2 deposits. The first was a section of heavy, decorative brass chain in a tightly woven, overlapping line. The section of chain is about 5" long and, its exact function is unknown. The other is the silver plated tip to a leather scabbard. The

piece was broken in two, but features a scalloped edge, some stamped designs, and a rounded tip. It is identical to one on a Revolutionary War scabbard in the Charleston Museum collections (figure 82).

Clothing materials comprised .9% of the assemblage. Bone buttons were the most common clothing fastener, followed by brass buttons. Two 19th century white porcelain buttons were recovered, as was a glass bead. The group also included 12 straight pins, a buckle and a brass lacing tip (figure 83). The personal group was quite small, comprising .1% of the assemblage. The group was diverse, however, and contained a pocket knife, a key, and a bone slat from a woman's fan. The furniture group was even smaller, .03% of the assemblage, and consisted of three upholstery tacks.

The tobacco group was smaller than that of the early 18th century; the late colonial assemblage contained 2.02% pipes, down from 4.4% (figure 85). The activities group was also somewhat smaller, .98% of the assemblage. Prominent in this group were 23 fragments of barrel straps. Also recovered was scrap lead, iron wire, copper wire, and unidentified copper fragments. Thirteen fragments of flower pots were also recovered.

1820–1850 Assemblage

The early 19th century assemblage covers the first of two eras of private ownership, and a variety of commercial uses. According to some records, it served at various times as a wine cellar, print shop, horse stable, blacksmith shop, and storage building. The archaeological record suggests that it also served as a habitation site during this period.

The majority of artifacts from the antebellum period were recovered from feature 42, the large pit on the building exterior. This feature was evidently filled quickly, and thus functions as a "time capsule" of sorts. The other antebellum deposits include zone 1b on the building interior and a variety of small pits on the building exterior. For comparative purposes, feature 42 was tabulated separately from the remaining proveniences; however, there was virtually no difference in the artifact proprtions, so they were combined for the present discusison.

The antebellum assemblage in general was marked by a dramatic increase in architectural materials compared to kitchen items. Kitchen materials comprised only 36% of the assemblage. Ceramics still dominated this group, however, comprising 64% of the kitchen group. The 19th century whitewares comprised 31% of the ceramics, followed by pearlwares (27%) and creamwares (15%). Contained in this group were a few reconstructable vessels. They included an annualar ware bowl, brown with a cabled design, and a tall annular ware mug, with bands of sponged or speckled decoration (figure 72). A blue transfer printed whiteware plate cross–mended from feature 42 and zone 1b, supporting the idea that soil and artifacts were generated on–site (figure 74). Also reconstructable was a green transfer printed whiteware plate from the base of feature 42 (figure 75). This is the "dragon pattern" by Spode and is dated c.1820–1830 by Ottilie Bentz (personal communication).

Whitewares are the hallmark of post 1820 archaeological assemblages. Wedgwood and others continued to work with the pearlware glaze formula, still striving for a white ceramic. By about 1820 this was achieved, and all refined earthenwares from this period are classified as whiteware. The same (pearlware) decorative techniques were used on whiteware, though the color palette changed from the earthen tones of the late 18th century (rust, golden yellow, sage green, cobalt blue, brown) to bright primary colors such as black, purple, mulberry red, forest green, and light blue. Transfer printing in colors other than blue became popular after 1830. By mid-century, vessel style changed from the thin delicate wares characteristic of the Georigan period to thicker, angular or octagonal vessels, often undecorated.

Porcelains and other 18th century tablewares declined in relative frequency. Only three fragments of white porcelain, developed in 1851, were recovered. Porcelains comprised 5.7% of the ceramics, while white saltglazed stoneware measured less than 2% and delft, 2.4%. A few sherds each of Nottingham, Scratch Blue stoneware, Astbury, Agate, Jackfield, and Whieldon ware were recovered.

Utilitarian wares comprised only a very minor amount of the ceramics, 8.7%. This small group included slipwares, a small number of miscellaneous lead glazed earthenwares, and a variety of 19th century stonewares. As is typical of the 19th century, colono wares declined in relative abundance and comprised 3.8% of the ceramics. Lesesne lustered was the predominant subtype.

Container glass comprised the remaining 35% of the kitchen group. Olive green glass continued to dominate the group (figure 76); clear bottle glass was far less common. A small amount of manganese glass, a late 19th century type, was present. Also included were small amounts of amber, cobalt blue, and brown glass. Only three fragments of table glass were recovered.

Architectural materials dominated the antebellum assemblage, comprising 54% of the assemblage. The group was dominated by nails, and the majority of identifiable ones were machine cut. Only six wire nails were identified, and only ten hand wrought nails were identified. Window glass fragments were also quite numerous; they comprised 28% of the architectural group, somewhat less than the Charleston average. The antebellum assemblage included 14 brass nails for slate roofing, in contrast to the single examples in the 18th century assemblages. Eight framing nails and three pieces of miscellaneous hardware were recovered.

A single arms item was recovered, for .03% of the assemblage. This was a flint chip. Clothing items were .64% of the assemblage. Clothing fasteners included six bone buttons, five shell buttons, and three others. Four brass clothing hooks were also recovered. The final clothing item was a straight pin. An ink bottle was the single personal item recovered, comprising .03% of the assemblage. Furniture items were only slightly more numerous, at .06% of the assemblage. These were an oil lamp fragment and a brass upholstery tack. The most elaborate and unusual artifact were fragments of a pewter picture or mirror frame (figure 87). Tobacco pipes comprised .85% of the assemblage, and included only 25 stem fragments.

The activities group, in contrast, was relatively large and diverse. The most interesting item was a bone die, featuring the number '4' on a single side. This was recovered from the deepest level of feature 42. This die is an exact match for one marked '5', recovered from the zone 2 interior deposits. Interestingly, both of these dice have numbers on a single side (figure 84). The matching set of dice, recovered in distinct locations, reinforces the interpretation that the recovered soil and artifacts were deposited, and redeposited, on site.

Barrel strap fragments were the most numerous identifiable activities items; 27 fragments were recovered. These no doubt reflect the storage function of the building. The group also included eight fragments of flower pots. The remainder of the group consisted of unidentifiable items; rings of iron, iron rods, iron and brass wire. Two small brass rings, reminiscent of curtain rings, and eight scraps of lead were recovered. The most distinctive artifacts were recovered from zones 1a and 1b; these were a stirrup and two horse shoes (figure 91)

1851–1900 Assemblage

The second half of the 19th century was an active period of use for the magazine. In particular, the exterior midden, zone 2, was deposited, or at least added to, at this time. Inside the building, zone 1a was deposited on the eastern side of the building interior. Numerous posts and other small features were dug and filled on the building exterior at this time, as well.

Kitchen materials continued to remain less important in the postbellum assemblage. They comprised 38% of the assemblage. As is typical of later 19th century assemblages, ceramics declined in proportion to glass containers, comrpising only 60% of the kitchen group. As with all 19th century assemblages, refined tablewares dominated the ceramics. Whitewares comprised 24% of the ceramics, pearlwares 28%, and creamwares 15%. Small numbers of sprigged whiteware (1830–1850), Lusterware (1840–1860), and flow blue ware (1840–1860) were present. The latest wares were gilt–decorated whiteware and white porcelain (1880s–1890s). White porcelain, developed in 1851, was present in moderate numbers, comprising 5.7% of the ceramics (figure 73). Earlier porcelains, principally blue on white oriental, comprised an additional 5.1% of the ceramics. Earlier 18th century types were present in very minor amounts.

Utilitarian wares comprised 11% of the ceramics. The ubiquitous Combed and Trailed slipware was the most common, followed by various stonewares. The latter group included the varied 19th century albany slipped styles as well as a few fragments of the alkaline glazed wares from the Edgefield district potters. The final group of utilitarian ceramics were the variety of lead glazed earthenwares.

Container glass comprised 40% of the kitchen group. Olive green glass remained the most common, but clear container glass increased dramatically. So did aqua and pale green glass, often used for condiment or pharmaceutical bottles. Later glass bottles were brown (for beer or whiskey), amber, or manganese (developed in 1870). Four identifiable fragments of soda water bottles were recovered; the additional fragments of cobalt blue glass are also likely from soda

bottles. Decorative or table glass fragments included 55 pieces of milk glass, 6 fragments of wine goblets, and 51 fragments of miscellaneous leaded glass. The final kitchen materials included 19 fragments of tin cans (developed after 1850), two large kettle fragments, and 4 cutlery items. These included two iron knife blades, a fork, and an iron spoon bowl (figure 78).

Architectural materials comprised 58% of the assemblage. Window glass was quite common in this assemblage, comprising 34% of the architecture, slightly below the Charleston average for this time period. Nails were the most common artifact, with machine cut nails the most common. Fifteen large framing nails or spikes were recovered, and nine brass nails from slate roofing were found. Miscellaneous hardware included screws, nuts, and washers, four pieces of door hardware. The final objects were six fragments of delft tile and two more of decorated tile.

Arms materials comprised .28% of the assemblage. Included in this group were 28 fragments of flint; only one was recognizable as a gunflint. Three .22 calibre shells were also recovered.

Clothing items comprised .44% of the assemblage and the group was rather varied. Buttons were the most common clothing item. The group included eleven brass buttons, five 4-hole bone buttons, and sixteen others. Most of these were porcelain or mother-of-pearl. Three were flat iron buttons. The most distinctive was highly molded Victorian brass button featuring three hound dogs (figure 87). Other clothing items included a scissors fragment and a brass clothing hook.

Personal items comprised .1% of the assemblage. This group included 4 slate pencil fragments, a tortoise shell comb fragment, a hard rubber comb fragment, a tooth brush fragment (figure 87), and a possible hygiene tool (ear scoop). Jewelry included a possible hair barette fragment. The furniture group comprised .28% of the assemblage and included eleven furniture tacks, a brass corner brace, three small hinges, and ten miscellaneous fragments. The miscellaneous category include a picture hook, a small brass plate, and a drawer handle.

Tobacco pipes comprised .93% of the assemblage, and activities items comprised 1.52% of the assemblage. The activities group included 32 flower pot fragments and 46 barrel strap fragments. Other special items included 4 printers type. Three of these were elaborate brass letters, which appear to have originally featured wooden handles (figure 92). These were likely for embossing leather covers rather than printing on paper (Brien Varnado, personal communication). The fourth was a piece of lead type. The late 19th/early 20th century deposits on the building interior also contained a number of tools, including a triangular file and a half-round file (figure 88). Three marbles were recovered, as were a number of links of chain. Other artifacts included in this group were those difficult to ascertain function, including brass and iron rings and wire fragments, and scrap lead. Of particular interest were a number of 'C' shaped iron rings, rectangular on the outside and approximately 3" in length. The function of these is unknown (figure 90).

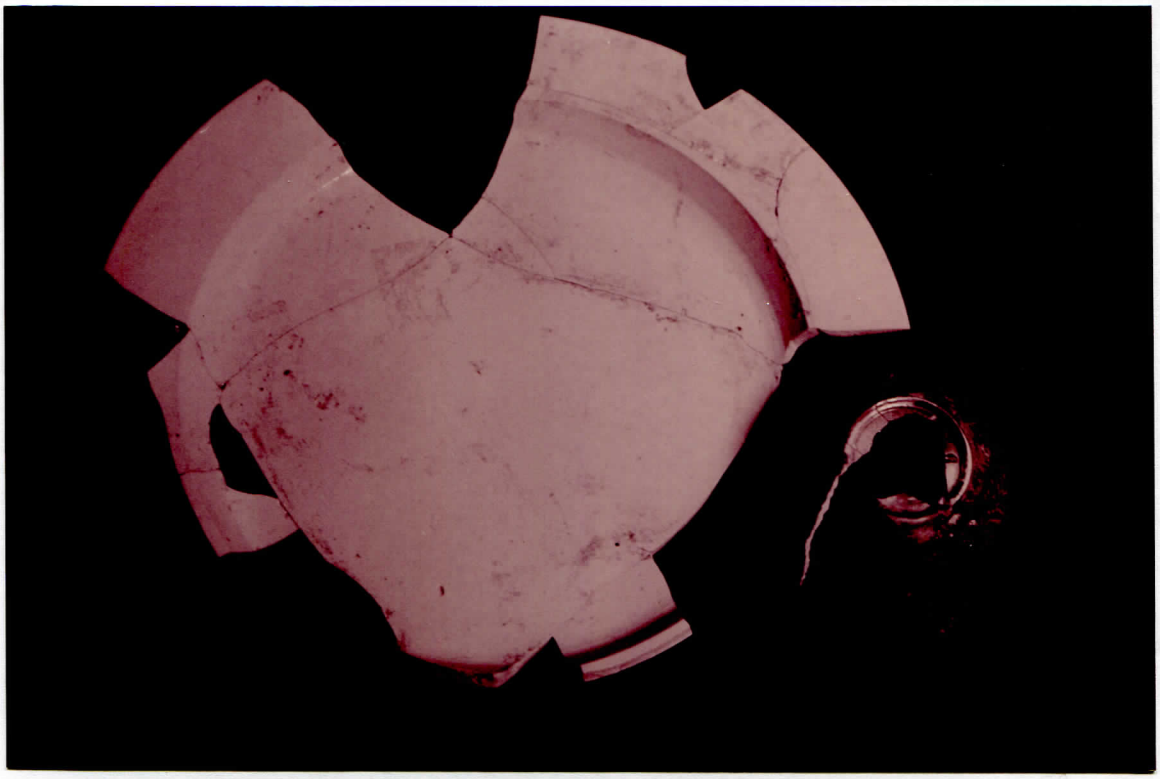


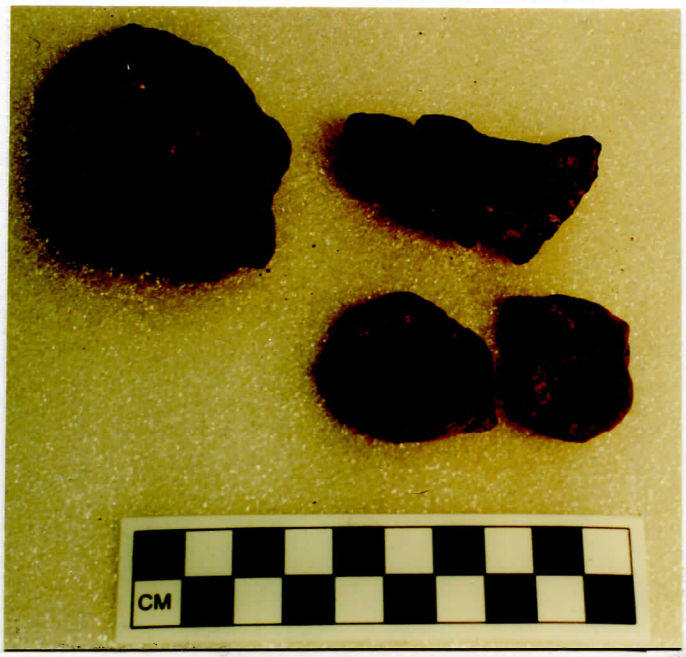
Figure 59
White Saltglazed Stoneware plate from feature 15
Whieldon ware cup from feature 24

Figure 60

Black lead glazed cup from zone 2 interior

Colono ware (Yaughan) bowl from feature 26 (exterior) and zone 2 (interior)

61



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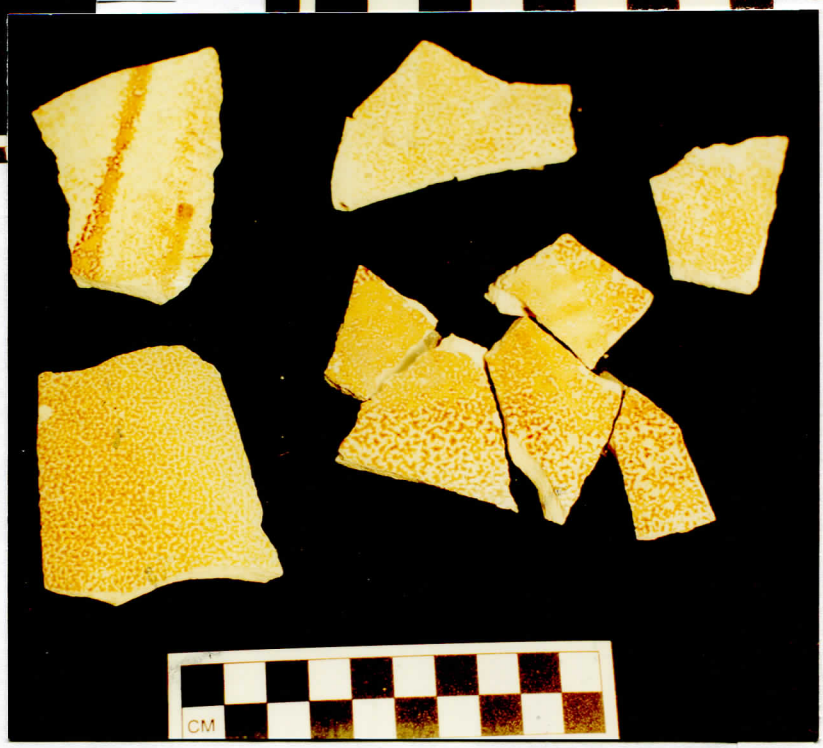

63

Figure 61: colono ware (Lesesne lustered) from zone 2 interior
Figure 62: colono ware (Yaughan) from zone 2 interior
Figure 63: Brown saltglazed stoneware from feature 24
Figure 64: slipware cup from features 23 and 24
Figure 65; Delft apothecary jar from feature 24

Figure 66: white saltglazed vessels from features 23–24

Figure 67: various lead glazed earthenwares

Figure 68: lead glazed redware vessel with glazed exterior, unglazed interior

Figure 69: grey salt–glazed stoneware crock, from feature 42

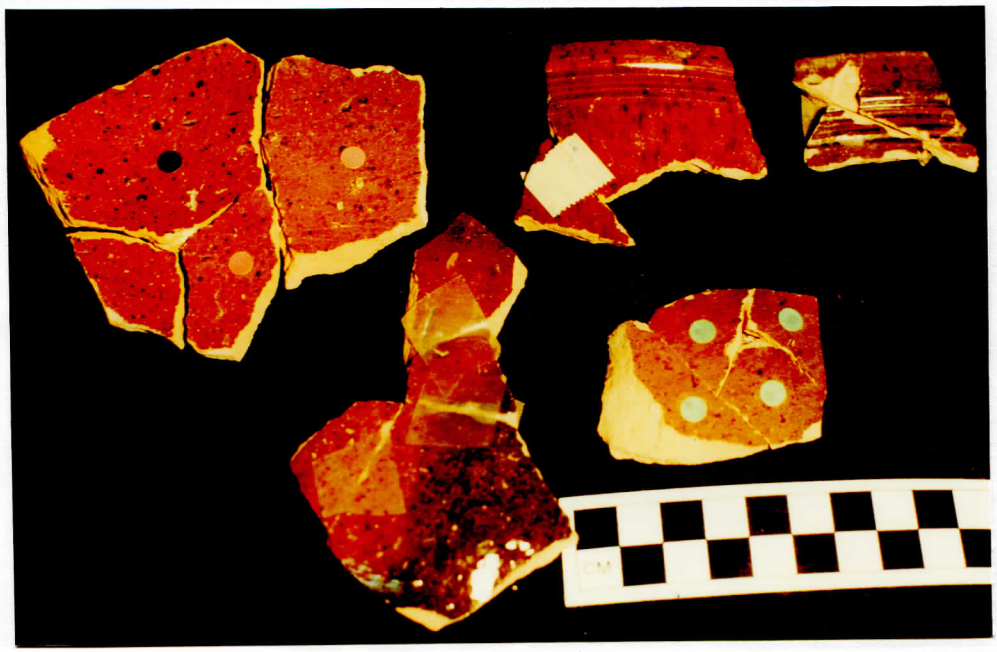

Figure 70
Green/brown lead glazed earthenware jar, from zone 2 interior proveniences

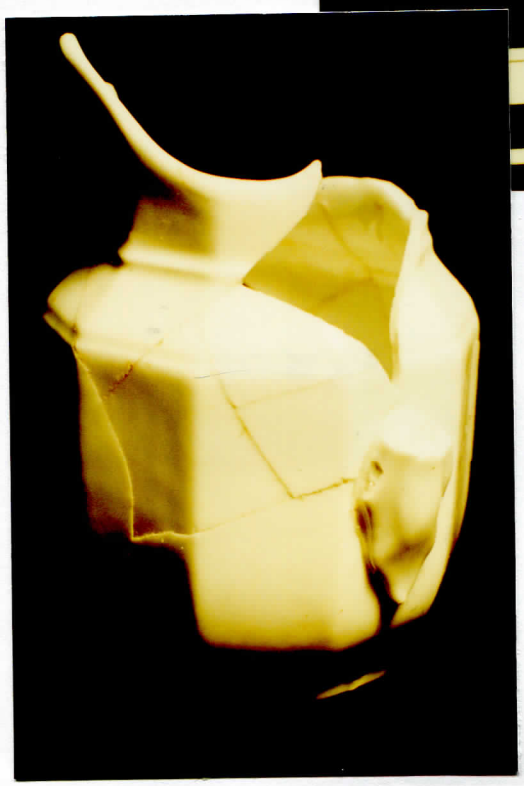

Figure 71: annular ware bowl from zone 1b and zone 2, interior

Figure 73: white porcelain pitcher from zone 2 exterior

Figure 72: annular ware mug and cable bowl from feature 42; creamware mug from feature 25

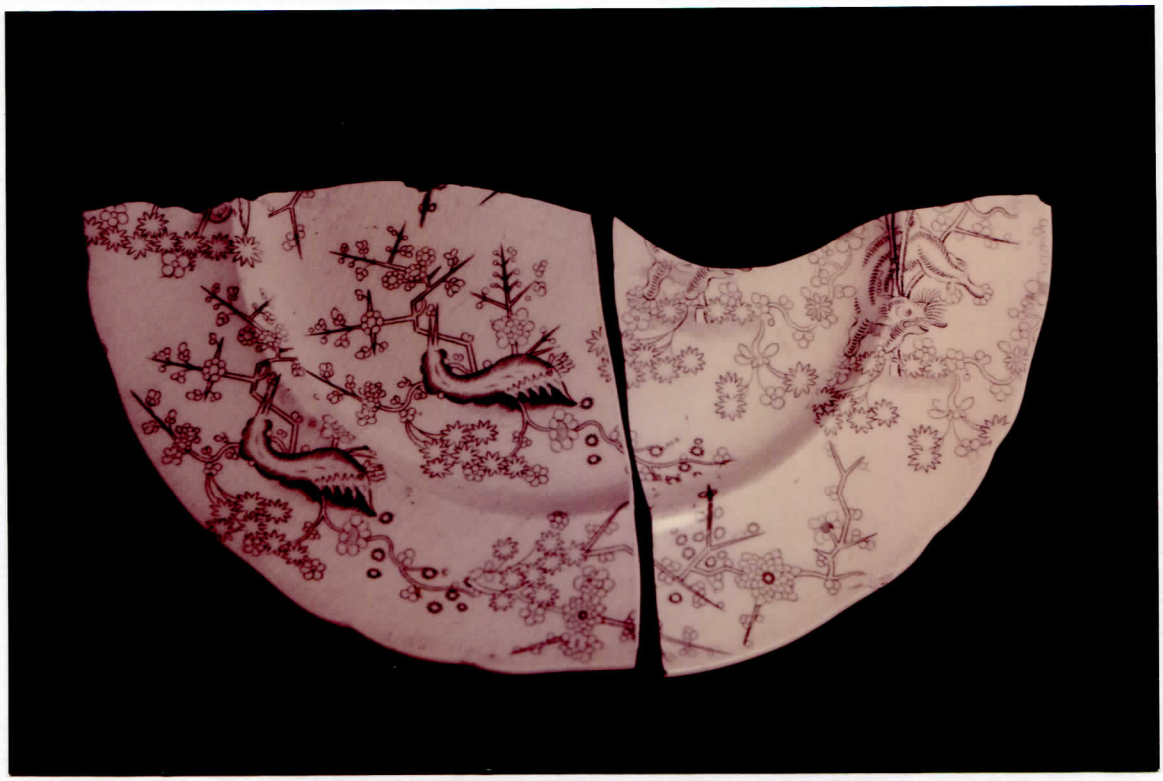

Figure 74
Blue transfer print whiteware plate from
feature 42 exterior and zone 1b interior

Figure 75
"Green dragon" by Spode, 1820–1830
from bottom levels of feature 42

76

Figure 76: green glass bottles from feature 42

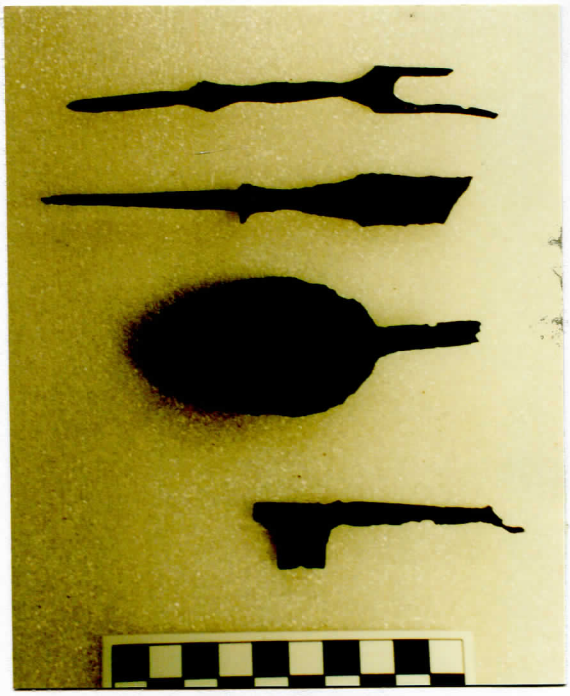

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Figure 78: examples of cutlery

77

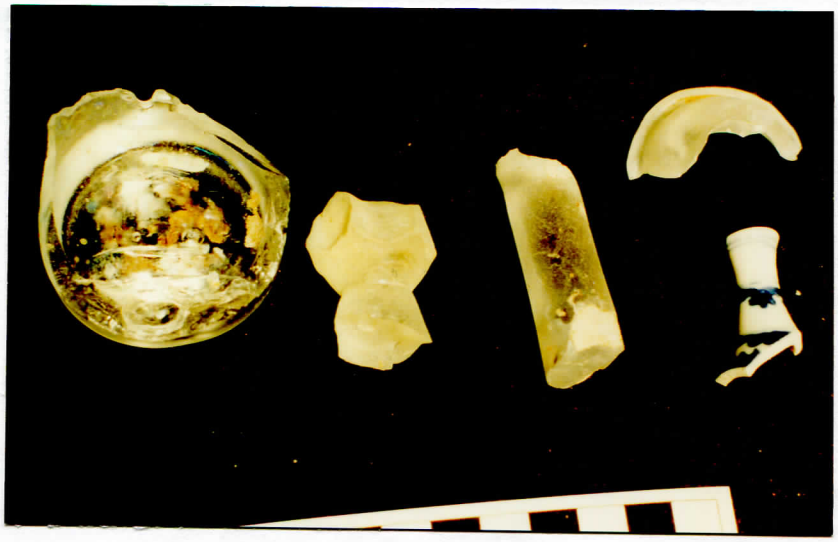
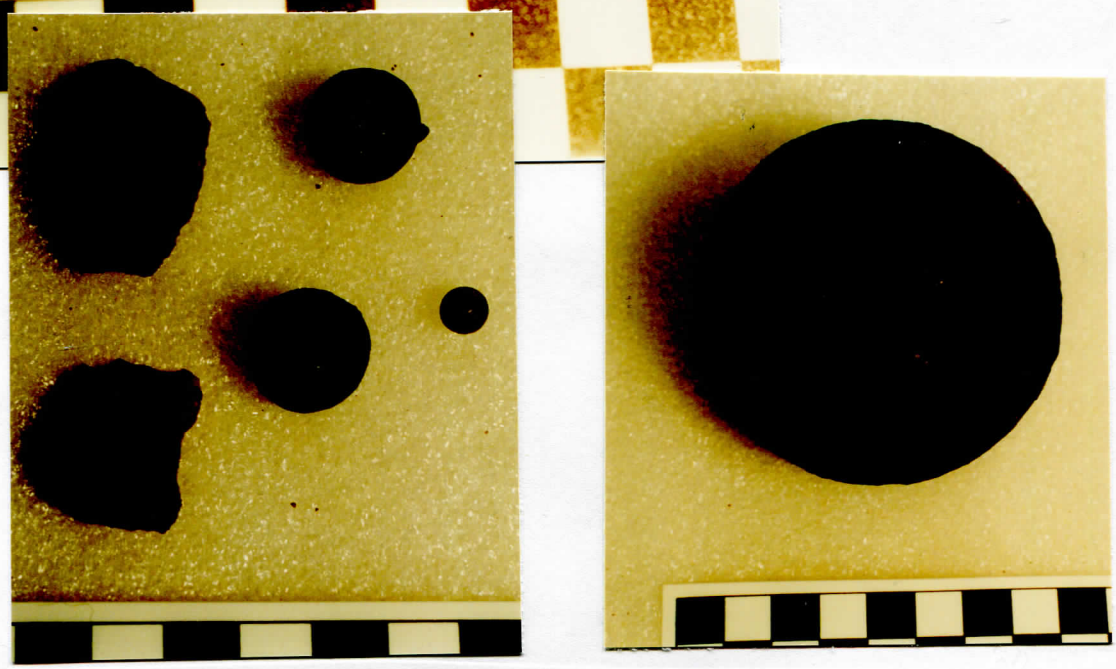


Figure 77: examples of table glass. The miniature porcelain vase is from feature 1

Figure 79: architectural samples. The pantile is from feature 24, the slate from feature 42

Figure 82: scabbard tip, zone 2 interior; decorative chain, zone 2 interior



Figures 80–81: lead shot and gunflints; cannon ball from zone 2 interior

Figure 83: clothing items, from feature 23, interior zone 2, feature 42

Figure 86: furniture items, roofing nails

Figure 85: tobacco pipes from feature 24, zone 2

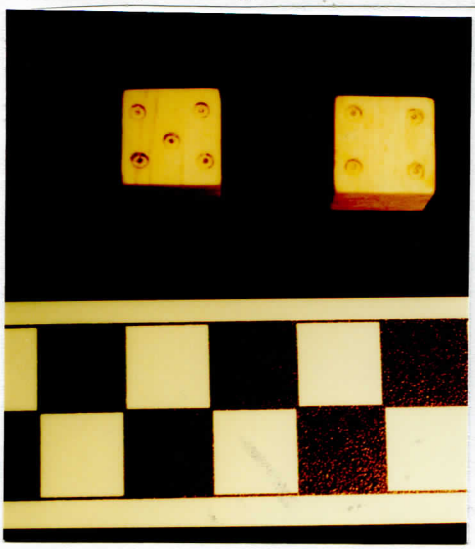


Figure 84: pair of bone dice. The '4' came from feature 42, the '5' from zone 2 interior.

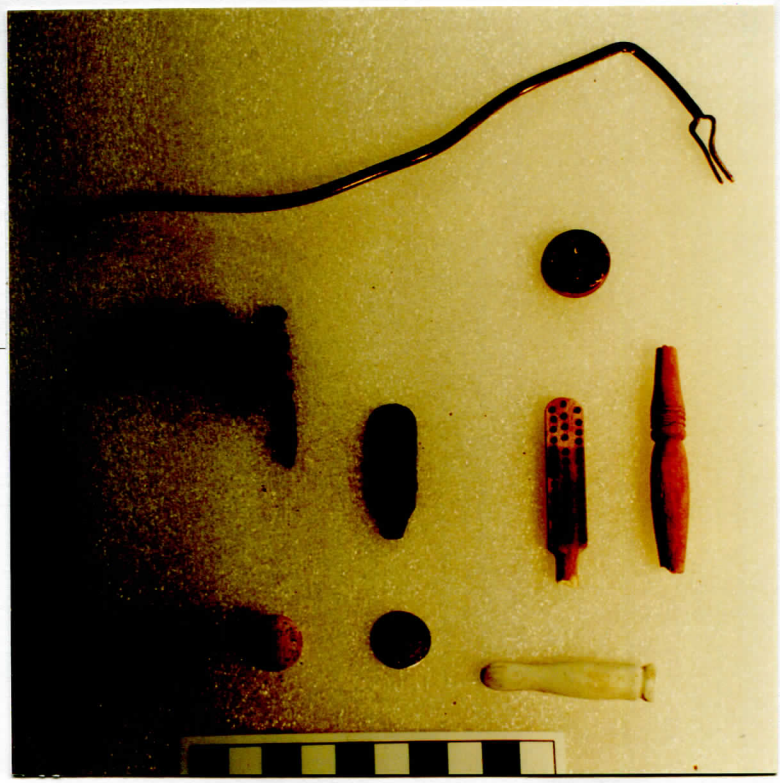


Figure 87: personal items from 18th and 19th century proveniences

Figure 89: barrel straps

Figure 90: unknown hardware

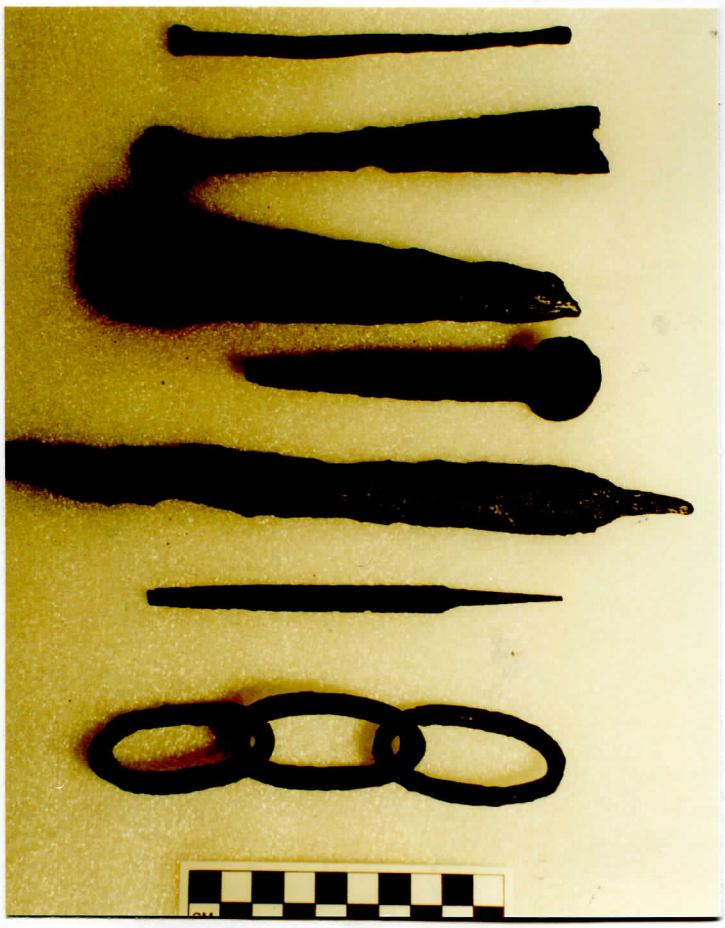


Figure 88: miscellaneous tools and hardware

Figure 91: stirrup and horse shoes, from feature 58, feature 75, zone 1 (all interior).

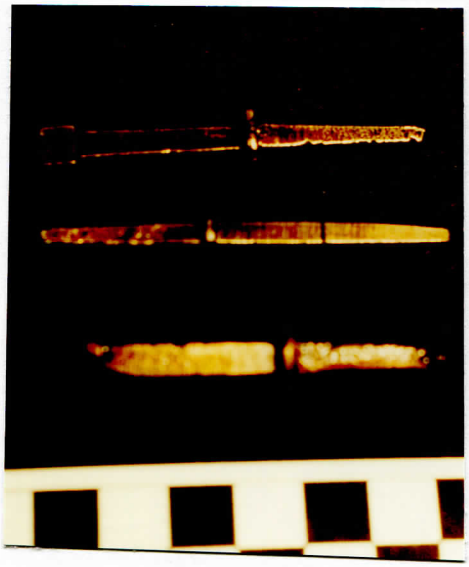


Figure 92: printer's type. The brass pieces would have featured wooden handles. They were used for embossing leather covers, rather than for printing on paper. From feature 2, zone 2 exterior, zone 1a interior.

Table 3
Guide to Temporal Subdivision
(by FS#)

1712–1750		1750–1820		1820–1850	1850–1900		
31	184	38	235	28	8	90	150
32	200	42	237	29	10	91	185
36	203	43	244	39	12	92	193
46	204	45	250	70	13	93	201
48	205	52	253	84	16	94	215
49	209	53	268	89	17	95	224
50	213	55		106	18	96	
51	214	68		114	20	97	
57	223	105		115	21	99	
58	226	113		117	22	100	
60	228	139		120	23	101	
61	229	142		122	24	102	
62	231	147		125	26	107	
63	234	157		129	30	108	
65	236	163		130	33	109	
69	241	167		132	35	110	
71	245	170		134	37	111	
76	246	171		137	40	116	
78	247	177		138	41	121	
80	251	179		141	44	122	
103	252	180		143	47	123	
112	254	186		144	54	124	
123	255	188		148	56	125	
124	256	190		149	59	126	
135	258	191		150	64	127	
136	260	192		151	67	128	
145	269	194		187	72	129	
158		196		202	73	130	
164		205		216	75	131	
168		206		227	77	132	
169		207		233	79	133	
172		208			81	134	
173		210			82	141	
174		211			83	143	
175		219			85	144	
178		221			87	146	
182		222			88	148	
183		230			89	149	

Table 4
Quantification of the Assemblage

	1712–1750	1750–1820	1820–1850	1850–1900
Porcelain, b/w	56	46	27	87
Porcelain, overglaze	1	8	7	13
Porcelain, canton		3	5	
Porcelain, white			3	128
Porcelain, misc	19			2
Stoneware, misc 19th		8	9	24
Brown saltglaze st.	23	11	4	12
Westerwald stoneware	16	43	15	25
Elers ware		3	1	1
Black Basalte ware				
Nottingham	8	8	5	4
White saltglazed st.	61	29	14	26
Slip dipped stoneware				
Littlers blue st.	1			
Scratch blue st.	1	1	3	2
Astbury ware	2	3	1	1
Agate ware		2	1	
Jackfield ware	1	3	1	2
Whieldon	22		1	
Creamware	20	193	106	290
Creamware, dec.		6	4	13
Pearlware, undecorated	17	178	58	206
Pearlware, blue h.p.		38	20	69
Pearlware, poly h.p.		35	17	52
Pearlware, shell edge		36	24	54
Pearlware, annular		41	22	52
Pearlware, trans print		65	57	131
Whiteware,undecorated		24	96	267
Whiteware, tr.pr. blue		16	44	102
Whiteware, tr.pr. other		6	62	55
Whiteware, shell edge		4	4	7
Whiteware, hand paint		2	13	21
Whiteware, annular		2	11	34
Whiteware, luster		1	2	5
Yellow ware		5	7	3
Rockingham ware				7
Flow blue				2
Portobello ware			1	

Slipware, comb	259	53	21	99
Slipware, sgraffitto	1			
Slipware, American	5	2	4	2
Buckley ware	2		3	3
Mid–Atlantic ware		4	1	1
Mottled ware		1	2	2
Southern European		2		
Black lead glaze e.w.	4	27	1	2
misc lead glazed e.w.	49	37	15	33
unglazed e.w.		2	1	
Olive jar			1	1
Faience				1
Delft, undecorated	16	69	15	32
Delft, b/w	57		2	8
Delft, polychrome	4	4	1	1
Colono, yaughan	63	27	5	17
Colono, Lesesne lust.	117	61	20	21
Colono, River Burnished	3	8	3	4
glass, dark olive	315	409	138	336
glass, light olive	19	83	85	136
glass, greenish clear	26	14	33	111
glass, manganese	2	25	34	17
glass, clear	29	72	63	317
glass, amber	2	2	4	64
glass, aqua	2	59	19	113
glass, cobalt		2	1	16
glass, blue		3		24
glass, brown		1		39
table glass	4	17	3	1
goblet	4	5		6
tumbler		13		
milk glass	2			22
kettle fragment	1	1		
cutlery	4	3		1
window glass	157	358	474	1748
nail, wrought	65	6	10	16
nail, cut	3	256	547	1491
nail, wire	1	7	6	
nail, ud	130	332	241	1080
nail, frag				
spike	8	6	8	15
brass nail	1	1	14	9

delft tile	4	3		6
hardware	3	3	3	4
gunflint	2			1
lead shot	1	1		
cannon ball		1		
flint frag		9	1	28
scabbard tip		1		
dec chain		1		
bone button	2	10	6	5
brass button	11	3	3	11
porcelain button		2	5(shell)	16
straight pin	2	12	1	
beads		1		
buckle	5	1		
lacing tip		1		
thimble	1			1
scissors handle	1			
clothing hook			4	1
coin	1			
slate pencil	2			4
bone dice		1	1	
pocket knife		1		
key		1		
fan slat		1		
hair comb				3
tooth brush				1
drawer pull	1			1
upholstery tack	6	3	1	11
lamp frag			1	
picture frame			1	
tobacco pipe	176	60	25	81
barrel strap	17	23	27	46
flower pot	19	13	8	32
toys	4			
misc tool				8
horse equip.			3	
printers type				4

Temporal Changes in Artifact Patterning

In 1977, Stanley South published the seminal work *Method and Theory in Historical Archaeology*. In this work, South proposed an analytical method which classified artifacts by function. The seven functional groups – kitchen, architecture, arms, clothing, personal, furniture, pipes, and activities – covered the range of domestic activities at British colonial sites. South went on to note that there were broad regularities in the relative proportions of these artifact groups across colonial, and possibly Federal, America, reflecting the "typical" range of activities on domestic sites. He termed this regularity the Carolina Artifact Pattern. Any deviation from the pattern should reflect different activities at the site.

Since 1977, South's pattern recognition approach has been widely used, and in some cases abused, by historical archaeologists. South himself (1988) has argued that pattern recognition should be simply a first step in studying cultural processes responsible for behavior reflected in artifact patterning. Subsequent researchers have suggested changes in the placement of certain artifact types (Garrow 1982). Others have named a variety of patterns, designed to elucidate variation in the material culture on rice plantations, cotton plantations, yeoman farm sites, urban, public, and industrial sites (see Jackson in Zierden, Drucker and Calhoun 1986).

South's methodology has always been used as an organizing tool for the Charleston artifact assemblages, allowing for direct intersite comparison. In the past decade, it has become apparent that a variety of factors influence artifact patterning, ranging from human behavior to the physical site formation processes to technological developments and marketing trends in the material culture itself. Julia King (1990) has proposed a different classification scheme for the analysis of intersite spatial patterning at colonial sites in the Chesapeake region; she has recently applied this technique to a lowcountry plantation site (King 1992). This technique considers domestic artifacts and architectural materials separately. Following her example, various classes and types within the kitchen and architecture group are considered separately.

Throughout the past decade, the material culture of Charleston sites have been subdivided temporally for sites occupied throughout the city's 300 year history. These temporal subdivisions are based on specific site events and general trends in Charleston's development. Charleston proveniences and their materials have generally been separated into three temporal subdivisions: 1670 to 1750, 1750 to 1830, and 1830 to 1900. The early period corresponds to Charleston's role as a frontier outpost and emerging port city. The second marks Charleston's "golden years" as a leading seaport and center of wealth, and the third corresponds with Charleston's economic decline and stagnation. These periods also correspond to changes in ceramic and glass technology. The early period is that of relatively scarce and expensive material culture; the second corresponds to the rise of the British pottery industry and the development of refined earthenwares, and the third to a decline in new ceramic types and the ascendancy of mass–produced glassware.

These temporal subdivisions are more or less comparable for a number of Charleston sites. Development of baseline data for this analysis began with excavations at the Heyward–Washington house in 1991 (Zierden 1993). At that point, five to six assemblages were available

for each of the three temporal periods. In each case, the majority of the samples were from elite townhouse sites, but at least two were from other types of sites: middle class residential, mixed residential/commercial, or public. That analysis will be recapped here, and comparisons made with the Powder Magazine. The dates correspond well to the general categories. The general 19th century category, 1830–1880, encompasses the two 19th century assemblages for the powder magazine. These two will be considered separately, and analyzed together, as the profiles for the two periods are quite different. This analysis will provide supporting data for interpretation of site function and activity range through the history of the magazine.

Organization of the data begins with the broad categories proposed by South. The relative proportions of these categories remain more or less consistent through time, and remarkably similar to the Carolina Pattern, supporting South's original contention that this pattern reflects typical behavior on a domestic site. The Carolina Pattern does not appear to be particularly sensitive to variables such as status and ethnicity; the relative proportions are instead affected by site formation processes and technological changes.

Kitchen artifacts dominate the assemblages and remain rather consistent through time, although relative proportions of various artifact types change. Kitchen materials average 50% of the assemblage, and tend to drop in relative proportions in the post–1830 period. This varies for the powder magazine through time. The earliest period contains only 45% kitchen materials, compared to an average of 55%. It jumps to 62.5% in the late colonial period, slightly above the average of 58.5%. It is nearly this high, 60%, for the antebellum assembage, but drops to 37% for the late 19th century. The 1830–1880 average is 43%. These data support the interpretation that folks may have been in at least part time residence during the late colonial and antebellum periods, and not so for the early colonial and late 19th century.

Achitectural materials, the other major category, demonstrates a consistent increase through time on most Charleston sites, no doubt reflecting the accumulation of architectural debris as lots were rebuilt upon and standing structures renovated, repaired, enlarged, or demolished. Architectural materials average 25% of Charleston assemblages in the early 18th century, and increase to 33% in the late 18th century and 41% in the 19th century. This assemblage, of course, does not include the volumes of brick, mortar, and slate rubble recovered on Charleston sites. This significant increase through time suggests that factors other than the activities of daily life affect the relative presence of architectural material. The architectural proportions do not follow this unilineal trend, and instead vary through time according to changing site function. Architecture is relatively high for the early colonial period, 44% compared to 26%. This may reflect a paucity of domestic materials rather than a preponderance of architectural items. In contrast, the late colonial period contained 33% architecture, identical to the Charleston average of 33.6%. The 1830–1880 Charleston average jumps to 48%; the powder magazine antebellum average remains low at 33%, despite numerous repairs and changes. Architecture jumps to 58% in the postbellum period, as domestic artifact fall proportionately. Another explanation may be that most of the postbellum proveniences <u>are</u> architectural proveniences; builders trenches, postholes, etc. Taken together, the two periods average 50% architectural material, comparable to the Charleston average of 48.3%.

Arms and furniture materials comprise relatively minor components of the artifact assemblages, and remain consistent through time. The arms items average .3% through time; this suggests that the use of arms remained relatively consistent through the study period. Likewise, furniture artifacts comprise about .2% over the two hundred year period, suggesting little variation in the accumulation and loss of furniture (bearing in mind that very little furniture would be cycled into the archaeological record). The arms category was expected to vary significantly from the Charleston average, given the special military nature of the powder magazine site. However, this was not the case. Arms materials were instead less than the Charleston average, .1% for the early colonial and .5% for the late colonial, down again to .02% and .28% in the 19th century. Furniture material was also comparable to the Charleston average, .32% for the early period, .03% for the late colonial, and .19% for the 19th century.

Clothing and personal items also form minor components of the assemblage, but these increase in number through time. This suggests that such items are increasingly available, and perhaps that the Charleston populace was increasingly able to afford them through time. Clothing items increase from .6% in the early 18th century to 1.2% in the late 18th and 1.8% in the 19th century. Personal items also increase from .2% to .5% These two groups also increase in variety during the study period. The clothing group is fairly comparable to the Charleston average, except that it does not increase through time, negating the phenomenon of conspicuous consumption. It is particularly evident in the 19th century assemblages, where the .43% proportion is much smaller than the 3.5% Charleston average. Personal items likewise remain quite small throughout the history of the magazine, averaging .1% or less, less than a third of the Charleston average.

The greatest variation occurs in the pipe group, suggesting dramatic changes in tobacco smoking habits and popularity, or at least in the acoutrements. The ubiquitous white clay pipes comprise 15% of the early 18th century component for the city, but decline precipitously by the late 18th century, dropping to 5%. Though white clay pipes were manufactured throughout the 19th century, the further decline in popularity to 1.6% in the mid−19th century. Though somewhat fewer in number, the tobacco pipes at the powder magazine follow this trend, and are present in rather large numbers. They comprise 6.7% of the early colonial assemblage, 2% of the late colonial, and .7% of the 19th century assemblage.

Finally, there is a slight decline in popularity of artifacts related to activities. Such artifacts comprise 4% in the early 18th century and about 1.5% in the late 18th and 19th century assemblages. This general trend would suggest a greater segregation of home and work place as the study period progresses, or at least a narrowing of the range of activities conducted on domestic sites. It must be noted, however, that the average of 4% for the early 18th century masks a tremendous range among the sites of this period, from .4% to 16%. It may be that the percentage of activities is generally consistent through time, but highly variable from site to site. The activities group at the powder magazine was comparable to the Charleston average. They were 3.2% of the early colonial, 1% of the late colonial, and nearly 3% of the 19th century. The large number of barrel strap fragments inflated this group.

Specific artifact types and groups provide a more detailed picture of the archaeological

signature for different temporal periods. A variety of artifact types and classes in the kitchen group were compared and contrasted. The relative percentage of ceramics to glass remains consistent through the 18th century (ceramics are 62% and 57% of the kitchen group), but declines rapidly after 1820 to 38%; during the 19th century, technological innovations led to mass production, and thus discard, of glass containers. This is mirrored in the glass category itself, where olive green bottle glass gradually declines in popularity (29% to 26% to 16%) and clear bottle glass, the hallmark of machine made glass, increases from 6% to 7% in the 18th century, and then to 20% of the kitchen group in the 19th century. The powder magazine proveniences deviated from this trend somewhat. Ceramics remained at 60% and above, particularly for the 19th century. Here, glassware was 27% of the kitchen group, compared to the Charleston average of 50%. Olive green glass matches the Charleston average for the 18th century, but declines precipitously for the 19th century. And the quantities of clear glass that normally dominate 19th century assemblages are not present in significant amounts in the magazine assemblages.

Specific aspects of the ceramics group are temporally sensitive, as well. Tablewares gradually increase through time, relative to most utilitarian wares. This is no doubt due to mass production of refined earthenwares, most of which were tablewares, and the mass production of glass containers, which partially replaced utilitarian ceramics. One problem with this particular analysis is that some of the refined earthenwares of the 19th century were utilitarian – large bowls, chamber wares – that are difficult to discern in fragmentary form and so are counted with the tablewares. Nonetheless, the types counted as tablewares comprise 61% of the ceramics in the early 18th century, 80% in the late 18th century, and 91% in the 19th century. Compared to the Charleston average, there are less tablewares at the powder magazine and more utilitarian wares throughout the study period. This is particularly striking for the 19th century.

The relative percentage of specific ceramic types were also examined for temporal variation. Some of these are temporal markers anyway; the percentages were calculated as a baseline for additional work, in hopes that such a profile may aid in dating proveniences for the future. The first type was colono ware. Previous researchers have associated this ware primarily with the 18th century (Ferguson 1992; Anthony 1986) and the Charleston data support this. Further, scholars have noted variation in the amount of colono ware relative to the distance from Charleston (Anthony 1989). Colono ware sometimes comprises over 50% of the ceramics on outlying plantation sites; closer to the city, the ware can be as little as 10%. In early 18th century Charleston, colono wares average 17% of the ceramics. By the late 18th century they are only 5%, and by the 19th century only .7%. In fact, the bulk of the 19th century examples are believed to be the result of redeposition. Colono wares are an interesting phenomenon at the powder magazine, and remain present in relatively large amounts. The are 21.7% of the early colonial assemblage, comparable to the Charleston average of 22.3%. Further, they are 9.5% of the late colonial, compared to a 5% average, and they are still 1.5% of the 19th century assemblage, compared to 1.3% average.

Chinese porcelain has been considered a marker of elite socioeconomic status, particularly for the 17th and 18th centuries, and the Charleston data appear to support this suggestion. Porcelain jumps from 10% in the early 18th century to 18% in the late 18th, a period

encompassing Charleston's economic apex. This proportion declines only slightly, to 14% in the 19th century, suggesting some continuation of this ceramic as a popular item in elite households. As noted in the discussion on clothing and personal items, status markers were evidently not used or discarded much at the powder magazine. Porcelain was relatively common in the early 18th century assemblage, 7.7% compared to an average of 6%. However, it is only 5% of the late colonial ceramics, compared to 20% for the Charleston average. The 19th century assemblages contained 6% porcelain, compared to a Charleston average of 15%.

The powder magazine did contain a comparable number of creamwares and a very large number of pearlwares. The creamware proportions agree closely (17% for the late 18th century compared to 20.6% and 9% for the 19th century compared to 11%). The pearlwares are 31% of the late colonial assemblage, compared to a 13% average, and 17% of the 19th century, compared to a Charleston average of 7.5%. Creamware was developed in the 1750s and by the 1770s had become the most popular type of tableware. By the 1820s the ware had declined somewhat in popularity, the delicate tablewares replaced with heavier pieces of a more utilitarian nature. Creamwares comprise nearly 20% of Charleston's late 18th century ceramics and 15% of the 19th century ceramics. Pearlware, developed in the 1780s and manufactured through the 1820s, comprises 16% of Charleston's late 18th century and 15% of the 19th century compnents.

The final area of comparison was a measure of the relative density of artifacts per provenience for the three periods. This should measure the level of discard activity in the work yard, as ideas about sanitation and the landscape changed through the 19th century. Other archaeologists have noticed that the urban archaeological site "disappears", or at least changes form, as the 19th century progresses; wholesale discard of the refuse of daily life is replaced with off–site municipal trash disposal, and the kitchen sheet midden is replaced by a few toys and pet burials. Relative artifact density , and relative bone density, then, should measure the level of use of the site for the affairs of daily life. A variety of proveniences were available for each of the three periods, including zone deposits of variety of depths and features of a variety of sizes and functions. A more accurate measure, artifact density per cubic foot of excavated soil, is only available on a general site level.

Though somewhat arbitrary, the present measure by number of proveniences did reveal some interesting trends. Early 18th century deposits contained 122 artifacts per provenience (67 proveniences) and the late 18th century assemblage contained 159 artifacts per provenience (205 proveniences). Nineteenth century proveniences, in contrast, contain only 22 artifacts per provenience (84 proveniences). This reflects a tremendous shift in refuse disposal practices. The sparse 19th century assemblage suggests that much less refuse was cycled into the individual archaeological site during this era, and was probably deposited more selectively. By the end of the antebellum period, off site refuse disposal appears to be the norm. In contrast, the Charleston yards were intensely utilized for refuse disposal in the late 18th century; moreover, the yard was utilized for a number of purposes, reflected in both the artifact density and the large number of proveniences. The early 18th century yards, in contrast, exhibited less alteration, though refuse disposal might be equally intense.

Despite the seeming preponderance of domestic materials at the powder magazine, artifact density was lower than the Charleston average for the 18th century. The early 18th century group contained 54 artifact per provenience, compred to a Charleston average of 122 per provenience. The same trend maintained for the late colonial period, where the powder magazine had 64 artifacts per provenience, compared to the Charleston average of 159. The biggest aberration was for the 19th century, where the powder magazine contained 137 artifacts per provenience, compared to a Charleston average of 22. However, the Russell house also varied from this trend, and the late 19th century assemblage there contained 184 artifacts per provenience! Prior to the Russell house, the low artifact density had been attributed to off-site refuse disposal. At the powder magazine, this high artifact density is attributed to on-site refuse disposal, principally the large refuse pit in feature 42. This may be a site-specific event, or it may simply be that comparable features have not been encountered in the other sites. This phenomena bears further study.

In contrast to the above figures, bone density at the powder magazine was comparable to the one Charleston site for whom this measure has been calculated. The Russell site contained 34 grams of bone per cubic foot of excavated soil, while the powder magazine contained 31.8 grams, reinforcing the general impression that the magazine was a refuse-laden site.

This detailed analysis of artifact proportions and patterning through time also elucidates some of the changes in site function. We begin with the basic assumption tht the Carolina pattern prescribes the average retinue of domestic daily life. If this is so, then the early colonial assemblage deviates rather significantly from the Carolina pattern, suggesting that the site did not serve a domestic function at this time. However, its military function was not reflected in artifact patterning, particularly a large number of arms, indicating that arms were not stored here. Pipes were rather common, and this combined with the moderate quantities of domestic refuse present, suggests at least a sloppy, trash-strewn site, and some of the discard of site occupants.

The late 18th century assemblage, in contrast, appears to be one in close agreement with the domestic profile of the Carolina Artifact pattern. There are a large number of domestic artifacts relative to architecture, and the other categories are in closer agreement, as well. Likewise, the antebellum (1820-1850) assemblage more closely resembles the Carolina pattern, where the late 19th century assemblage does not. The powder magazine, then, may have been used at least informally as a part-time residence during these periods.

Those that were in residence at the magazine were not wealthy, or at least not status-conscious. Examination of proportions of specific artifact groups and types speaks generally to the nature of this daily life. The artifact assemblage shows a preponderance of plain, or middling wares, and a relative lack of luxuries such as Chinese porcelain, clothing and personal items. Middling and utilitarian wares are the norm.

It is only with the completion of over twenty archaeological projects that the above analysis is possible. This discussion has been decriptive in nature, but it has demonstrated that the archaeological record is temporally sensitive to a variety of technomic, social, and physical phenomena. These statistics are more broadly interpreted in Chapter V.

Table 5

Quantification of Temporal Artifact Assemblages
(in relative percentages)

	1712–1750	1750–1820	1820–1850	1850–1900	Carolina Pattern
Kitchen	45.08	62.52	60.23	37.85	60.3
Architecture	43.97	32.91	33.66	58.55	23.9
Arms	.10	.50	.02	.28	.5
Clothing	.85	.91	.40	.44	3.0
Personal	.10	.10	.20	.10	.2
Furniture	.32	.03	.04	.28	.2
Pipes	6.78	2.02	.50	.93	5.8
Activities	3.55	.91	5.10	1.52	1.7
no. artifacts/provenience	54	64	137	137	

Charleston Averages

	1760–1830	1830–1880
Kitchen	58.47	43.63
Architecture	33.64	48.32
Arms	.30	.24
Clothing	1.13	3.52
Personal	.45	.61
Furniture	.20	.18
Pipes	4.45	1.39
Activities	1.31	2.05
no. artifacts/provenience	**159**	**22**

Table 6
Temporal Changes in Charleston Artifact Assemblages

	C. 1720–1760 *	C.1760–1830#	C. 1830–1880@
Kitchen, % total	55.81	58.47	43.63
Architecture, % total	26.0	33.64	48.32
Arms, % total	.19	.30	.24
Clothing, % total	.64	1.13	3.52
Personal, % total	.29	.45	.61
Furniture, % total	.25	.20	.18
Pipes, % total	11.25	4.45	1.39
Activities, % total	5.47	1.31	2.05
Ceramics, % kitchen	59.2	58.59	35.68
Glass, % kitchen	41.0	41.46	50.44
Tableware, % ceramics	58.42	81.98	88.09
Utilitarian, % ceramics	41.57	18.01	11.90
Colono ware, % ceramics	22.36	4.97	1.27
Oriental porcelain, % ceramics	6.07	20.38	15.34
Creamware, % ceramics		20.61	11.24
Pearlware, % ceramics		12.99	7.43
Olive green glass, % kitchen	32.52	27.29	18.59
Clear bottle glass, % kitchen	5.46	6.65	22.04
Window glass, % architecture	22.90	39.21	43.92
Total # artifacts/provenience	**122**	**159**	**22**
total # proveniences	67	205	84
total # artifacts	8229	32,746	18,670

* assemblage composed of **six** sites: Heyward–Washington, John Rutledge, Miles Brewton, Beef Market, First Trident, McCrady's Longroom.

assemblage composed of **six** sites: John Rutledge, Miles Brewton, William Gibbes, Beef Market, First Trident, 66 Society St.

@ assemblage composed of **five** sites: Miles Brewton, Aiken–Rhett, John Rutledge, Heyward–Washington, 66 Society.

CHAPTER V

Interpretations

Since 1980, archaeological research in Charleston has been guided by a series of long-term research goals. The proposed research topics address a number of issues, both descriptive and processual. Several of these were proposed from archival studies (Rosengarten et al. 1987; Zierden and Calhoun 1984) while others were developed by scholars working in Charleston and other cities (for example, Cressey et al. 1982; Honerkamp and Council 1984; Lewis 1984; Reitz 1986). Data from subsequently excavated sites have been utilized to examine these issues, whenever appropriate. In ensuing years, issues explored throughout the field of historical archaeology have been addressed with data from urban sites. These include such topics as subsistence strategies (Reitz 1986, 1987), refinement (Bushman 1992, Martin 1994), landscape interpretation (Kelso and Most 1990; Stine 1996), and meaning (Leone and Potter 1988).

Research topic selection for individual projects is based on the scale of the project, as well as the temporal and functional affiliation of the site. The unified research approach gives weight to small projects, as each project has a place in the growing comparative data base. Archaeological research in Charleston has been multi-disciplinary, utilizing the knowledge and skills of historians, architects, zooarchaeologists, and palynologists over the years. Each contributing scholar has begun with small samples, which have cumulatively become important data sets in their field. One criticism of the Charleston Museum program over the years, however, has been the spatial limitations of the individual excavation projects (Yentsch 1991; Garrow 1984).

The archaeological project at the powder magazine, then, advances the Charleston research in many ways. First, the project is spatially extensive enough to derive broad interpretations about the site. Secondly, through the inspired efforts of Historic Charleston Foundation, the project was truly interdisciplinary, with opportunity for dialogue among a host of scholars. The Powder Magazine project, like the concurrent one at the Nathaniel Russell house (Zierden 1995, 1996), then, stands as an important source of new archaeological interpretations on Charleston's development.

The collective data were used to derive interpretations specific to the powder magazine and its possible occupants, and those generally dealing with the development of Charleston. Because of their importance to the general reinterpretive goals of the magazine project, the site-specific interpretations will be presented in detail, subdivided into discrete, if somewhat overlapping, topics of discussion.

These site-specific interpretations will be incorporated into the broader topics considered for Charleston as a whole. Comparative data from the many previous Charleston projects will be included in these discussions. The principal focus of archaeological research in Charleston for the past several years has been the evolution of the urban landscape. This study encompasses previously discrete research topics, including diet and subsistence strategies, terrain alteration and

site formation processes, health and sanitation, and mental constructs. Archaeological stratigraphy has been the key data source for this discussion; architectural, photographic, cartographic, documentary, botanical, zoological, and ecological data all contribute to this study. More recently, the artifact assemblages themselves, in tandem with the documentary record, have been used for an overarching study of artifact patterning, consumerism, refinement, social stratification, and ideology.

The research topics considered for the magazine move from general to specific within two broad, if overlapping, categories. Five topics are considered in this section:

1. Site formation processes at the magazine.
2. Architectural evolution of the magazine.
3. Colonial military technology and powder magazines.
4. The powder magazine in the Proprietary period
5. The powder magazine and the changing urban landscape.

The vast archaeological data base for Charleston, in all of its myriad details, may generally be divided into two discrete categories – stratigraphy, the complex layering of discrete soil deposits, and material culture, the artifacts contained within those soil lenses. The consideration of the urban landscape relies principally on the stratigraphic evidence, with the artifacts providing supporting data in terms of dating and function. The first question considers stratigraphic and material evidence to understand the basic development of the archaeological site. The second, on architectural changes, relies principally on stratigraphy. The recovered artifacts are more central to the broader questions of landscape evolution and symbolism.

The Charleston Data Base

Research at the powder magazine derives meaning from comparison with numerous previously studied sites in Charleston, and elsewhere. The twenty archaeological sites considered in this research differ in many respects, but can be grouped into two categories: residential only and dual residential–commercial (see figure 2). The latter are located in that portion of the city that has been intensely utilized from at least the early eighteenth century through the present day. The dual residential–commercial sites include retail, craft, and service enterprises (Charleston Place, First Trident, Lodge Alley, 38 State Street, Visitor's Center, McCrady's Longroom and Tavern); public sites containing some residential debris include the Beef Market and two waterfront dumps (Exchange building, Atlantic Wharf), and the 1712 Powder Magazine (Zierden and Hacker 1987; Zierden et al. 1983b; Zierden et al. 1983a; Grimes and Zierden 1988; Zierden et al. 1982; Calhoun et al. 1984; Zierden and Hacker 1986; Zierden n.d.; Zierden 1994c).

The eleven residential sites are, with two exceptions, located in what were suburban areas in the late eighteenth or early nineteenth century and contain standing structures dating to those periods. Their continuous use as residential property to the present facilitates study of the domestic evolution of the property. All properties retain their residential landscape characteristics; seven were the homes of elite, four the homes of middle class residents. David Smith (1987) has argued

that a heavy dependence on trade with Britain and on slaves for every kind of labor from domestic servitude to fine carpentry led to a lack of growth of a sturdy middle class in Charleston. The few successful small properietors employed slaves and invested their earnings into their own land and slaves; most merchants were also planters. Charleston's elite was the richest society in colonial America; Peter Coclanis (1989; see also Jones 1980) has suggested that in 1774 Charleston's wealth per (free) capita was 416 (pounds sterling), compared to 38.2 for New England and 45.2 for mid–Atlantic colonies. Among the present sample, those property owners classified as "wealthy" and "elite" owned their townhouses and at least one plantation. They maintained at least eight slaves in the city, as well as a larger number on their plantation(s), and they held public office at some point in their adult life. In physical terms, the elite are those with houses in excess of 7000 square feet and urban lots larger than 18,000 square feet. The middle class houses averaged 4600 square feet on lots of 6000 square feet. These men often rented these properties, and earned a living elsewhere in the city (Jones 1980).

Urban gentry who built homes in the eighteenth and nineteenth century suburbs include William Gibbes (1772), Miles Brewton (1769), John Rutledge (1763), Thomas Heyward (1772), Joseph Manigault (1803), and William Aiken (built by John Robinson in 1817), and Nathaniel Russell (1808). The Russell, Rutledge and Heyward lots were occupied in the early eighteenth century, prior to construction of the present houses. The remainder of the houses were among the first in their respective neighborhoods. The four middle class sites include 66 and 40 Society streets and 72 Anson Street, rebuilt on Ansonborough lots after the 1838 fire, and 70 Nassau Street, built in the Charleston Neck in the 1840s. More extensive and more recent archaeological work has been conducted at the residential sites, and this work has produced the core of information on the Charleston landscape; however, the commercial sites have also informed the interpretations presented here (Zierden et al. 1987; Zierden 1990a; Zierden and Grimes 1989; Zierden 1993a; Zierden 1992; Zierden et al. 1985; Zierden et al. 1988; Zierden 1989; Zierden and Anthony 1993; Zierden 1990b; Zierden 1996).

Site Formation Processes

Today, archaeologists are concerned with the meaning of archaeological remains; what they meant to the people who made and used them, and what they mean to the people who study and protect them. Since the publication of Leone and Potter's The Recovery of Meaning in 1988, archaeologists have been concerned with discerning the meaning of artifacts to past users, the social and ideological template encoded in the material culture, and how this material culture was used to define and reinforce these social mores to a diverse population in the 18th and 19th centuries.

At the magazine, and elsewhere in Charleston, archaeologists are concerned with another type of meaning: what does the presence of these artifacts in the ground mean, in terms of formation and alteration of the landscape? More particularly, how and why did they end up in the particular position and association in which we find them? Thorough consideration of these

issues is an essential first step in the endeavor to recover past meaning. Our analysis begins, then, with a consideration of site formation processes, the physical events that form the archaeological record, and then move to issues of redeposition, discerning and dating discrete proveniences, and determining associations.

A basic question guiding archaeological analysis, though one rarely articulated, is, "how did these artifacts get here?" When working with students and volunteers, and in front of the public, this question is asked repeatedly, engaging the archaeologists in a constant struggle to answer this question clearly, and without hesitation. An often unarticulated assumption prefacing most archaeological studies that the artifacts were discarded, or otherwise deposited, by the previous site residents. On an isolated rural site, this is a relatively safe assumption. On urban sites such as the magazine, however, this is a real monster under the bed, waiting to undermine our reconstruction of the past. For urban residents clearly moved great quantities of earth and their contents. All of the materials recovered at the magazine, with the exception of the interior zone 1, are considered to be deposited by site occupants, but this interpretation was reached after careful consideration of site data and was not simply presumed.

Cultural materials enter the archaeological record by four basic methods: discard, loss, destruction, or abandonment (Schiffer 1977). Discard, the throwing away of refuse (discussed in detail in the section on urban landscape development), 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, etc. Archaeologists discover lost items in wells, or soil lenses that collect beneath wooden floors. Abandonment includes destruction of buildings and their contents from fire or storm, or the artifacts left behind or thrown out when tenants vacate a property. In some cases it is possible to distinguish proveniences (the defined archaeological boundaries of single behaviors) resulting from specific depositional processes.

Once in the ground, artifacts can be redistributed or they can be removed (Ascher 1968; Honerkamp and Fairbanks 1984; Schiffer 1983). Usually the archaeological record is a combination of all three events. In the urban situation, where these processes can become very complex, archaeologists are particularly interested in the processes which introduce and redistribute materials.

Urban residents deposited most of their refuse in the back yard or work yard. Crowded conditions and health considerations also resulted in the deposition of refuse in any convenient space in the city. Open lots, unpaved streets, and alleys were likely candidates (Calhoun et al. 1984; Zierden et al. 1983a; Rosengarten et al. 1987). Quantities of refuse were also dumped into creeks and lowlying marshy areas, creating new real estate (Sapan 1985; Zierden and Calhoun 1986; Zierden et al. 1983b).

Urban archaeological deposits reflect abandonment and loss, as well as discard. Abandonment activities include loss of materials due to fire or storm, and the resulting cleanup

activities (Zierden et al. 1983a), and the transfer of a domicile to a new tenant or owner (moving out). The single event filling of large features such as privies sometimes reflect this activity (Lewis and Haskell 1981; Zierden and Hacker 1987). Artifact deposits resulting from loss have been manifested as zones beneath a present or former wooden floor (small items swept through cracks between boards) and in the small artifacts accumulated in drains. Loss and abandoment deposits can often be distinguished from discarded deposits by the artifact profile, as well as by the physical properties of the artifacts.

A key aspect of the urban site may be disorganization, the result of continuous occupation and the intrusion of later deposits into earlier ones. Another site formation process might be described as 'construction', the moving of earth to build the massive structures of the city. Additional factors unique to urban sites are private or municipal collection of refuse, which resulted in the redeposition of refuse in a central location far from its place of origin (Dickens and Bowen 1980), and the replacement of private handling by municipal or corporate managment of such basic needs as water procurement and storage, sanitary waste management, and trash disposal (Honerkamp and Council 1984; Zierden and Calhoun 1986).

The primary site formation process, however, appears to be discard of rubbish and building debris. Although many individual artifacts were probably lost, no entire proveniences could be attributed to such. Disposal of refuse, then, is the principal process operating at the magazine, but these processes were not uniform across time and space.

An important issue to consider when analyzing refuse disposal practices at a site of long-term, evolving occupation such as the powder magazine is redeposition. As a mid-19th century resident works and builds on his property, his ground-moving activities disturb earlier deposits, bringing artifacts to the surface and mixing them with later artifacts in their new provenience. Precisely isolating redeposited artifacts is almost impossible, for while we do know when an artifact was manufactured, we cannot say for certain how long it was used and when it was discarded. North Devon gravel tempered earthenware serves as a good example. Manufactured from 1650 to 1775, it is often considered a marker of 17th century lowcountry sites. Yet when it is recovered in a zone with a TPQ of 1780, is it a 17th century discard redeposited, or a piece manufactured in 1775 and quickly discarded? In absence of clear evidence, each ceramic encountered in later proveniences, for example, has been analyzed as part of that material culture.

An interesting phenomenon on Charleston sites has been the overwhelmingly domestic nature of artifact deposits, whether they were residential property, dual residential-commercial lots, public markets, or areas of filled land. While initially surprised by this phenomenon, researchers have suggested that domestic activities, principally food preparation, storage, and consumption, are the activities most likely to cycle artifacts into the archaeological record. The maintenance of a dry goods store, for example, would result in artifacts entering and leaving the living site, but not being broken and discarded. The market site, an enterprise centered on the sale of food, was full of domestic debris and animal bone; interestingly, the early 19th century deposits on the same site, associated with a bank building, were also domestic in nature. The exact source and association of such refuse deposts have not been determined with any finality.

While the above discussion suggests an overriding homogeneity to Charleston assemblages, there are subtle functional and temporal differences among the sites. These have been explored in great detail on previous sites; the powder magazine has been subjected to the same rigorous analysis.

It should come as no surprise that the artifact assemblage at the powder magazine was overwhelmingly domestic. Such an artifact assemblage was expected for the 19th century, when the site served a variety of domestic/commercial functions, but the 18th century artifact assemblage was equally, if not more, domestic in nature. For a military site that was not a locus of any documented permanent human occupation, this seemed puzzling. An immediate, and unsettling, interpretation was that the refuse was not generated on site, but instead reflected casual, or even deliberate, disposal from neighboring lots. The presence of a dense midden on the building interior, which gradually accumulated in the 18th century (zone 2), presents such a dilemma. It has been suggested tht this was imported fill for leveling a new floor; however, there was no encountered evidence for removal of sand from the building's immediate exterior. The artifact assemblage seems unique enough to strongly support the idea that the artifacts are from this site and are not "general Charleston trash." Further, the 18th century artifacts and bone were relatively intact, suggesting little trampling or redeposition of the interior midden soils. The relatively large sherds made it easy to recognize a number of ceramic cross-mends and other related artifacts, and many sherds of the same vessel were found across the building interior (figures 61-70). This is not a characteristic of redeposited soil. Cross-mends also occurred between interior excavation units and exterior proveniences (figures 60, 74, 84). By extension this would suggest that the exterior artifacts were also generated on site.

If that is accepted, then the question arises as to who generated the refuse. It appears that the powder magazine site received more regular human traffic than expected. The 1739 Assembly order mandated that "two men belonging to the Watch be placed there every night..." Perhaps this is their daily discard, scattered and hidden among the barrels and racks of powder stored in the building, thereby explaining the untrampled nature of the materials. Such an untidy site stands in contrast to the expected fastidious, safety-conscious behavior prescribed for magazines, but the presence of the artifacts is undeniable. By contrast, there were far fewer artifacts in the early 18th century proveniences, and in the late 19th century proveniences when the building stood vacant. There was also far fewer faunal specimens from these periods, arguing against regular domestic use. The late 18th century midden contained a large amount of animal bone, which when analyzed fit the domestic profile. A high rodent population reflects the presence of food or debris to attract them.

Architectural changes – construction, renovation, demolition – triggered other site-forming processes. Changes to the roof resulted in the filling of three pits in the mid-18th century, their fill including architectural and domestic debris. The 1830s renovation evidently triggered a massive cleanup of the interior, as the large 1830s pit contained a host of domestic trash and a distinctive bone die, whose mate was left behind on the interior and recovered in zone 2. Demolition of the brick wall created feature 21.

The Architectural Evolution of the Powder Magazine

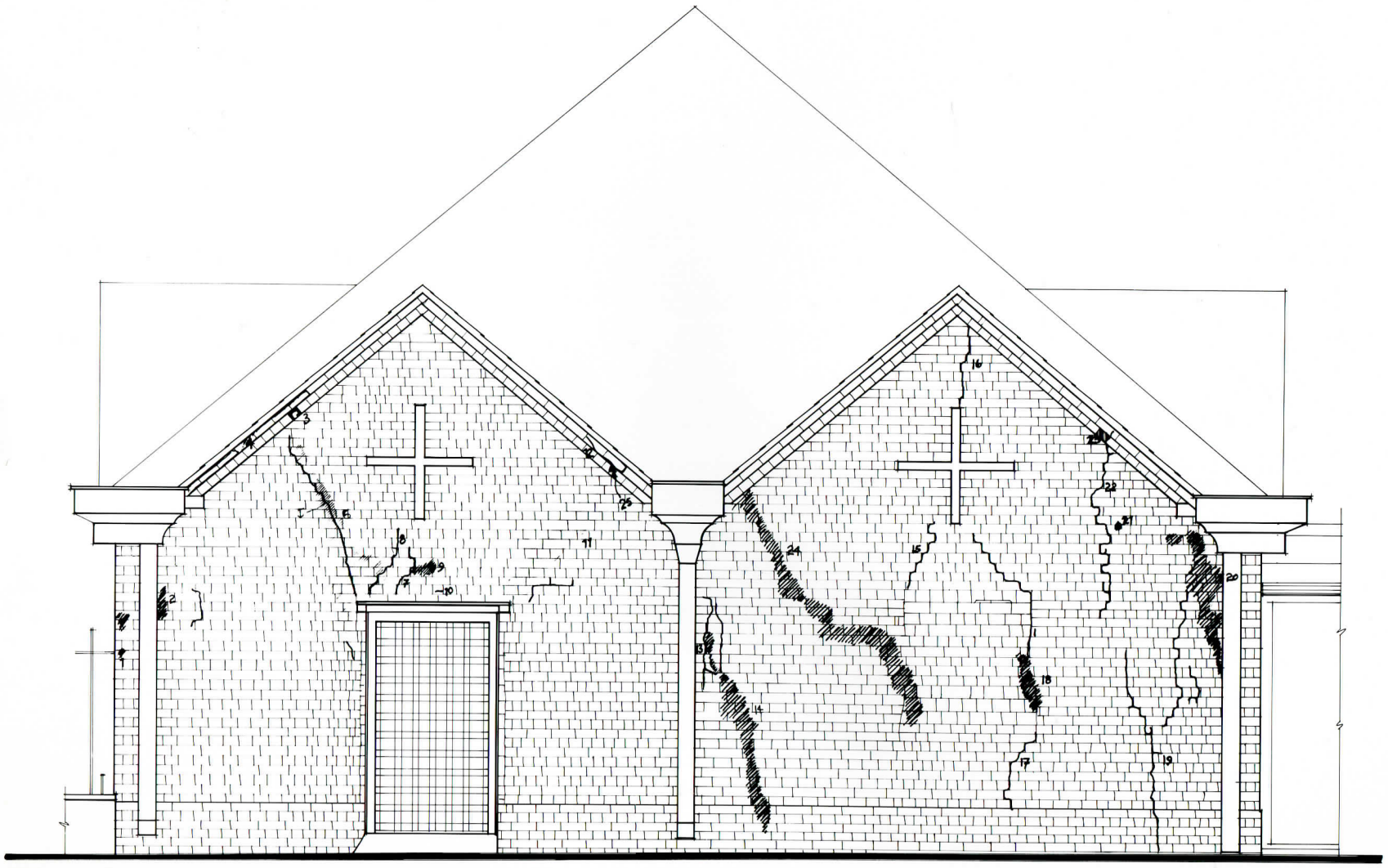
The powder magazine is a low brick structure measuring 33 feet square on the exterior. The walls are 3.5 feet thick, and each of the four walls evidence two openings, many of which have been altered to a point of confusion. The east wall currently features two windows; the south wall a window and an altered doorway; the west wall a large doorway currently gated with heavy wrought iron, and the north wall a modern double door and an enclosed large opening. Currently, and at least into the late 19th century, the door on the east side is used as the principal outside entrance. The south opening adjoins a connecting hallway leading to the basement of the single house to the rear of the magazine. The west door of wrought iron is further secured with an interior glass door.

The interior of the magazine features groin vaults arising from a single central column and eight additional English bond piers. At the time the work began, the floor was covered with red and black clay tiles, placed by the Dames in 1923. The square magazine features a pyramidal roof and pairs of low brick gables breaking out on each of the four facades. The resulting irregular roofline is covered with heavily patched pantile of an unknown date.

The major descriptive contribution of the project was elucidation of architectural changes to the building. We were specifically seeking archaeological evidence for the roofing sequence, the flooring sequence, and location of the original door. We recovered good evidence for the first two; answers to the third question remain elusive.

A number of architects and architectural historians examined the building during the course of the restoration, their analyses and advice resulting in the current cumulative knowledge. These studies began with Historic Charleston Foundation staff members Jonathan Poston, Louis Nelson, Carter Hudgins, and Ben Wilson, and former consulting architects Joseph Opperman and Charles Phillips. During this phase of the project, Frank Matero (University of Pennsylvania) visited the building and compared it to those in the Caribbean. Jonathan Poston consulted with Geoffrey Parnell (Tower of London) by letter. Subsequent to this, architect Glenn Keyes and restoration consultant Richard Marks continued the analysis and planning for the restoration project. Dr. Carl Lounsbury (Colonial Williamsburg Foundation) and Dr. Bernard Herman (University of Delaware), visiting scholars, each spent a day examining the fabric of the building. Dr. Edward Chappell and Dr. Willie Graham of Colonial Williamsburg Foundation then spent a somewhat longer period examining the site and preparing a written report. (Chappell and Graham 1995).

Chappell and Graham comment that the "peculiar" appearance (also referred to as "rather mannerist" by Geoffrey Parnell) of the building results from its specialized function, the use of multiple facade gables, and the combination of details usually found on domestic buildings with heavy military construction. The further note that brick facade gables treated as parapets were by this time archaic in Britain; however, the use of oversized gable parapets remained popular in



1A WEST ELEVATION

Figure 93

HISTORIC CHARLESTON FOUNDATION

CLASSIFICATION			
hair line ck.	mortar patch	major crack	break-off
5	1, 24	3. 1" WIDE	21
7	2	22. ½"-⅝" "	23
8	4	25. ½" "	
13	6		
15	9		
16	11		
17	12		
19	14		
22	18		
	20		

SURFACE CRACK RECORDINGS OF

THE OLD POWDER MAGAZINE

79 CUMBERLAND STREET, CHARLESTON, SOUTH CAROLINA

drawn: Nicholas Alexiou

date: June 1995

scale: 1/2"-1'-0"

elevation

sheet no.

2P-11

HISTORIC CHARLESTON FOUNDATION

CLASSIFICATION

hair line ck.	mortar patch	major crack	break-off
1	3		2
6	4		10
8	5		
11	7		
12	9		
	13		
	14		
	15		

THE OLD POWDER MAGAZINE

79 CUMBERLAND STREET, CHARLESTON, SOUTH CAROLINA

SURFACE CRACK RECORDINGS OF

drawn: Nicholas Alvaid
date: June 1995
scale: 1/2"-1'-0"
section
sheet no: 2P-08

Figure 94

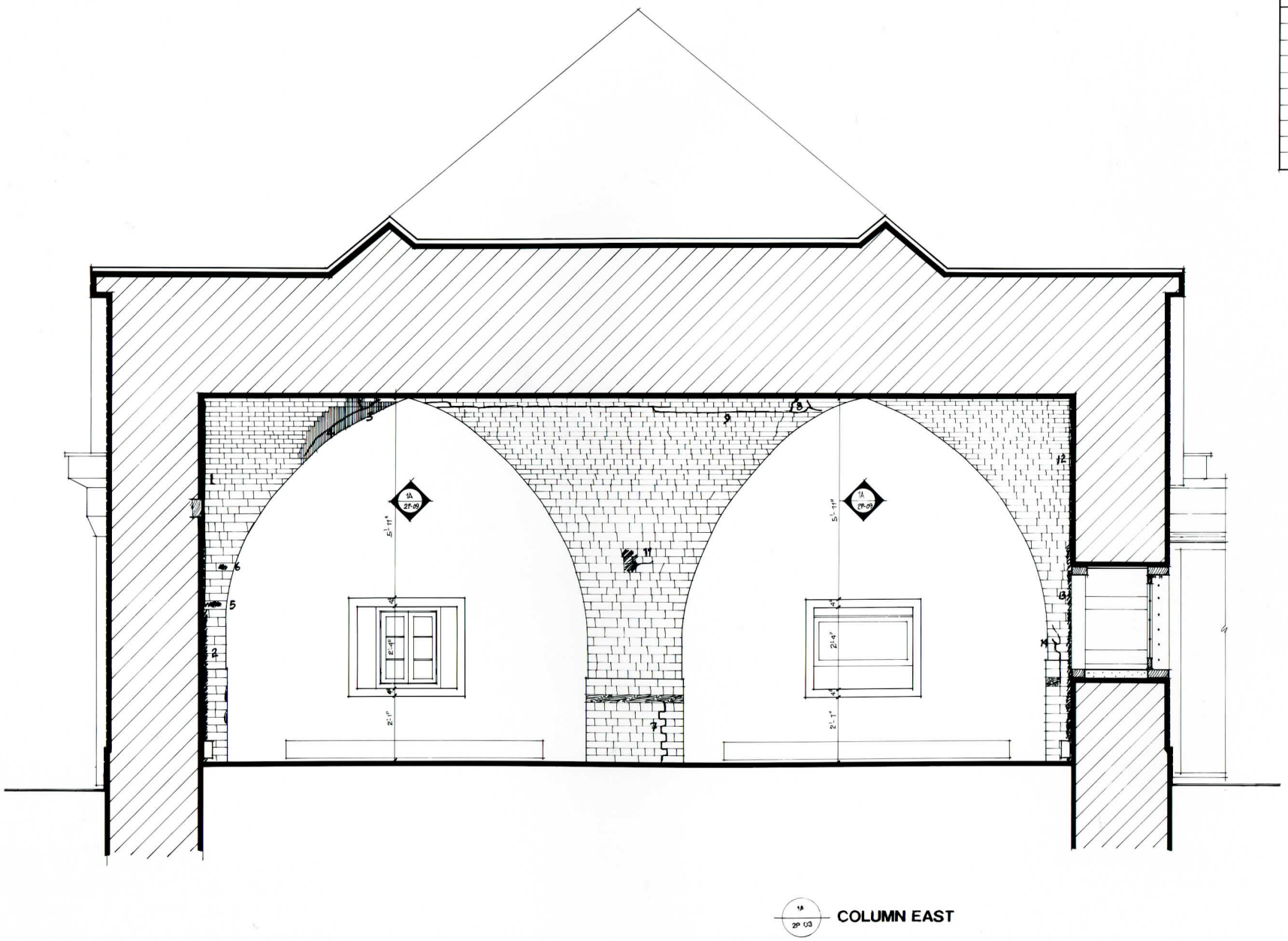


Figure 95

HISTORIC CHARLESTON FOUNDATION

CLASSIFICATION

hair line ck	mortar patch	major ck	break-off
1	2	4 DEEP	3
7	5	8 1/2" WIDE	
9	6	10 1/2"-1" WIDE	
12 ←	11 →		
14	13		

SURFACE CRACK RECORDINGS OF

THE OLD POWDER MAGAZINE

79 CUMBERLAND STREET, CHARLESTON, SOUTH CAROLINA

drawn: Nicholas Alertzi

date: June 1995

scale: 1/2"=1'-0"

section

sheet no.

2P-03

HISTORIC CHARLESTON FOUNDATION

CLASSIFICATION

hair line ck.	mortar patch	
1	2	
3	10	
4		
5		
6		
7		
8		
9		

THE OLD POWDER MAGAZINE

79 CUMBERLAND STREET, CHARLESTON, SOUTH CAROLINA

SURFACE CRACK RECORDINGS OF

drawn Nicholas Kholos
date June 1995
scale 1/2"=1'-0"
section
sheet no 2P-09

1A 2P-09 INNER SOUTH

Figure 96

the 18th century lowcountry. Here, the gables function to allow the four groin vaults on the buildings interior; without them, these would have been too low. Chappell and Graham suggest that this vaulting gave the building an additional measure of security.

These scholars suggest that the original evidence for building construction is relatively clear. They then go on to consider many of the same questions asked of archaeology, and to consider preliminary archaeological evidence in their analysis. The interior excavations, in fact, provided the best evidence for the construction sequence of the building. Evidently, contiguous trenches were excavated for the entire foundation plus the east–west band of bricks (feature 61). The builders trench (feature 54) was clearly contiguous between the exterior wall and this bisecting foundation (figure 53). The trenches were excavated into the original sandy soil, allowing a foundation 3.5 feet wide. There is some builders trench evidence to suggest that a north–south arm ran through the center of the building, but this was heavily altered later, and Chappell and Graham suggest it may represent the base of a later partition.

Once the foundations were finished, the masons constructed nine English bond piers, each about three feet square. The central pier was evidently constructed on a wooden frame on top of the slightly off–center central brick foundation (figure 45); its subsequent deterioration is responsible for the settling of the central pier.

From here, Chappell and Graham note that the piers were constructed to a height of about 4'4", and then the fame centering was constructed to support assembly of the vaults (1995:5). The early posthole features may be for this framing, but they are more likely for the powder racks, to be discussed later. The spaces between the piers were then filled with English bond masonry, while the exterior brick facade covered the exterior faces of the piers. The inner and outer walls were built somewhat independently, and such buildings often have the space between filled with random brickwork and rubble.

The flooring sequence was determined by the interior excavations. Here, two intact floors were discovered, separated by layers of midden containing datable artifacts. Feature 50, the brick floor covering the western half of the building, was dated to the antebellum period by its construction in post–1830 yellow mortar, and by the 1795 TPQ for zone 2 beneath it, and by the dates of associated zones 1a and 1b. The addition of this floor post–dates use of the structure as a magazine, and does not likely relate to any earlier features. Chappell and Graham (1995:17) do note that it may reflect a continued east/west subdivision of the building, which they posit for the earlier period. The available archaeological evidence suggests that the original floor was the sand surface designated zone 4. Dr. Douglas Frink suggests that the OCR date of 1700 and the physical characteristics of the soil suggest that it functioned as a feature, that is, a product of human use, rather than simply a previous ground surface (Frink, personal communication, 1996). The randomly placed brick paving, feature 56, follows shortly thereafter; feature 56 predates the 1740s deposits of zone 3 immediately above it. What is not clear from the present data is exactly when the "original" brick floor was constructed. Feature 56 is in the matrix of zone 4, which has been interpreted as original grade. It is possible that the building had an earthen floor for some period, with the brick floor added some years later. The sterile nature of zone 4 would argue

against this, however, as the various postholes, while early, all contain some artifacts.

An alternate explanation, provided by Richard Marks and somewhat supported by the documents, is that the magazine had a raised wooden floor from a very early date, and that zone 4 and feature 56 represent the crawl space. No archaeological evidence of wooden flooring survives, but surely they existed. The joists could have been supported on the interior spread footings. The often-mandated repairs in the early 18th century include wooden floors, but like the other improvements, there is no way to determine if these were completed. Further, it seems that brick paving of a crawl space was unnecessary. Again, the somewhat random pattern of the paving would suggest that worn, or "high traffic" areas received this paving. This might correspond with the 1725 reference to "the floor of the Magazine is much sunk" and again in 1729, that "the floor on the north side should be raised with new sleepers it now being sunk so low that water in wet seasons overflows that poart of the floor." A similar report was made again in 1731 (Davis 1942:189-190). Again, the continuous mandating of the same repairs indicates that these were rarely, if ever, made. Further, the zone 3 above was a narrow, highly compacted accumulation, suggesting that it received heavy foot traffic and compaction. An accumulation of soils beneath a raised wooden floor would not exhibit these physical characteristics.

Chappell and Graham do suggest that the above zone 2, which has been interpreted as cumulative primary midden may have been introduced fill for leveling the site and constructing a new floor. Again, such an explanation is certainly plausible, but cross-mends of artifacts from this deposit and outside features would again argue for on-site disposal (see previous section). It must be noted, though, that Geoffrey Parnell would expect a timber floor in the building from its inception. He further notes that the piers would have been lined with boards to the level of the 'springing'. This was, he notes, "a well practised method of keeping moisture at bay" (letter to Richard Marks, 12 February 1997).

Determining changes to doorways was more problematic. Here, the field strategy was to excavate adjacent to possible openings, exposing the foundation, and searching for any pattern of wear on floors adjacent to the door. The present excavations exposed three doors: the two bays on the north wall (the eastern one is the present door), and the northernmost on the western wall (currently secured with a heavy iron door and glass door on the inside). The excavations revealed a few interesting bits of evidence, but showed nothing conclusive. The door on the west side was severely altered in the 20th century; the interior toe of the foundation is covered by a rubble-filled step of the 20th century tile floor. The 18th century floor is intact in front of this door, and though it does not show any particular evidence of heavy traffic, may correspond with an opening here. Chappell and Graham likewise could find no remaining evidence for this as an original opening (1995:11). Richard Marks reports that the iron door is likely 18th century.

The current entrance (eastern bay on the north side) was much altered during the current century. The building foundation revealed nothing definite, but the brick floor in this vicinity (defined as feature 77) was quite worn, suggesting heavy traffic. This area of disturbed brick was followed by the section containing two flat stones, whose placement may be deliberate (Bernie Herman, personal communication). Chappell and Graham find very tentative evidence to suggest

that this doorway was opened, or at least enlarged, in the early 19th century. They use documentary evidence along with physical evidence to posit that this may have been an original opening, matching the one on the east side of the south wall, and that a north/south interior partition further segregated the powder stash from the outside world.

Most puzzling was the western bay on the north wall. Here, heavy alteration to the brickwork suggested that this was a large opening at one time. The toe of the foundation was worn at an angle, in a manner consistent with heavy traffic. The brick floor was worn here, but the artifacts in the above zone 2 were not. Small units were excavated on the exterior; one on this entrance, and the one on the western wall. Neither unit revealed any conclusive evidence. Several architects have viewed these excavations (Joe Oppermann, Carl Lounsbury, Bernie Herman), and they all felt the data were inconclusive. Chappell and Graham (1995:12) feel more strongly that the worn spread footings argue for a low doorsill here, at an early date (figure 97). The brickwork suggsted to them that this opening was sealed in the first quarter of the 19th century. Subsequent to all of this research, restoration work by Richard Marks revealed that this patched opening contained an intact chimney stack (figure 98). Hindsight showed that the chimney stack was clearly visible in the patched brick on the exterior (see background of figure 25). There is no documentation for construction, use, or abandonment of this feature, but all must be 19th century changes. The fireplace may have been used for heating the improved (paved) western portion of the building, or for blacksmithing. The former seems more plausible as there is no evidence that the fireplace was accessible on the exterior. None of the other openings were investigated archaeologically, and they have been discussed thoroughly by Chappell and Graham. The reader is referred to this document for further clarification.

The roofing sequence was determined by the recovery of roofing material from datable features on the building exterior. Documentary suggestions that the magazine was originally roofed in slate, or thus re-roofed shortly after construction was not supported in the archaeological record. Quantities of terra cotta pantile were recovered from the three large mid-18th century features (23, 24, and 15). Quantities of worn roofing slate were recovered from feature 42, deposited in the 1830s. All of these features seem to have been excavated specifically to contain debris from these roofing renovations, and they incidentally received domestic debris already scattered across the site. As mentioned earlier, there were cross-mends of specific artifacts from interior zones and these exterior features. Further, slate was not recovered in any of the 18th century proveniences; it was common in proveniences post-dating 1820. After reviewing the above data, Joe Oppermann has suggested that the original roof was terra cotta pantile, replaced in the 1740s by slate (the old pantile discarded in features 15, 23, and 24). In the 1830s or so, the slate roof was replaced by the current pantile roof (the slate discarded in feature 42). The 1863 Harper's illustration shows a pantile roof in already dilapidated condition (figure 17).

In their study of the roof, Charles Phillips and Joe Opperman discovered an upper surface of hidden brickwork, between the roof surface and the vaulted ceiling. The area between the roof and this brick surface was filled with clean, damp sand. This sand layer was sampled, and appears to be the same material as the fill of the builders trench. The sand was a mostly yellow mottled

Figure 97: Worn spread footing in N125E105, adjacent to western bay on north side
Figure 98: Chimney stack in this altered opening

which is a chest holding proud memories of blood and war." The interesting reference to an "old octagon" suggests that the quote was originally applied not to the square Charleston magazine, but to the 1714 powder magazine in Williamsburg, which was octagonal. It preserved at this same time by Mrs. Cynthia Beverly Tucker Coleman and her associates in the Association for the Preservation of Virginia Antiquities. Like the Charleston magazine, the Williamsburg magazine was one of the first buildings preserved in the historic town.

Ownership by the Colonial Dames also marked a change in the gender of the building's occupants. The interior received a renovation, a paint job, a waxed wooden floor (later a tile floor), and a host of fancy furnishings appropriate for formal entertainment. The weedy exterior was replaced with a garden, and later, formal plantings and walkway accentuated by Revolutionary cannon from elsewhere in the city. The interior meeting space was later converted to a museum reflecting the heritage of Charleston and of members of the Colonial Dames. But the moisture problems that began in 1713 continued unabated to 1993. At that time, Historic Charleston Foundation acquired the building on long-term lease and has embarked on an ambitious, appropriate regimen of restoration.

The Powder Magazine thus continues its evolving symbolic role in Charleston, from protector, to anonymous commercial space, to an all-but-abandoned "problem" to a romanticised symbol of past glories, to a piece of "revised history". Thus it is no accident of the the urban landscape that this squat, "mannerist" building sitting at an odd angle remains among parking garages and lofty church spires. It reflects Charleston's changing role as frontier settlement, commercial center, economically stagnant town, and reinvigorated sunbelt tourist destination.

structures or as part of fortification complexes. Two of these remain standing. These lowcountry magazines, as well as contemporary ones from other British colonies, have been examined to better understand these specialized structures.

The Charleston magazine is architecturally unique among lowcountry magazines, indeed among most known examples in the British colonies. No precedent has been found for the square shape, vaulted ceiling and paired gables. Geoffrey Parnell, Keeper of Tower History, Royal Armouries termed it "rather mannerist" in 1993 (Letter to Jonathan Poston 1993). More recently (letter to Richard Marks, February 1997), Dr. Parnell has discovered a late 17th century precedent for the Charleston magazine. He notes that most of England's principal magazines were re-fitted at that time, but in the Citadel at Plymouth, the Office of Ordnance erected a large square magazine in the late 1660s (figure 99). This was designed by their chief engineer, Sir Bernard de Gomme, who went on to provide smaller versions at other Ordnance sites in the 1670s and 80s. Dr. Parnell notes that these were replaced by much larger, rectangular magazines of the "classic Vauban model" in 1716-17, shown in figure 100. Dr. Parnell further notes that none of the late 17th century powder houses survive; thus the Charleston magazine, if it is indeed this earlier model, is one of the last built in this style and perhaps the only one remaining. The Vauban-style replacement may be found at Tilbury Fort, dated 1717. These drawings depict a barrel-vaulted structure, with proposed rack system for powder storage (figure 100). The framing depicted in these renderings support 800 barrels (letter from Geoffrey Parnell, September 21, 1993; February 10, 1994.

A more typical magazine is that located at Fort Johnson. Some sources date this structure prior to the Revolution (Taylor 1994:11), while others suggest it was rebuilt after the War of 1812 (South 1973; Trinkley et al. 1994). This building is rectangular, measuring 20 feet by 27 feet. The building is brick, laid in Flemish bond, with three exterior buttresses on either side. The roof is of brick, with a cement-like coating, and the two gable ends feature the only openings; a semi-elliptical door is offset by a small square window. The side walls are pierced in the center with slot windows measuring 7 by 14 inches. The interior is barrel vaulted, but there is evidence that this was a later addition, during the Civil War (figure 101a).

One of the most enigmatic structures is the small building on Charleston Neck at Shipyard Creek. Preserved in the middle of a residential section of the Charleston Navy Base, this structure has been known as the "dead house" and viewed as a funeral crypt. However, its construction is also in keeping with a magazine, though how it may have been altered over the years remains unclear. The structure was owned by Edgerton Leigh from 1767-1771, at the time Leigh was powder receiver (Taylor 1994).

The small (10.5 by 12.5 foot) building features a barrel vaulted interior and paved brick floor. The gable roof is slate, and the gable ends have a square parapet. Joe Opperman (1993) observed, however, that the square parapets had been added over what were gable ends. Most interestingly, a bronze commemorative seal for the Lords Proprietors adorns the front gable end over the single wooden door. There are no other entrances, other than a louvered ventilator on the back. The most striking feature are heavy brick buttresses projecting from the sides of the

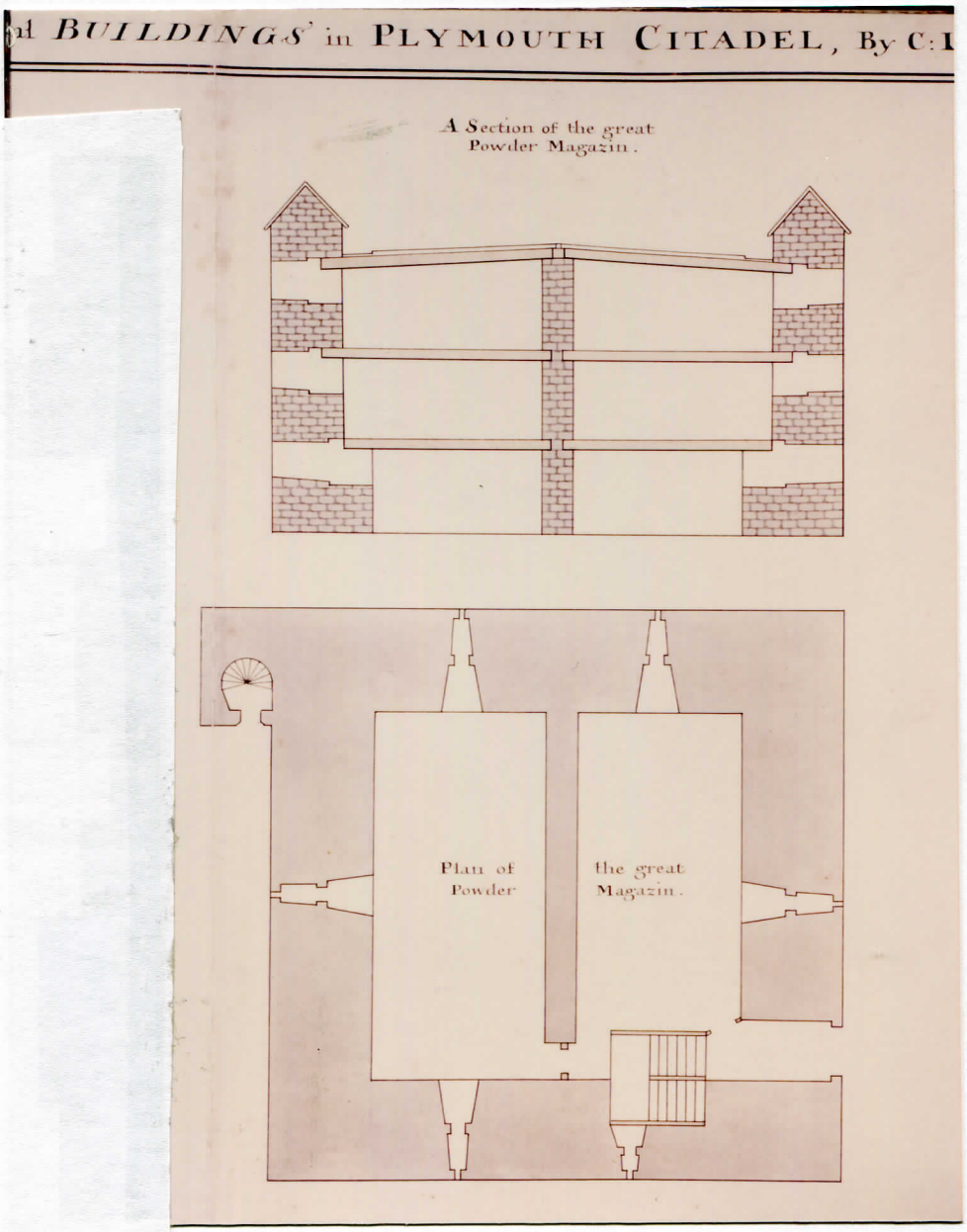
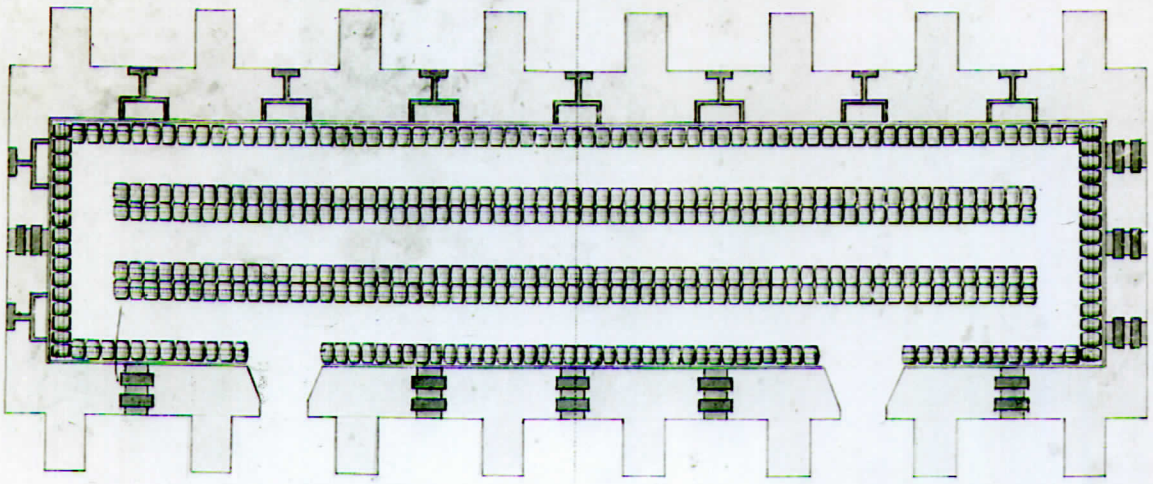
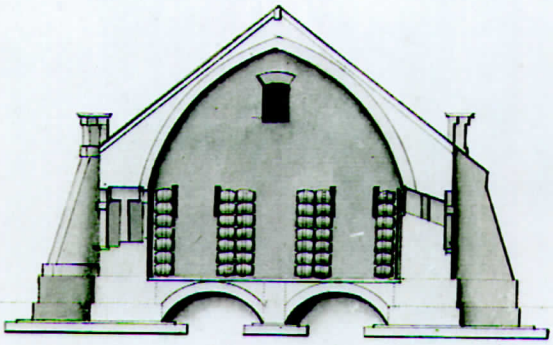


Figure 99

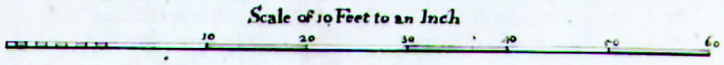
Plan of the Citadel at Plymouth, 1660
Designed by Sir Bernard de Gromme, the square building style was later replaced by Vauban's rectangular buildings (see Figure 100).

PLAN and SECTION of one of the *POWDER MAGAZINES*
at TILBURY FORT shewing what quantity of Powder may be contained therein.
An: 1717.





Scale of 10 Feet to an Inch



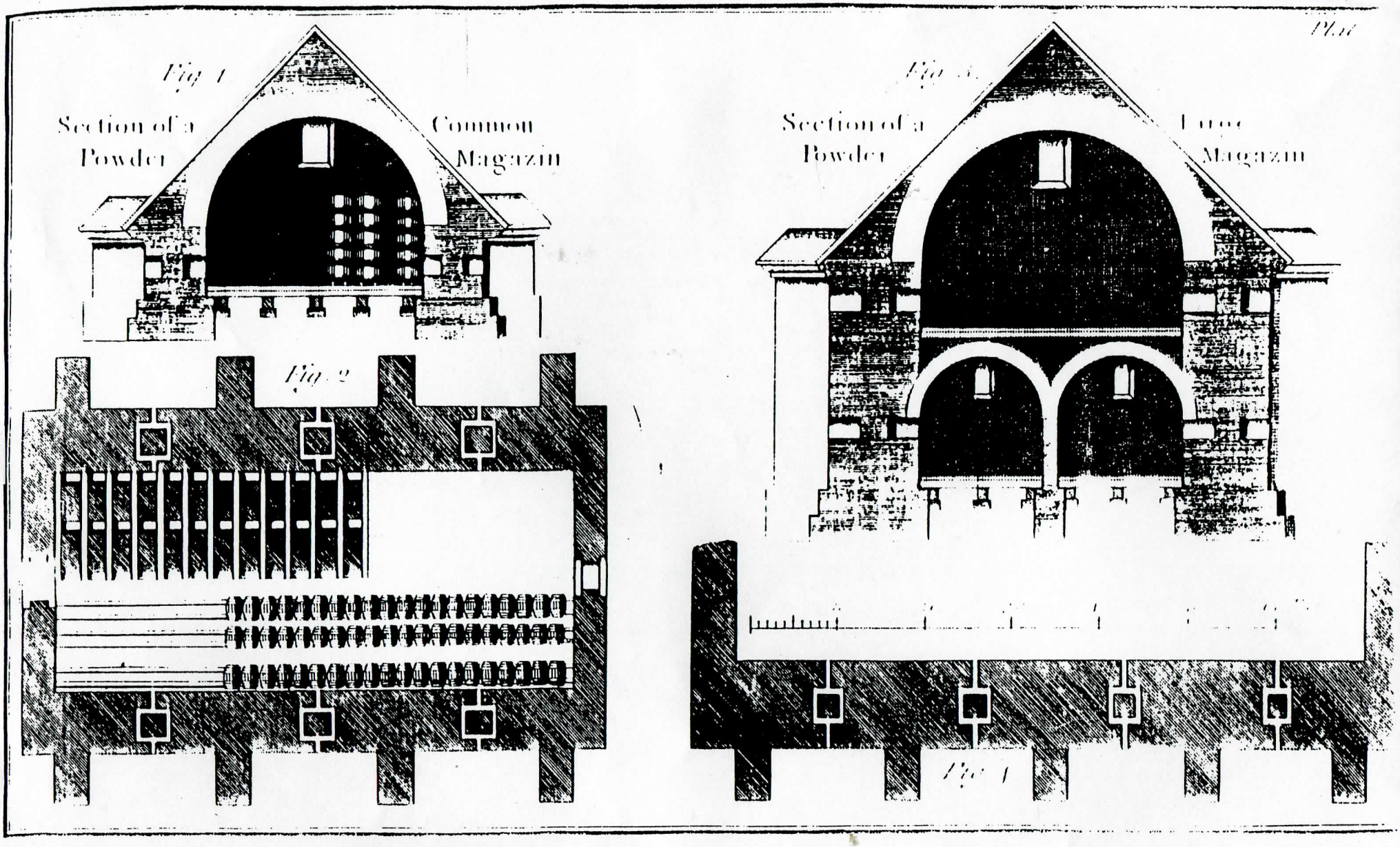


Figure 100: plan of barrel–shaped magazine at Tilbury Fort

building. These oversized structure are the strongest evidence for use of the building as a magazine (figure 101b).

Other Charleston magazines are no longer extant. The "new magazine", built in 1737 on the Old Burying Ground was deemed insufficient from the start and abandoned within a few years. Interestingly, the 1739 map implies that it was round, with an exterior protecting wall, whereas the Cumberland street magazine was square (market T and S on figure 8).

The later replacement for the Charleston magazine were those on Charleston Neck, designed by Robert Mills in the early 1820s. This Isabella Street compound featured nine circular structures, arranged in a square pattern with the largest in the center reserved for public powder. These structures also featured a pyramidal roof, a central column and vaulted ceiling, this time rounded. These structures, in a state of disrepair, were sold by the city in 1872 and subsequently dismantled (Taylor 1994:16).

The final documented lowcountry powder magazine of the colonial era was built at the town of Dorchester in 1757. Though the upper Ashley River was no longer the 'frontier', the continued hostility with Indian groups and their French or Spanish allies led Governor William Henry Lyttleton to assess the colony's security. Convinced that a magazine was needed for the colony's interior, he urged the Commons House to authorize construction. Two days later, the legislature agreed to build an enclosed magazine of brick at Dorchester and post a guard of 6 or 8 men (Bell 1995). The enclosing fort was built of tabby, believed easier to construct with unskilled labor.

Archaeological excavation revealed that the rectangular magazine, built partially underground, was 20 by 14 feet (though it was commissioned at 22 by 18 feet). Little else is known about its construction (figure 102). An entry in the Journal of the Commissioners of Fortifications states that it was to be shingled, though archaeologists believe that it was subsequently covered with mounded dirt. They also found that the interior of the magazine consisted of two interior buttresses along the east and west walls, and two raised brick platforms situated on the long axis, possibly serving as post supports (Carillo 1973). The powder magazine was subsequently used as a tile kiln. As the colonial hostilities of the mid-century were actually far removed, in the backcountry, the primary function of the fort seems to have been protection of the powder magazine, and possibly to house a small garrison of troops (Carillo 1976:46).

Colonial magazines from elsewhere also provided comparative information. Of particular interest is the magazine in Williamsburg, Virginia, constructed in 1714. There are many similarities between the Charleston and Williamsburg magazines. The latter was constructed about the same time, was used as a magazine throughout the 18th century, had a variety of other uses in the 19th century, and was one of the first buildings restored and preserved in the early 20th century. There are several differences, as well. The Charleston magazine was deliberately constructed on what was the outskirts of town. The Williamsburg magazine was located in an open public square, where it served as a focal point (Shurteliff 1935; Samford 1985). Though of comparable size, 33 1/2 feet in overall width, the Williamsburg magazine is octagonal and multi-storied (figure 103).

Figure 101a: The 'Dead House' on Charleston Neck
Figure 101b: The Fort Johnson powder magazine

ADVERTISEMENTS.

WHEREAS a powder-magazine of brick work, is directed to be built with all expedition, in the village of *Dorchester*. Whoever is incli-nable to undertake the said work, finding all mate-rials necessary for the same are desired forthwith to give in their proposals to the commissioners of fortifi-cations, or to *Samuel Prioleau*, Clerk.

The Commissioners of Fortifications advertise for the construction of a brick powder magazine at Dorchester in March of 1757. The Commissioners later decided to build the fort enclosing the magazine of tabby, reasoning that unskilled slave labor would be cheaper than the services of trained bricklayers.

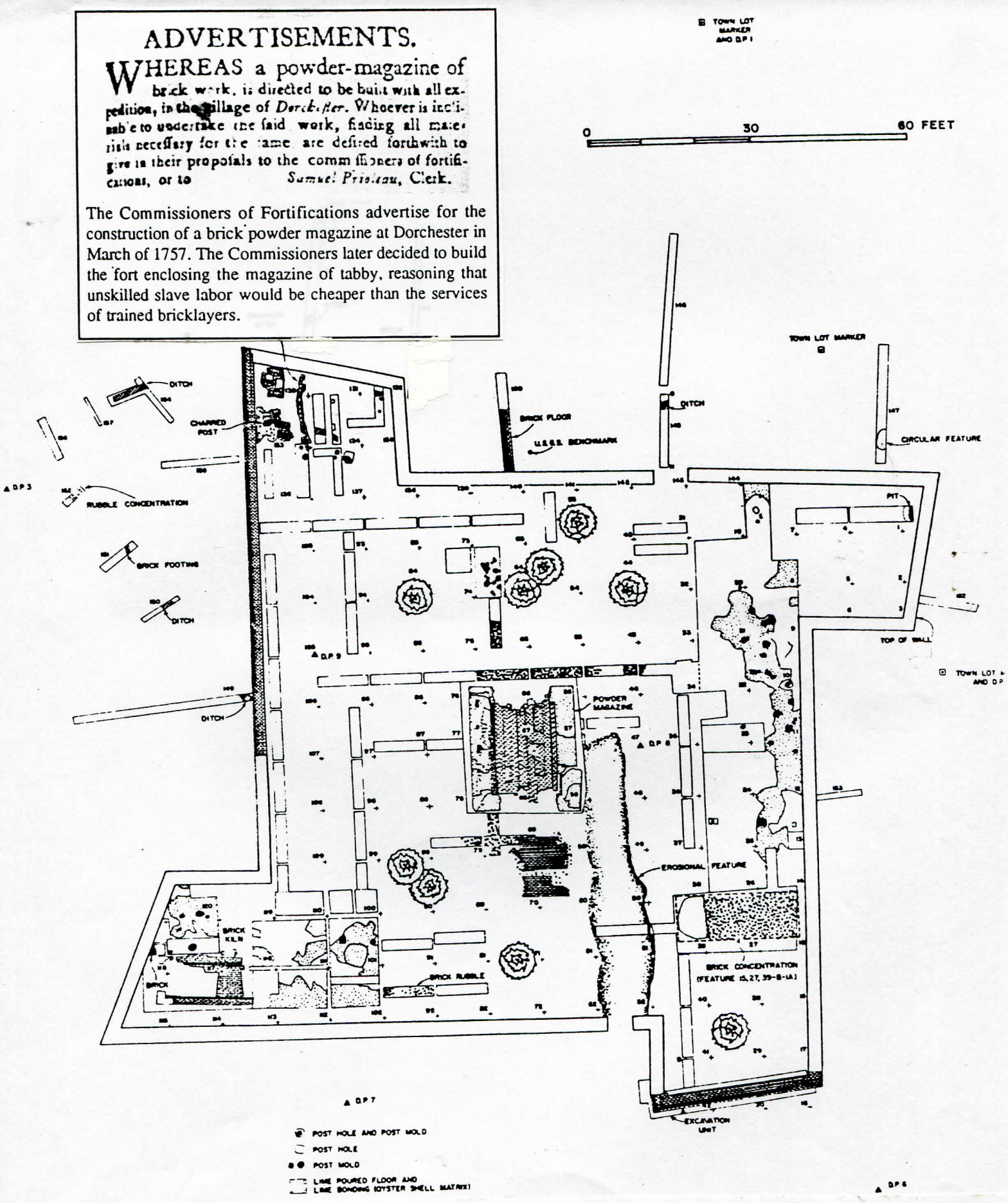


Figure 102
Fort and Powder Magazine at Dorchester
(from Carillo 1976)

This magazine stored a variety of arms, as well as powder. All public arms and ammunition were stored in the building and a keeper of arms was appointed to receive and discharge supplies. Also, a public armourer was appointed to clean and mend the public arms.

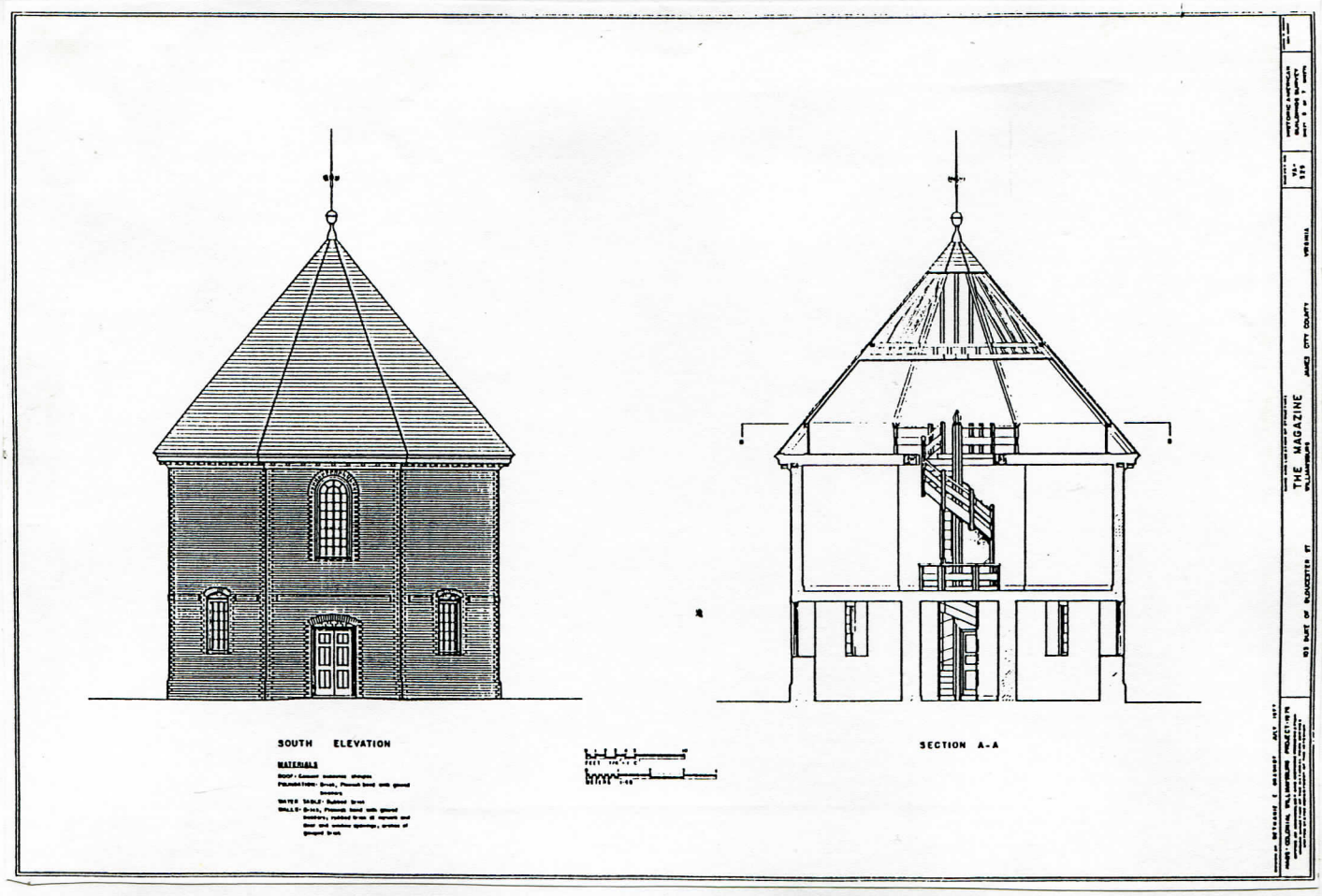
Provisions were made in 1722 for building an enclosing wall; this was evidently not permanent, and in 1755 a large brick wall was erected. This was evidently 10 feet high, and 22 feet out from the face of the magazine. Also at this time, general unrest in the colony led to the appointment of a 12-person guard, to be on constant duty, and construction of a guardhouse near the magazine. The guard was continued until 1762, and intermittently thereafter. The magazine required periodic repair during the second half of the 18th century. The building was two stories plus an attic. The first floor is interpreted as divided into a gun smith's shop, or Armory, and a powder room. The second floor was for the storage of acoutrements, arms, and equipment. Larger pieces were stored in the enclosed yard. Public arms for protection of the Virginia colony were supplanted by guns and other equipment held by plantation and home owners throughout the colony. Every responsible member of the community was made a member of the militia.

The removal of the public store of powder and arms by Lord Dunmore in 1775, after the battle of Lexington, raised great excitement among the local citizens. A group of volunteers attempted to keep watch over the magazine, but Dunmore's men were able to elude them and spirit the powder away by ship. They also buried some powder in the magazine yard, being shielded by the high brick wall. Archaeologists also discovered a cache of cannon balls in the magazine yard. In contrast to the Charleston magazine, and to most dictates, the powder room was evidently not explosion-proof; indeed, the roof of the magazine was wood shingles.

After the Revolution, the powder magazine served a variety of purposes. It was a market house for a while, and later a Baptist meeting hall until their own church was constructed in 1855. It then served as a dancing school, and then a livery stable. By the late 19th century, the building was in a great state of disrepair. When the walls began to fall, efforts were initiated by the Association for the Preservation of Virginia Antiquities to acquire and preserve the building. While these negotiations were underway, a fire from a nearby stable ignited the magazine roof and destroyed it. The APVA then had the structure restored.

An archaeological research plan for the magazine (Samford 1985) suggests that the interior of the magazine yard may have been used for storage, activities such as cooking and making lead shot, etc. There is no report on artifacts recovered from the site, other than the cache of 300 cannon balls. These included 3-, 4-,and 6-pounders (Borresen 1958).

A second comparative example, and one extant only in the archaeological record, is a late 17th century arsenal at Mattapany. This southern Maryland plantation tract was occupied by Henry Sewall in 1665. Charles Calvert, third Lord Baltimore and second Lord Proprietor of Maryland, took up residence here when he married Henry Sewall's widow in 1666. This was his primary residence until his final return to England in 1684. His house was described in 1671 as "a fair house of brick and timber, with all Out-houses, and other Offices thereto belonging, at a



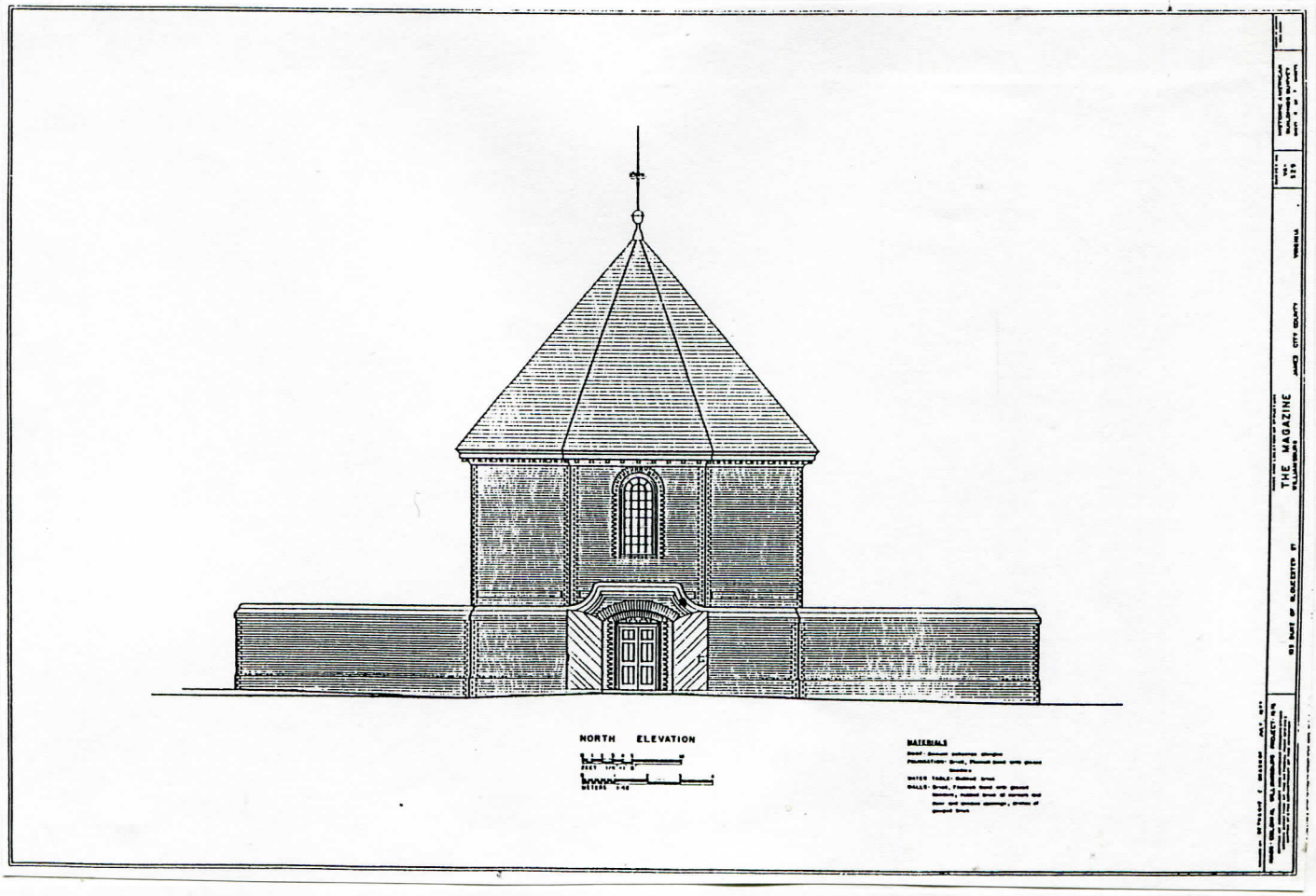


Figure 103
The Powder Magazine at Williamsburg
(Courtesy Colonial Williamsburg Foundation)

place called Mattapany, near the River of Patuxent...about eight miles by land distant from St. Maries..."

In 1567, immediately after Calvert's move to Mattapany, the manor began to serve as a meeting place for the proprietary court and Council (Pogue 1987:4). By 1678 the property was also used as an arsenal and is mentioned repeatedly as an arsenal and magazine until 1689. Even after the fall of the proprietary government, the Calvert family retained Mattapany. (Pogue 1987:6). Henry Darnall managed the estate in 1707, but lived elsewhere. The tract was re-patented to the Sewall family in 1722, and it remained in their possession until 1840. Mattapany remained a working plantation until the late 19th century.

The role of Mattapany as an armory and magazine began in 1671 with an act requiring that money be spent "towards the mainteining of a Constant Magazine with Armes and Amunicon for the defense of this Province". By 1676 guards were stationed there periodically. The armory and magazine remained active during a series of skirmishes with local Indian tribes in the 1670s.

Calvert evidently maintained this armory well; a 1678 inventory included 315 muskets, 101 carbines, 1 blunderbuss, 1,750 pounds of powder, 6,400 pounds of shot...(Chaney and King n.d.) After trouble with pirates in 1682, a permanent guard was posted, though the exact nature of their occupation remains unclear. These men were paid in tobacco, and they were to provide their own arms, provisions, and horses.

The central role of the Mattapany armory ended with proprietary rule and the unrest that accompanied the shift to royal authority in 1689. Calvert returned to England, and the armaments at Mattapany were collected and redistributed to the new provincial magazines. The 1690 inventory at Mattapany included 4 barrels of gunpowder, 3,000 pounds of shot, and another 3,000 pounds "found afterwards plaistered up in the wall." Also found were 194 muskets, 118 carbines, and 32 assorted blunderbusses, fowling pieces, and other guns.

Chaney and King note that other than the plastered walls there are no known descriptions. Nor it is clear that the magazine was a separate structure. However, they carefully build a documentary case for the armory and manor house as separate structures, within a fortified area (Chaney and King n.d.). Another early 18th century country magazine in Prince George's county, Maryland was in the cellar of a non-domestic structure, accessed by an exterior subterranean passageway (McCarthy et al. 1991:67).

Archaeological research by Dennis Pogue in 1981 encountered large pits filled with building rubble, including brick, pantile, and plaster, along with quantities of domestic debris. Also recovered by Pogue were a number of lead shot and a broken, lead-filled gun barrel. Pogue interpreted this as remains of the manor house. In their subsequent work (1991-1993), Edward Chaney and Julia King have identified a far larger complex within a palisade about 300 feet away. They have interpreted this fortified structure as the manor house, and believe the large deposits encountered by Pogue are remains of the magazine. Chaney and King's work also revealed quantities of lead shot, along with a range of domestic debris.

This review of contemporary colonial magazines suggests that those studied exhibit far more differences than similarities. All were constructed of brick (though the construction material of the Mattapany building is unknown at this time), but otherwise varied greatly in size and style. Heavy, vaulted roofs, often including soil with or on top of the magazine was also the norm, except for the Williamsburg magazine which evidently featured a wooden roof. Moreover, wooden floors and interior walls were ordered for the Charleston and Williamsburg magazines. Stylistically, the Charleston magazine appears to be unique. While the Charleston magazine housed only powder, some of the contemporary mid-Atlantic magazines housed arms of all kinds, and the Williamsburg magazine even featured a gun repair facility. Large caches or abandoned deposits of armament have been recovered archaeologically at these sites, while the Charleston magazine contained virtually no artifacts of this type. The Mattapany structure contained quantities of shot and flint, but only the broken barrel. This would suggest that weapons were not stored here (Ed Chaney, personal communication 1997)

Those magazines manned by sentries, the Charleston Magazine and that at Mattapany, seem also to share large deposits of domestic debris. It is unclear from the available archaeological reports if this was also the case at Williamsburg and Dorchester. After careful consideration of the data, the Charleston debris has been interpreted as trash from the sentries stationed there. The same would seem to be true of the Mattapany site. Comparison of the artifact assemblages are shown in Table 7. Overall, the present study has demonstrated the highly varied nature of colonial magazines. This variation provides a cautionary note regarding predictive statment about these sites for archaeological research purposes.

Powder Magazines in the Proprietary Period

Charleston's celebrated success, and well-documented history as a thriving commercial center in the late 18th and 19th centuries often overwhelms, and somewhat masks, earlier and later periods where different political and economic forces were at work. This is particularly true for the Proprietary period, when documentary, architectural, and archaeological evidence on daily life is relatively scarce. By the late 18th century, external threats of raids and warfare from Indians, Pirates, and European rivals had waned, to be replaced by the internal threat of slave revolts. In the Proprietary period, however, and indeed throughout 17th and early 18th century North America, protection was an overriding concern. Moreover, these threats were real, and often realized. Protection of the colony often guided its political and economic policies. Powder magazines and armories were central to the community during this early period, and their construction, maintenance, and furnishing were a community-wide concern. By the late 18th and certainly by the 19th century, these structures were located at specialized military sites, often physically removed from the civilian community. In the colonial period, when every responsible citizen was a member of the militia, the physical facilities were integrated into the community; their central role is revealed in official documents and cartographic sources.

Protection is a dominant theme on the 1704 Crisp map. The surrounding city wall is emphasized and shown in detail, while each of the features of this fortification are identified in the

Table 7

Comparison of Assemblages, Mattapany and Charleston Magazines

	Mattapany		Charleston	
	1983 *	1991**	1712–1750	1750–1820
Kitchen				
Ceramics	573	360	840	1141
Glass	346	316	422	709
Architecture	155 (c.300)	555	1231	974
Arms	52	139	3	15
Clothing	8	26	24	27
Personal	4	--	3	3
Furniture	9	--	9	1
Pipes	540	336	176	60
Activities	3	--	91	29

* figures derived from Pogue 1987

** preliminary figures provided by Edward Chaney and Julia King

legend, for a total of 12 items. In contrast, 2 commercial and 6 religious structures are enumerated (figure 104). The powder magazine was not yet constructed, but the northern portion of the city, where it will be built, is relatively unoccupied (Akin 1809) (figure 104).

Though the city had grown tremendously by the time of the 1740 rendering, protection of the city was still emphasized. Though the south, west, and northern city walls had been dismantled after the Yemassee war to facilitate growth, they are still shown on the map. The accompanying key enumerates 6 religious structures, 3 government structures, 6 commercial facilities, and 7 related to protection. Though it was unused at the time of the rendering, the old magazine is clearly shown, as is the new magazine. These trends are in contrast to the 1788 map, where the new magazine, the guard house, and barracks are the only protective structures enumerated, among 24 public buildings and 22 commercial wharves. Protection from fire had replaced protection from external attack, as public wells and city fire engines are carefully noted; indeed, fire protection was the raison d'etre for this map.

The primary tool of protection for colonial frontier settlements was a protective fort. The initial settlement at Albemarle Point was immediately fortified. The settlement, "on a point defended by the main river with a brooke on one side and inaccessible marsh on the other" (Cheves 1897:196–197), was protected by a palisade and four pieces of artillery which were directed toward the river (Calhoun 1986:2–14). Though a number of settlers immediately established farmsteads outside of the walls, the fort provided an area where they could take refuge in times of attack. Comparable settlement patterns can be seen in colonial settlements throughout the 16th through 18th centuries. The new Oyster Point settlement was seen as better for trade but also more defensible and indeed the entire town was fortified.

Maintenance of an adequate and ready supply of powder and armament was the second protective strategy of colonial settlements. Thirty barrels of powder were among the supplies aboard the 1669 expedition to Carolina. As this was spoiled in the voyage, an immediate shipment of 10 barrels was first stored in the Lords Proprietors storehouse. Indeed, the powder, the guns, and the protective palisade of the original town made the settlers "feel more like soldiers in a garrison than planters" (Shaftesbury Papers, vol V:184; Davis 1942:186).

Protection of the community powder figures heavily in early correspondence. The Act of 1680 that established the new Charles Town further dictated that "a publicque store of powder [be] always in readiness". The early powder supplies were kept in the "public store" and there were efforts to build a magazine as early as 1702 (Davis 1942:186).

Placement of armories and magazines were considered carefully, whether they were urban structures or outlying 'country magazens'. Placement of the Charleston magazine was debated before it was decided that "the powder house be built within the said line of intrenchment." The previous discussion of comparative colonial magazines demonstrates their central role in colonial life. Of particular note is the history of the Dorchester magazine. Construction of this magazine was not a site–specific event, but part of a larger protective plan dictated by the colonial government. Recently, Dan Bell (1995) has surmised that the surrounding tabby fort was built

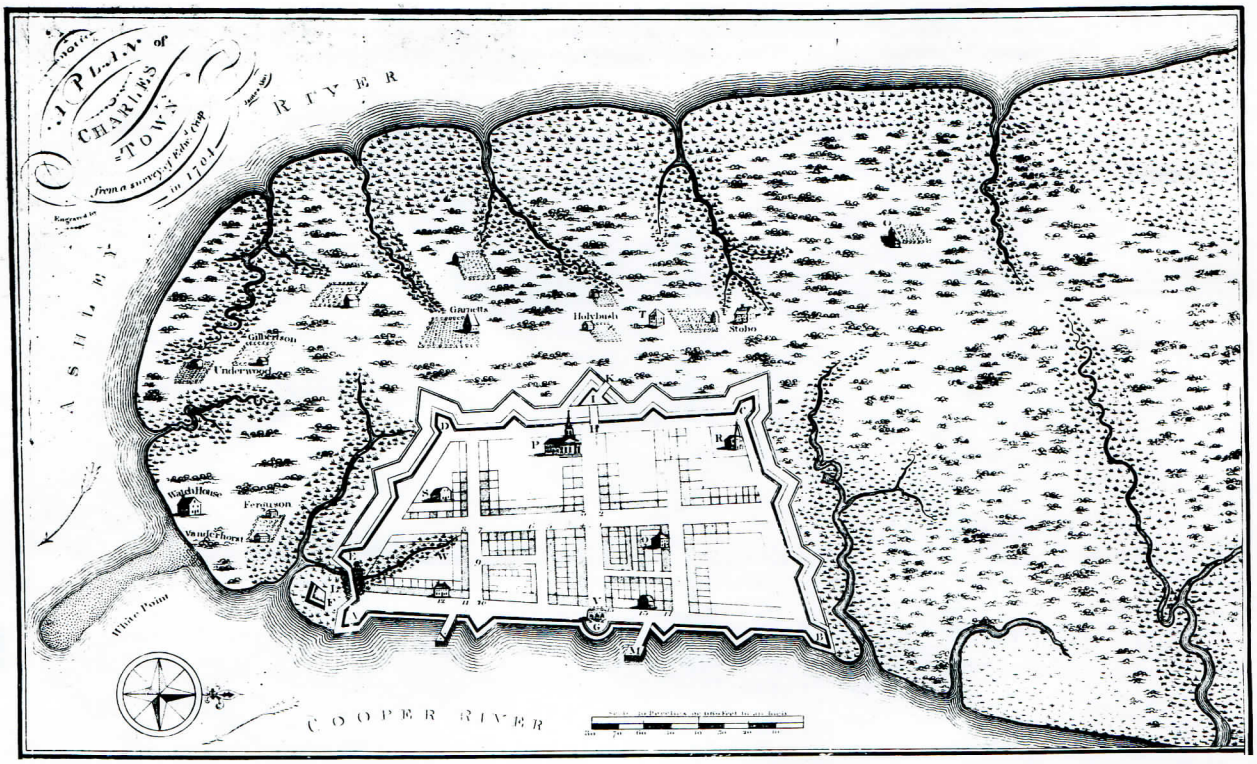


Figure 104a: The Charleston Fortifications in 1704
Figure 104b: The Charleston shoreline in 1740

not in anticipation of an external attack, but expressly for the protection of the powder magazine. Further, the magazine was carefully constructed of brick, where the style and material of the fort was chosen for easy construction.

The third protective endeavor was store of public arms. In Charleston, these were kept separate from the store of powder, while the mid-Atlantic sites studied kept the two together. The public store of arms were used by the militia, a group of citizen-soldiers, initially charged with defending the colony and later evolving into a local police force for domestic affairs. McCarthy et al. (1991) provides a cogent discussion of the evolution of the colonial militia. They note that colonial warfare had a profound effect on the development of the militia, and in turn on the politics and economy of the colonies. They note that " the militia experience of citizen-soldiers, at least in part, aided in the creation of a more democratic and participatory colonial society, in time leading to revolution and independence".

Early in colonial history, formation of a militia filled the gap created by lack of a standing army in the face of threatened attack from Native Americans and rival Europeans. Stores of public arms and ammunition were carefully placed within easy reach of the militia. Militia leaders were responsible for protection and safety of citizens, and their duties included distribution of arms and ammunition. Studies of Thomas Addison (McCarthy et al. 1991) and Charles Calvert (Chaney and King n.d.) suggest that the militia officers were men of estate, closely connected with the leading gentry in the region.

Through the years, Charleston's powder magazine has been viewed as a symbol of colonial protection. During the proprietary period it was protection, not a symbolic building but an essential component of a frontier settlement. Maintenance of a store of powder was one of the basic functions of the colonial government. While the various invasions by the Spanish and attacks by Indians seem in hindsight to have been more threat than reality, the experience of the French at Fort Caroline in 1563 demonstrate how such an engagement could readily destroy an entire colony (see Deagan 1983:22; Lyon 1976). The role of the powder magazine was one essential to life in proprietary Carolina.

Changing Symbolic Role in the Urban Landscape

Examination of the myriad details of the physical and ideological parameters of the powder magazine site serves as a foundation for a broader exploration of Charleston's evolution as an urban center, through the paradigm of landscape studies. The focus of this discussion is an exploration of how Charlestonians changed, and were changed by, their interaction with the land. Following the lead of geographers, a landscape perspective attempts to form linkages among material, social, behavioral, ideological, and natural elements in a region of study (Stine and Zierden 1996).

Of particular importance to the study of Charleston is the concept that land is not 'natural', but modified for human occupation and use; above all, it is a shared space, evolving to serve a community (Jackson 1984:7–8). John Stilgoe (1982:3) defined landscape as "that area comprehended in a single view." Dell Upton (1990) challenged Stilgoe's definition, suggesting that the landscape, particularly that created by the elite, was meant to be experienced dynamically; the visitor passed from one contrived setting to another, and was expected to piece together many partial views and symbols.

Thus Paul Shackel and Barbara Little suggest that cultural landscapes are expressions of ideals, of emulation and assertions of power, used to reinforce hierarchies (1994). Elizabeth Kryder–Reid (1994) further explores the idea that they are three dimensional spaces, entered into and experienced. Further, the same landscape was viewed in different ways by the various groups who used it. Thus the urban landscape is more than just an amalgamation of individual landscapes of the elite, middling, and poor. It also possesses a unique and definable character of its own, simultaneously collective and contradictory; as such it requires a broader level of study, beyond that of individual components. For an urban center was, as Dell Upton has suggested, "a product of large social and economic forces, a pattern reflecting collective action" (1992:51). A material culture study of the city moves beyond individual sites and individual actions to an investigation of reciprocal relationships among selves and human alterations of the physical world.

Upton further suggests that intentional creation is only one change in the ways humans interact with their surroundings. The urban environment in particular was experienced through all five senses – sight, sound, smell, taste, and touch. While many of these become difficult to recover through archaeological, or even historical, methods, they were integral to the mental constructs of daily life in cities. Upton suggests that these can be recovered through verbal and visual descriptions, providing linkages between the intangibles of city life and tangible surviving artifacts. For people moved through their environment, interacted with it, and reacted to it in these many ways. Upton suggests that the cultural landscape "fuses the physical fabric of the city and the culture of its residents with the imaginative structures that urbanites used in constructing, explaining, and representing them" (Upton 1992:53).

The oldest public secular building in the Carolinas, Charleston's powder magazine still stands, rather incongruously, in the middle of a modern, changing city. The building's function changed several times during the course of its 300 year existence; further, the building has always served a symbolic role, and this symbolism has evolved with the building and with the city. The Powder Magazine serve as a convenient metaphor for discussion of Charleston's evolution as an urban center.

Even without its buildings, the Charleston landscape is one much altered by generations of inhabitants. While the current terrain of Charleston appears to be almost completely flat, the colonial peninsula featured more relief (Akin 1809; Roberts and Toms 1739). Alteration of the terrain to better suit the economic and social needs of town residents began almost immediately. Major changes such as the filling of creeks and marshes along the Ashley River and the creation of "made land" along the Cooper riverfront began in the late 17th century and continued into the

early 20th. Concurrent with this was the filling of the numerous fingers of marsh and small creeks which cross-cut the peninsular interior. More subtle, and noted primarily through archaeology was the filling of small marshy and low areas to improve individual lots. When the magazine was constructed, and for a few decades after, the northern city wall abutted a large creek that drained to the Cooper River. Eighteenth century city maps suggest that this areas was gradually filled, creating the real estate necessary for growth accommodated by creation of Cumberland Street, and ultimately the market area.

The historical legacy of Charleston's economic success has overshadowed the city's earlier, more diverse functions as a frontier town; a religious center, a trade center, a political center, and a center for interior exploration, Indian trade and relations, and as a pawn in the evolving international rivalry among the European powers. Thus it was that defense of the colony was foremost on the minds of European proprietors and early settlers alike when the colony was founded in 1670. Ten years later, Charles Town was moved to the peninsula formed by the Ashley and Cooper rivers, a location viewed as more defensible and better situated for trade. Further, the new town was a walled city, likely earthen on the land sides with a brick sea wall along the Cooper River bluffs. The walls were outfitted with a series of bastions, a moat, and bridge along the west wall. The 1704 map accentuates the wall as a prominent feature.

By 1686, the desire for a fortified town was matched with endeavors to store gunpowder for the defense of the province. In 1703 the Assembly directed that a "country magazen" be built for proper storage of powder and arms, and that a public magazine be built within the "intrenchment" from the land of three indifferent freeholders. Documents suggest that this magazine was built by 1712. Archaeological evidence supports construction during the second decade of the 18th century.

The city map of 1739 suggest that the magazine was constructed in the center of a large open lot next to the city wall between Meeting and Church streets. The graveyards of St. Phillips and the Congregational churches abutted the property to the south. Immediately north of the city wall was a creek and wide expanse of marsh. The map also suggests that the magazine was further protected by a wall surrounding the building itself (figure 8).

Seemingly secure and removed from the heart of the settlement, the magazine was used as a storage place for all powder sold by merchants and individuals, as well as for State-owned powder. The recovered artifacts, or lack thereof, suggests that arms were not stored here. But in 1713 the building was found to be ineffective, as the roof leaked and the powder was in danger from rain and moisture. The Assembly ordered a host of repairs. By 1725 it was again in a state of disrepair. Temporarily replaced by a new and even less adequate magazine, in 1739 the old magazine was again returned to active use. The Committee recommended a host of carefully enumerated improvements, including a two centry boxes to be built and that "two of the men belonging to the watch be placed there every night as centrys and relieved every two hours".

Archaeological evidence of this mid-century renovation appears in the form of three trash-filled pits on the building exterior, containing quantities of architectural rubble, particularly

clay pantile fragments. These appear to be from the original roof, removed and replaced with slate. The three pits also contained quantities of domestic refuse, including bone, glass, ceramics and pipes. Inside, portions of the dirt floor were evidently improved with rather rough brick paving, consisting of isolated areas of half brick and poured mortar, perhaps corresponding with high traffic areas such as doors. By mid-century, a thin, highly trampled layer of midden soil (zone 3) had been tracked and compacted onto this floor. The narrow band of trampled soil contained white saltglazed stoneware, fragments of glass, and charcoal, providing a Terminus Post Quem of 1740.

The soil and artifacts in the exterior mid-18th century pits, and that which next accumulates on the building interior (zone 2) provide the most tantalizing clues to use of the magazine during the late colonial period. Noticably absent from the deposit are gunflints, shot, or almost any evidence of armament. A silver scabbard tip, two gunflints, and a link of decorative chain were the only finds. The strongest signature of the buildings' official function was a relatively large proportion of barrel strap fragments. Noticably present in the deposits are large and varied quantities of colonial domestic refuse, including ceramics, colono wares, wine bottles, pharmaceutical bottles, tobacco pipes in large numbers, and great quantities of faunal material. Commensal species, particularly rats, are present in the faunal assemblage (comprising 12% of mni, up from 6% in the early period), and a large proportion of the mammal bone appears to be rodent gnawed. Cross mends and vessel matches from interior and exterior proveniences support the interpretation that all refuse was generated on site, a basic premise not assumed on urban sites. These data portray a dark, dank, but substantial building, and one that was likely used as residence for the sentrys and perhaps their families. At the very least, a range of domestic activities took place on site; while buttons could have been lost from clothing, scissors and straight pins suggest clothing repair. Perhaps this is the sentrys' daily discard, scattered and hidden among the barrels and racks of powder stored in the building, thereby explaining the untrampled nature of the materials. Such an untidy site stands in contrast to the expected fastidious, safety-conscious behavior prescribed for magazines, but the presence of the artifacts is undeniable. The interpretation as domestic debris is supported by the characteristics of the faunal assemblage, and Betsy Reitz first proposed this interpretation.

Dell Upton prefaces his specific discussion of the city with a focus on republicanism as an ideal of the early national period. Religious metaphors of sin and moral responsibility, evolving economic concepts, natural history, and political language were manifested in a broad effort to order and improve urban space. The colonial idea of a gridded city – and Charleston was one – was revised in a drive to "conquer space." According to Upton, this was accompanied by a mania for filling, and occasionally for leveling, exemplified in Boston's total destruction of Beacon Hill, and for "equalizing space through public works that would make every property equally useful. Early republicans thought of regulated space as essential to human society" (1992:53-54).

While the magazine continued its role as official repository, guarded by sentrys, the neighborhood around the magazine was changing. As Carolina colonists searched for profitable staple crops, following an initially successful Indian trade in deer skins, the settlement developed gradually as a port and market. The 1730s witnessed the town's transformation from a small frontier community to an important mercantile center, bolstered by replacement of proprietary with

royal rule, the development of backcountry settlements, and the production of rice as a profitable staple. Thousands of Africans were imported as a labor force, and merchants grew rich dealing in staples and slaves.

In the early 18th century, the town rapidly expanded to meet these needs. A thriving waterfront developed along the Bay (the Cooper River bluffs), and the town expanded on an east–west axis. The city walls were demolished or simply built beyond; the 1739 map shows the location of the walls, but their relative importance is greatly reduced compared to the 1704 map. By mid–century the rapid physical expansion subsided, and a growing population was accommodated by subdividing lots and expanding into the center of downtown blocks. This growth encompassed the magazine site, as well. The northern city wall disappeared, and Cumberland street was established. In 1748, petitions, protests, and complaints from Charles Town citizens forced disuse of the Powder Magazine, owing to its now–close proximity to dwellings and publick buildings; protector had become pariah. The building's value to the community rebounded during the Revolutionary War, when the building was again used as a magazine, and appropriate repairs were made. After a few months, though, the powder was moved to a secret location in the basement of the Exchange building.

In 1741, the rightful ownership of the property was called into question by descendants of Peter Buretel, on whose land the magazine was built. The three plaintiffs were awarded rents on the property, "until the same shall be delivered into their possession". This evidently occurred gradually, as the building continued intermittent use as a magazine until 1820. A plat dated 1801 shows subdivision of half of the original lot; the other half was already subdivided and improved.

The magazine remained in the hands of Buretel's heirs until 1902. Throughout the 19th century, it served a variety of functions, none of them very glamorous, ranging from storage for the owners to rental property. Unwanted memorabilia of English colonialism, including portraits of King George, were stored there, and eventually vandalized by a "base intruder". The building served as a wine cellar for the Manigault family in mid–century. Other uses include a livery stable, a store house, and a print shop, and blacksmith shop.

These various uses left a substantial impact on the archaeological record. A huge trash pit filled in the 1830s contained quantities of architectural refuse, including the 1740s slate roof, again replaced with pantile. Brick and mortar rubble, ash, and domestic refuse were also used to fill this pit. The surrounding protective wall was demolished. Pollen analysis indicates that a clover–covered lawn gave way to a variety of weed species. And the interior trash midden was covered with brick paving in the western half of the building. The eastern half accumulated a very dark organic midden layer, containing relatively sparse amounts of trash. The soil was also laden with parasites, suggesting animal and perhaps human occupation of the building. The floor configuration of the brick reflects use as a livery stable or at least a subdivided interior. Recovered artifacts reflecting the various private uses include horse shoes and stirrup, and printers type. General refuse disposal continued during the 19th century and sheet midden accumulated in the now–shrinking yard. Archaeological and photographic evidence suggests that the building was surrounded by a wooden fence, and subdivided internally as well. The structure suffered extensive

damage in the 1886 earthquake, and there is internal and external evidence of repair. Openings were evidently changed continually.

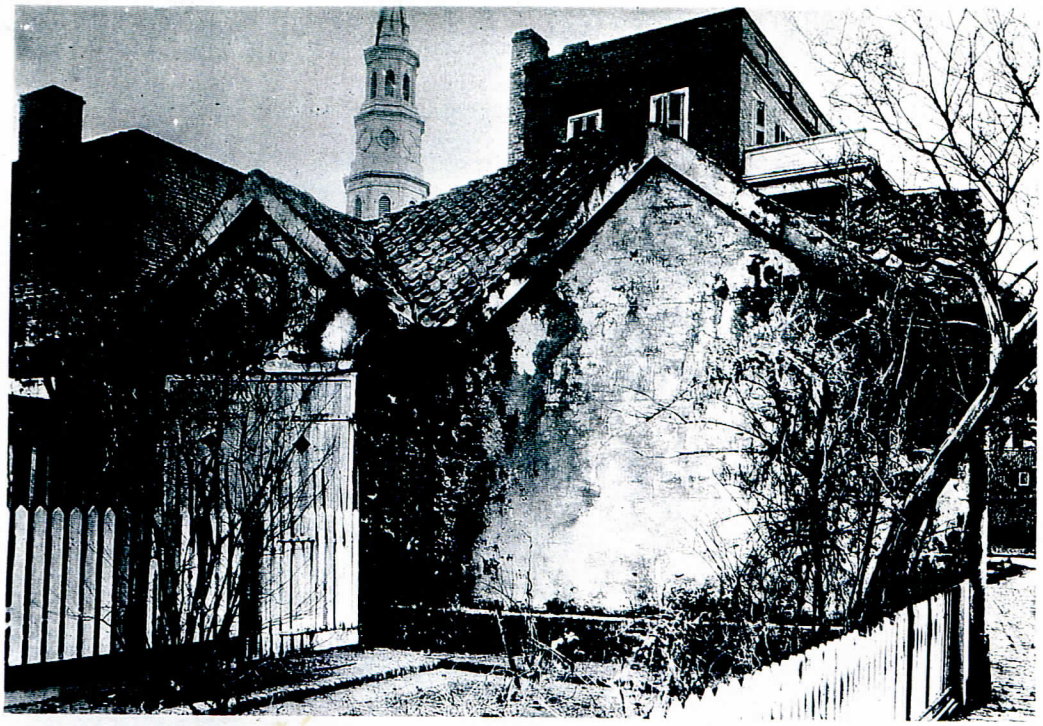
The dilapidated, underutilized Magazine nonetheless remained standing as much of Charleston's earlier architecture was replaced by massive Georgian and Neoclassical buildings, both private and public. A series of fires, beginning in 1740, cleared large tracts of the city for rebuilding at a time when merchants and planters acquired untold wealth (figure 104). Many displayed their new riches in architectural monuments to themselves, with accompanying formal gardens. The necessities of daily life, including a retinue of enslaved African laborers, were relegated to the rear of the property. The private houses were matched by public architecture on a grand scale, including churches, government buildings, and commercial establishments. The economy of post–Revolutionary Charleston boomed, and the city remained an important player in the trans–Atlantic mercantile world. But the development of rail networks, the Civil War, and changes in the technology of rice cultivation would accrue to Charleston's misfortune in the second half of the 19th century.

The palynological and parasitological record of the 19th century magazine reflects a rather neglected space with a weedy exterior, and animal– and human–borne parasites reflecting an unkempt, unsanitary interior (figure 105). These unsanitary conditions were only a little worse than those generally found throughout the town, for Charleston had been struggling with the health problems attendant an overcrowded city; a plethora of privies and wells in close proximity had contaminated the groundwater by mid–century. Charlestonians responded by building cisterns to collect rainwater, paving the workyards of their homes, building wastewater drains, and removing trash to off–site dumps. By the late 19th century, municipal poverty was the main reason that such problems persisted, despite the pleas of the Commissioner of Public Health.

The economic stagnation of the late 19th century was reflected in a lack of new construction. The old houses and buildings remained, but in a state of disrepair. The descendants of colonial power brokers lived in 'genteel poverty', shared their decaying townhouses with boarders and tourists. But it was the threat of destruction of perceived architectural and historical treasures that gave birth to the historic preservation movement early in the 20th century.

In 1897, owner Gabriel Manigault felt that "the time has come when the Magazine must be removed altogether." Some sources suggest that the building had remained vacant since the 1886 earthquake (figures 105 and 106). The response to Dr. Manigault's suggested demolition was the first effort in Charleston to preserve a historic building. In 1902 the South Carolina chapter of the National Society for Colonial Dames purchased the building; they restored it and used it as their headquarters and later as a museum (figures 107–109). Early 20th century photographs graphically illustrate the Magazine's third functional and symbolic role. The new role as historical monument echoed the original protective and patriotic one of the fortified magazine, but with a new twist; whereas the powder magazine fulfilled a necessary function, staffed and possibly occupied by male soldiers about the business of warfare or its prevention, the preserved magazine presented a romanticized version of its past glories. A 1916 calendar photo of the magazine carries the accompanying quote from Owen Wister, "That stubborn old octagon of Revolutionary times

Figure 105
The Powder Magazine in 1898
Note the wooden floor and refuse on the building interior; the refuse in the front yard.



OLD MAGAZINE, CUMBERLAND STREET.

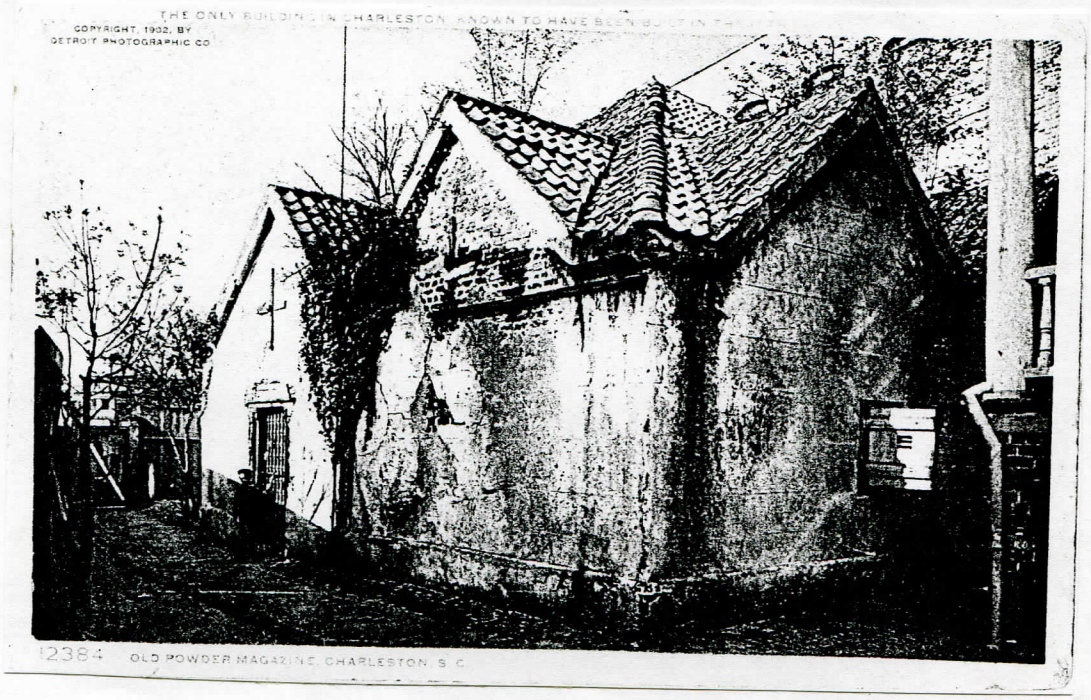
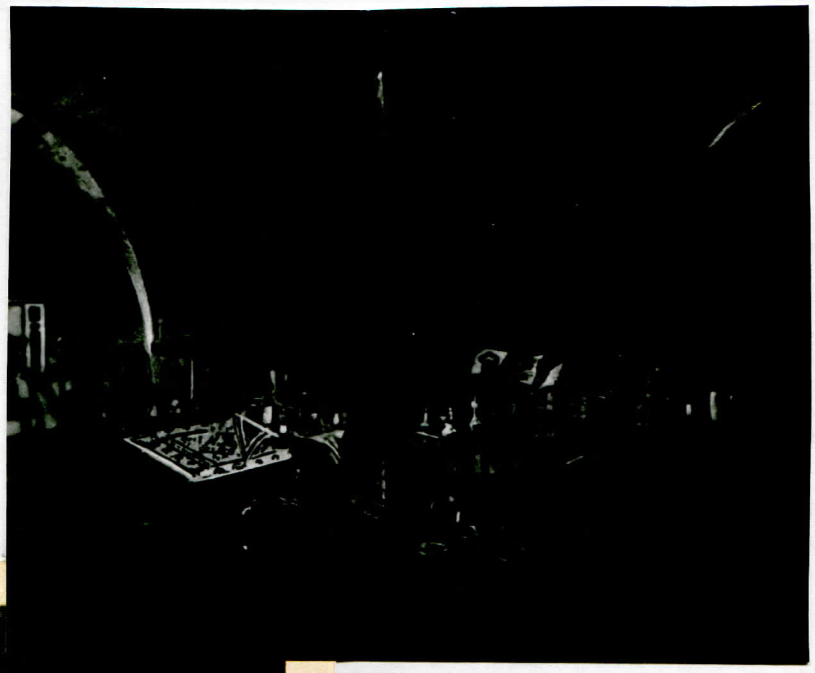
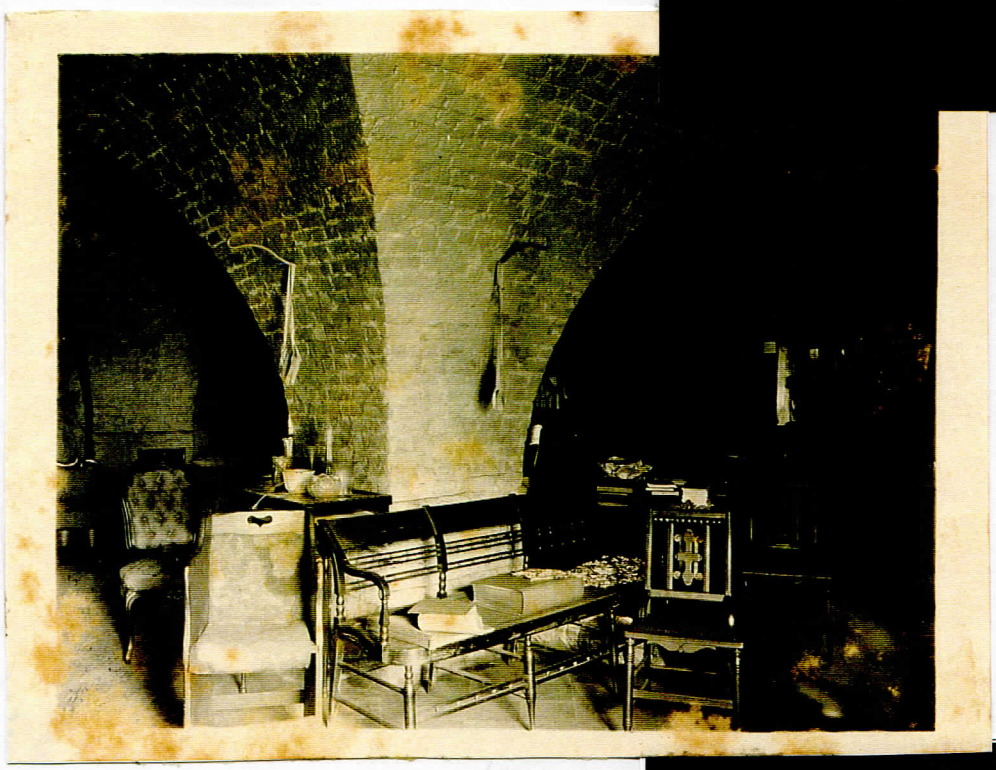


Figure 106
The Powder Magazine yard in 1883
Note the internal fence, the bricked front yard

Figure 107
The Powder Magazine in 1902

Figure 108: Exterior of the Powder Magazine in the early 20th Century. Note the landscaped front yard. (A courtesy of South Carolina Historical Society; B courtesy The Charleston Museum)





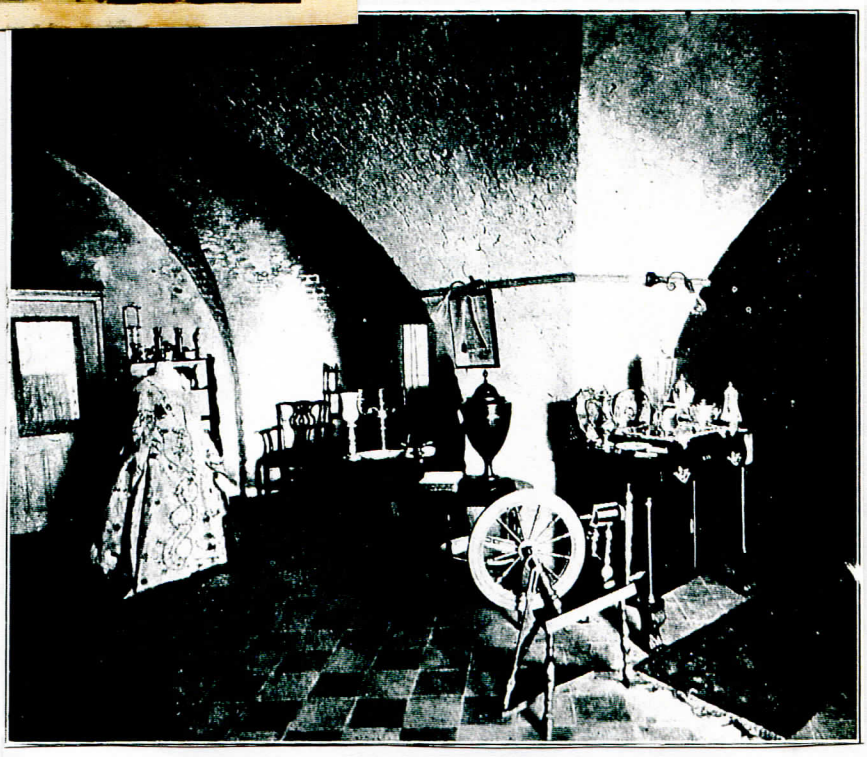


Figure 109: Views of the Magazine interior as the Dames' meeting place and later museum. (A courtesy of South Carolina Historical Society; B, C courtesy The Charleston Museum)

which is a chest holding proud memories of blood and war." The interesting reference to an "old octagon" suggests that the quote was originally applied not to the square Charleston magazine, but to the 1714 powder magazine in Williamsburg, which was octagonal. It preserved at this same time by Mrs. Cynthia Beverly Tucker Coleman and her associates in the Association for the Preservation of Virginia Antiquities. Like the Charleston magazine, the Williamsburg magazine was one of the first buildings preserved in the historic town.

Ownership by the Colonial Dames also marked a change in the gender of the building's occupants. The interior received a renovation, a paint job, a waxed wooden floor (later a tile floor), and a host of fancy furnishings appropriate for formal entertainment. The weedy exterior was replaced with a garden, and later, formal plantings and walkway accentuated by Revolutionary cannon from elsewhere in the city. The interior meeting space was later converted to a museum reflecting the heritage of Charleston and of members of the Colonial Dames. But the moisture problems that began in 1713 continued unabated to 1993. At that time, Historic Charleston Foundation acquired the building on long–term lease and has embarked on an ambitious, appropriate regimen of restoration.

The Powder Magazine thus continues its evolving symbolic role in Charleston, from protector, to anonymous commercial space, to an all–but–abandoned "problem" to a romanticised symbol of past glories, to a piece of "revised history". Thus it is no accident of the the urban landscape that this squat, "mannerist" building sitting at an odd angle remains among parking garages and lofty church spires. It reflects Charleston's changing role as frontier settlement, commercial center, economically stagnant town, and reinvigorated sunbelt tourist destination.

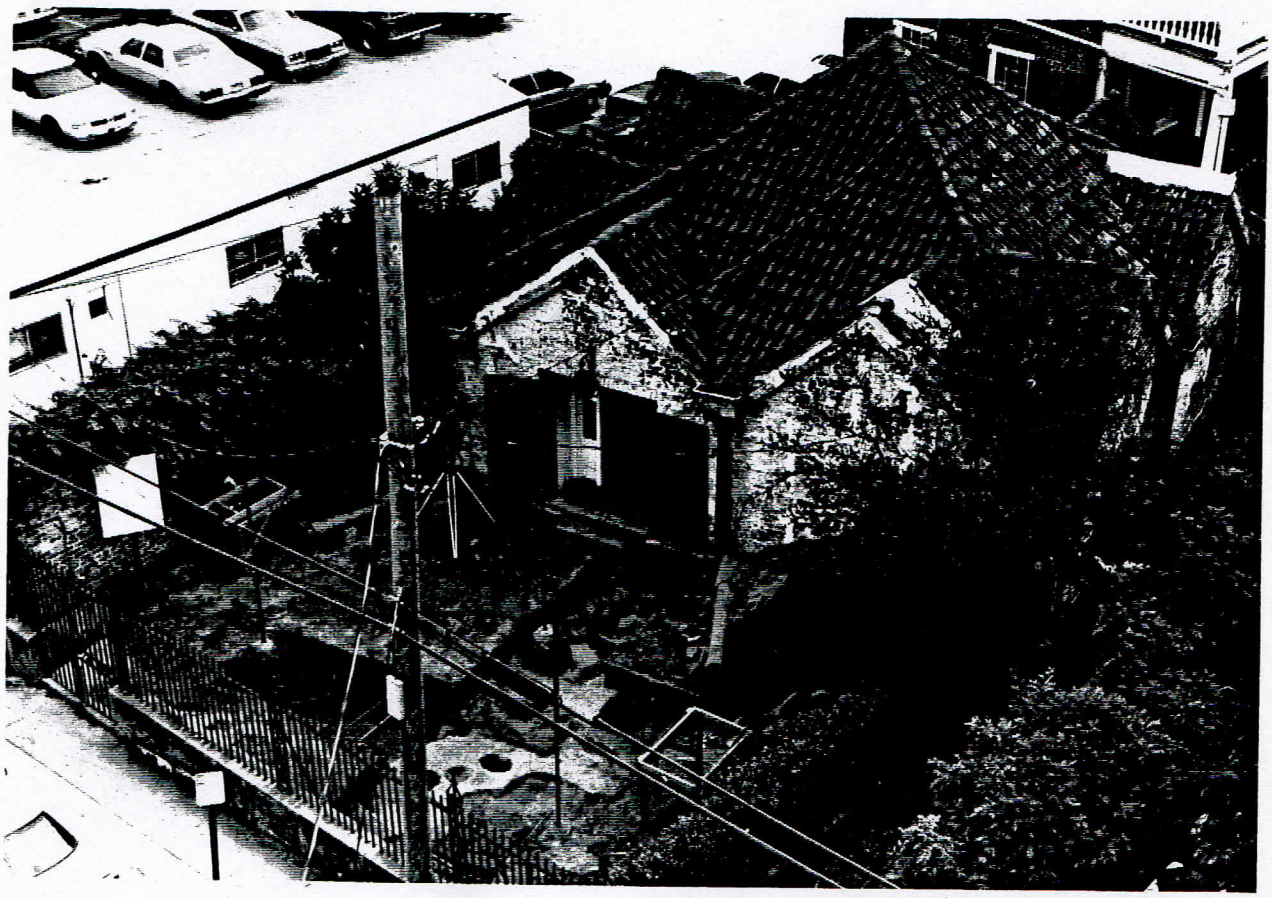


Figure 110: The Powder Magazine from the Cumberland St. Parking Garage

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APPENDIX I

Vertebrate Fauna from the Powder Magazine, Charleston, South Carolina

Daniel C. Weinand and Elizabeth J. Reitz

Introduction

Although there is substantial interest in subsistence strategies practiced by people living in and around Charleston, South Carolina, patterns of vertebrate use have been difficult to define due to variables such as urban or rural location; socio–economic and ethnic status; as well as temporal and functional differences. As zooarchaeological studies in the Charleston area are conducted, many of these aspects of life in the region are more fully understood; however, the full range of location, status, temporal, and functional variables have not yet been explored in the region. Most of the vertebrate data from Charleston are from residential or mixed residential/commercial sites from the late 18th and early 19th centuries. Although Charleston also played an important military role, no military faunal assemblages have been studied to make our understanding of vertebrate use in the city more complete. Additionally, few data exist for early 18th–century subsistence strategies so it has been difficult to follow changes in animal use in the city from its foundation in the early 18th century through the 19th century.

Recent archaeological investigations at the Powder Magazine site provide an opportunity to explore two of the variables understudied so far. The Powder Magazine site is an urban military site and so offers the opportunity to expand our understanding of military life in the city. If the Powder Magazine was used solely for storage of gunpowder and firearms during the 18th–century part of its occupation, we might learn if specialized subsistence strategies were practiced by soldiers through patterns of vertebrate remains suggesting meats obtained through purchase or rations. Because data were recovered from the early part of the 18th century through the 19th century, the Powder Magazine site also affords the opportunity to examine change in animal use through time at this site, although the change in site function in the 19th century might limit the interpretive power of the diachronic sequence. Both contributions are important for our understanding of the economy of the city.

In order to identify aspects of animal use at the Powder Magazine site that might reflect the site's early function or changes in subsistence through time, data from five other Charleston

area collections will be summarized. Three collections represent vertebrate remains from the 18th century (Table 1). These are the First Trident Tannery (Zierden et al. 1983), deposited in the 1740s; the Beef Market site (Calhoun et al. 1984), deposited between 1739 and 1796; and a sample known as pre–Brewton from the Brewton House site (Reitz 1990), deposited about 1730 through 1768. The earliest deposits at First Trident are thought to be from a tannery operating on the periphery of town and the occupants may have been mainly men, some of whom may have been slaves. The Beef Market was the official site for a public market that functioned at this location until the end of the 18th century (Calhoun et al. 1984). Only the pre–Brewton data are from an 18th–century residential site. These data represent our knowledge of 18th–century vertebrate use in the city. Although biomass has been estimated for all of these samples, the summary will focus on estimates of Minimum Numbers of Individuals (MNI), a quantification technique discussed in the methods section of this report.

Data from the late 18th and early 19th centuries are combined into what is called a General Charleston pattern (Reitz 1986; 1990) that will be used here as an example of post–1800 animal use in Charleston (Table 2). Many of the sites used to construct the General Pattern are high status sites and others had a commercial function instead of, or in addition to, a residential one (Reitz 1990). All of the General Pattern collections are from Antebellum period. In order to carry the comparison into the post–bellum period and through the end of the 19th century, data from the residential Pringle–Frost occupation at the Brewton House (ca. 1840–1880) will also be considered (Reitz 1990). The Pringle–Frost materials were deposited between the 1840s and 1880. Although the Pringle–Frost family was an important member of Charleston society, it had limited financial means and lived in genteel poverty after the Civil War.

The pre–1800 collections (Table 1) suggest that domestic animals contributed about a third of the individuals at sites that had at least some residential function, represented by First Trident and pre–Brewton. In the Beef Market collection, however, domestic animals contributed over half the individuals, most of which were cattle, although some pigs and caprines were also present (Calhoun et al. 1984:78). This difference is probably explained by the function of the Beef Market as a commercial venue where meats such as beef, pork, fish, venison, and poultry were sold, the term "Beef Market" clearly not reflecting the full range of commercial activities that took place on the property. Wild animals contributed two–thirds of the individuals in the First Trident and pre–Brewton collections; most of the wild animals were fish (Reitz 1990; Zierden et al. 1983). The similiarity of the First Trident and pre–Brewton assemblages is interesting considering that First Trident almost certainly had a different function and was occupied by people in a different social situation compared to the pre–Brewton household. Nonetheless, this comparison suggests that in the early part of the 18th century there was a consistent character to vertebrate use in the city and that only some meats were acquired through purchase at the city's market.

The post−1800 period is represented by the General Pattern and the 19th−century Pringle−Frost component from the Brewton House site (Reitz 1990). In the General Pattern almost half of the individuals are domestic animals; but in the Pringle−Frost collection domestic animals contributed less than a third of individuals. Wild animals were primarily fishes and wild birds. Wild birds, primarily turkeys and Canada geese, may actually not have been wild at all, but feral or tamed animals. The level of use of wild birds in the post−1800s was apparently not different from the level of use in the pre−1800s. Fish use was low in the General Pattern, but uncharacteristically high in the Pringle−Frost collection. While fish constituted at least third of the individuals in the First Trident and pre−Brewton assemblages in the 18th century, they are generally rare in 19th−century assemblages. The high number of fish in the Pringle−Frost sample may either reflect enhanced preservation of fish remains at the Brewton House site, the impoverished character of the Pringle−Frost household, or perhaps a preference for fish by the household (Reitz 1990).

The high number of commensal taxa in the Pringle−Frost collection may be another explanation of the relatively low percentages of the other taxonomic groups in this assemblage. Commensal animals, primarily Old World rats (MNI=10), contributed 24 percent of the individuals. This frequency of rats is even higher than was found in the 18th−century Beef Market. The relatively high number of commensal taxa in the post−1800 group may also indicate that vermin, especially rodents, increased through time in the city.

Two other characteristics need to be examined in that they provide evidence for change in economic activity through time. One of these is element distribution. When the data for cattle elements recovered from Charleston archaeological sites are plotted against a Standard cow using a technique based on ratio diagrams (described further under Methods) three distinct patterns have been observed for Charleston (Figure 1; Reitz and Zierden 1991). These patterns seem to reflect site function rather than status, and so may be helpful in distinguishing between faunal materials from a military site and those from sites with other functions.

One of the patterns of cattle bones recovered archaeologically is clearly a residential one and is found both at upper and middle status sites (Figure 1; Reitz and Zierden 1991). While fragments from both the head and foot are recovered from residential sites, fragments from the hindquarter and especially the forequarter are more abundant than fragments from the head or foot. Forequarter bones were more common than hindquarter bones regardless of status. All residential sites, regardless of whether they were associated with middle or upper status occupants, conform to this pattern.

The non−residential patterns (Figure 1) can be divided into two categories based on function: public facilities associated with marketing and disposal of meat (Beef Market and Atlantic Wharf) and entertainment facilities (McCrady's Tavern and Lodge Alley). In the Beef Market pattern, fragments from the head are more common than in the residential pattern.

Bones from the forequarter were underrepresented compared to residential sites. Hindquarter and foot fragments are found in similar proportions in the market and residential patterns.

The pattern for entertainment–related collections is a mirror image to the market pattern yet distinct from the residential pattern. At sites whose primary function was public entertainment fragments from the head were more common than at residential sites. In fact, the market and entertainment patterns have identical ratios of head fragments compared to the Standard cow. Bones from the forequarter were overrepresented in a mirror image to the pattern described by market sites although somewhat below that described for residential sites. Fragments from upper hindquarter were rare or absent, also in a mirror image to the market pattern. Fragments from the foot were slightly more common in the entertainment pattern than in the residential one. The percentage of entertainment–related fragments from the forequarter and the lower hindquarter, however, fall within the residential range. Entertainment facilities may have obtained meat exclusively through purchase at the market, thereby removing bones from the market.

The bones recovered from residential sites do not compliment those missing from the Beef Market. This suggests that the market was not the only source of bones for most residential sites. One interpretation of these data is that faunal remains from residential sites probably became part of the archaeological record through a combination of on–site butchery, meat purchased from vendors, and salted meats. Another source of meat, one which might contribute elements from the entire skeleton, would be on–site butchery. Since the residential pattern is also unlike the unmodified distribution of elements in a cow skeleton, on–site butchery, however, does not appear to be the only source of meat/bones at residential sites. Instead, a combination of on–site butchery and market purchases seems indicated. The ratio diagrams suggest that residential customers rarely purchased cuts which contained teeth or other skull fragments. Instead they were likely to purchase cuts from the forequarter which contained bone. At home, consumers may have discarded these market bones with ones from the head, hindquarter, and foot which originated from their own slaughter activities.

The other characteristic that should be considered is the presence of sawed bones. Sawing is a method of processing meat to produce small portions and is usually associated with butcher shops rather than home–butchering. If sawing was a common butcher shop technique and an uncommon household treatment, this may also be indicative of common use of commercially prepared meats at the Powder Magazine. Sawing has been found to increase through time at Charleston sites, especially those which are associated with 19th–century, middle–class occupations. Less than 1 percent of the modified bones in the 18th–century First Trident Tannery (Zierden et al. 1983), pre–Brewton (Reitz 1990), and Beef Market (Calhoun et al. 1984) collections had been sawed, although sawed bone was present at all three sites. Sawed bone was more common in middle–class, 19th–century collections. Between 8 percent and 15 percent of the bones in the 66 Society Street (Frank 1988) and

President Street (Wood 1988) collections were sawed; sawed bones constituted 8 percent of the 40 Society Street collection (Reitz and Dukes 1993), although only 4 percent of the 72 Anson Street collection was sawed (Reitz and Dukes 1993). By way of contrast, sawing was found on only 1 percent of the bone in the Pringle–Frost collection (Reitz 1990), and further suggests that the Pringle–Frost household did not make use of purchased meats to the same extent that other 19th–century households did.

It is interesting to note that all of the Charleston urban sites have some similarities regardless of function, time period, or occupant's status. However, the data suggest that domestic animal use may have increased between the 18th century and first half of the 19th century, and that fish use may have declined over that time. After the Civil War, some households may have experienced a decline in the use of domestic meats. The element distribution information has great importance for study of faunal remains from a military location. The assumption is that most soldiers would be given rations, probably of processed or store–bought meats. We would expect, therefore, that cattle elements from the 18th–century Powder Magazine site would be more similar to the entertainment pattern, which also appears to be based upon purchased meats, than would elements from the 19th–century component at the Powder Magazine, which might have been residential and/or commerical rather than military. A higher percentage of sawed bones, such as found in the 19th–century middle–class deposits, would also be consistent with purchase of at least some meat from markets. If the soldiers received rations, we might expect to see a higher percentage of sawed bones in the 18th–century Powder Magazine than in other 18th–century collections, and we might find an increase in the percentage of sawed bone by the later part of the 19th century. There is also the likelihood that vermin increased in the city through time. These possibilities will be tested against vertebrate remains from the Powder Magazine site.

Materials and Methods

Vertebrate faunal materials from the Powder Magazine, Charleston, South Carolina, were excavated under the direction of Martha A. Zierden, of The Charleston Museum, using a 1/4–inch mesh screen during recovery. The site includes an 18th–century military powder magazine and a 19th–century structure of undetermined function. From records, we know that two sentries were stationed at the Powder Magazine at the time of the Revolutionary War (Martha A. Zierden 1994, pers. comm.). After 1800, the structure was no longer used for the purpose of powder storage. What it was used for or if the structure was used as a residence after this time is unclear. In an attempt to examine the progression of uses at the site, faunal materials were grouped into four analytical units based on temporal subdivisons assigned by Zierden. These divisions are 1712–1750, 1751–1820, 1820–1850, and 1851–1900. For the purposes of comparison with other Charleston sites, the two 18th–century components are

eventually combined into a pre−1800 assemblage and the two 19th−century components are combined into a post−1800 assemblage.

Vertebrate remains were identified using standard zooarchaeological methods. All identifications were made by Daniel C. Weinand using the comparative skeletal collection of the Zooarchaeological Laboratory, Museum of Natural History, University of Georgia. All bones were grouped by analytical unit before the aggregation of data. Bones of all taxa were counted (NISP) and weighed (Wt, gm) to determine the relative abundance of the species identified. A record was made of identified elements. Age, sex, and bone modifications were noted when observed. Where preservation allowed, measurements were taken following the guidelines established by Angela von den Dreisch (1976). These data are presented in Appendix A. In calculating MNI, faunal materials recovered from each time period were considered discrete analytical units. Appendix B lists the FS#s from each temporal component. Occasionally it was found that a higher MNI estimate was suggested at a higher taxonomic level, such as family, than at the genus or species level. For example, more individuals might be estimated if all materials identified as Anatidae and Chen spp. were examined together rather than considering those bones identified only as Chen sp. independently. When that was the case, the estimates of MNI for lower taxonomic levels are included in the species lists in parentheses. Estimates included in parentheses are not included in the total for each list or in subsequent calculations. This same approach was used in the case of fossilized material as well.

While MNI is a standard zooarchaeological quantification medium, the measure has several problems. MNI is a measure which emphasizes small species over larger ones. This is easily demonstrated by a hypothetical sample which consists of four rats and only one cow. While four rats represent a larger number of individuals, one cow will supply substantially more meat. A further problem with MNI is the assumption that the entire animal was utilized at the site. From ethnographic evidence we know that this is not necessarily the case, particularly in regard to larger individuals and for animals utilized for special purposes (Thomas 1971; White 1953). This is an especially relevant issue when dealing with historic samples where marketing of processed meat products was substantial, but the exact extent unknown. Additionally, MNI is influenced by the manner in which the data from archaeological proveniences are aggregated during analysis. The aggregation of separate samples into one analytical whole (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. Furthermore, some elements are simply more readily identifiable than others and the taxa represented by these elements may appear more significant in the species list than they were in the diet.

Biomass determinations attempt to compensate for problems encountered with MNI. Biomass provides information on the quantity of meat supplied by the animal. The predictions 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 materials, in this case, bone. The relationship between body weight and skeletal weight is described by the allometric equation:

$$Y=aX^b$$

(Simpson et al. 1960:397). Many biological phenomena show allometry described by this formula (Gould 1966, 1971). In this equation, X is the skeletal weight, Y is the quantity of meat or the total live weight, 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 line (Casteel 1978; Reitz and Cordier 1983; Reitz et al. 1987; Wing and Brown 1979). A given quantity of bone or a specific skeletal dimension represents a predictable amount of tissue due to the effects of allometric growth. Values for a and b are obtained from calculations based on data at the Florida Museum of Natural History, University of Florida, and the University of Georgia's Museum of Natural History. The allometric formulae used here are presented in Table 3. Biomass was estimated using the same analytical units defined when estimating MNI.

Biomass and MNI are subject to sample size bias. Casteel (1978), Grayson (1979), and Wing and Brown (1979) suggest a sample size of at least 200 individuals or 1400 bones for a reliable interpretation. Small samples frequently will 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 the bias, or correct for it, until the sample is made larger through additional work.

In order to summarize the data, the species list was reduced to several categories based on vertebrate class and husbandry practices. Domestic mammals include pigs (Sus scrofa), cows (Bos taurus), and sheep or goats (Caprine). Sheep and goats are generally combined into the subfamily category of Caprinae due to the difficulty in distinguishing between them osteologically. Some of the bones could be identified to species, and in those cases the species was sheep (Ovis aries). Domestic birds were chickens (Gallus gallus) and rock doves (Columba livia). Wild mammals included rabbit (Sylvilagus spp.), raccoon (Procyon lotor), and deer (Odocoileus virginianus). Wild birds include duck (Anatidae, Chen spp.), turkey (Meleagris gallopavo), rail (Rallidae), and passenger pigeon (Ectopistes migratorius). Turkeys may actually belong in the category of domestic birds. According to the American Poultry Association (1874) standards of excellence for these two species had been established by the mid−18th century. Aquatic reptiles included chicken turtle (Deirochelys reticularia), pond turtle (Pseudemys spp.), yellow−bellied turtle (Trachemys scripta), sea turtle (Chelonidae), and softshell turtle (Apalone spp.). Commensal taxa included Old World rats (Rattus spp.), dog (Canis familiaris), and horse (Equus caballus). While these animals might have been consumed, they are also common around human residences either intentionally as pets and work animals, or unintentionally. Some of the other animals not included in the commensal

category might also have been commensal, such as the rabbit and raccoon. It should be noted that only biomass for those taxa for which MNI had been determined is included in the summary tables.

The presence or absence of elements in an archaeological sample provides data on butchery and animal husbandry practices. The mammalian elements recorded from the Powder Magazine were summarized into catagories by body parts. The term "Head" refers to skull and mandible fragments as well as teeth. The vertebra/rib category includes ribs and vertebrae, including the atlas and axis. The forequarter category includes the scapula, humerus, ulna, and radius. Carpals and metacarpals are record as forefoot. The hindfoot includes the tarsals and metatarsals. The foot contains bones identified only as metapodials and phalanges which could not be assigned to one of the other categories. The hindquarter category includes the innominate, sacrum, femur, and tibia. The term "foreleg" refers to forequarter and forefoot while the term "hindleg" refers to the hindquarter and hindfoot.

In order to indicate the number of elements and their location in a carcass, most elements identified for domestic mammals were illustrated. Unillustrated bones are noted in the figure legends accompanying each figure. Although the atlas and axis are accurately depicted, other cervical vertebrae, as well as thoracic, lumbar, and caudal vertebrae, and ribs are placed approximately on the illustrations, with the last lumbar location used to illustrate vertebrae which could be identified only as vertebrae. Bones identified only as sesamoids, metapodials, or phalanges are illustrated on the right hindfoot.

The archaeological element data are also compared to a Standard cow on a log difference scale (Reitz and Zierden 1991; Simpson 1941). The Standard cow was developed from the number of elements present in an unmodified cow skeleton with certain alterations. The number of bones for the Standard cow was reduced to reflect values which are probably more realistic from the standpoint of identification. The number of cranial elements was reduced to 52 from 64. It was considered likely that only fragments from the following bones would be identified under most circumstances: parietal, frontal, temporal, maxilla, occipital, premaxilla, and zygomatic, as well as 32 teeth, 2 horns, 2 bulla, and the mandibles. The number of axial elements were reduced to 28 from 71. It was considered unlikely that all caudal vertebrae and ribs would be identified to species so this number (44–46) was reduced to two. The sacrum includes five segments, which in young animals may be seperate but which in adults are fused. Hence the number of sacral elements was reduced to 1 from 5. The number of sesamoids, metapodials, and phalanges was reduced from 60 to 24. The exact number of bones in this group is variable since it includes small metapodials such as the metacarpal V, phalanges, and sesamoid bones, the number of which is individually variable. It seems unrealistic that all of these would be identified as cow under normal circumstances, so the number was reduced by 40 percent. The consequence of this step was to reduce the percentage of some element categories while increasing the percentage of others. The actual percentages for each category

are as follows: Head, 25.8 percent; Axial, 28.6 percent; Forequarter, 3.2 percent; Hindquarter, 6.9 percent; Forefoot, 5.7 percent; Hindfoot, 5.7 percent; and Foot, 24.2 percent.

In order to compare the archaeological data with the Standard cow, the percentages of each element category for the Standard cow are converted into logarithms, subtracted from the log value of the same element category for the archaeological percentages, and plotted against the Standard cow represented by the vertical line in Figures 1–3. Although the archaeological values are fragment counts and the values for the Standard cow whole elements, the relationships in the ratio diagrams are similar to those found in unmodified histograms. The cow ratio diagrams in Figures 2 and 3 represent pre–1800 and post–1800 relationships, respectively.

Relative age of the species identified was noted based on observations of the degree of epiphyseal fusion for diagnostic elements, as well as the presence of deciduous teeth. When animals are young their bones are not fully formed. Along the area of growth the shaft and the end of the bone, the epiphyses, are not fused. When growth is complete the shaft and epiphysis fuse. While environmental factors influence the actual age at which fusion is complete (Watson 1978), elements fuse in a regular temporal sequence (Gilbert 1980; Schmid 1972; Silver 1963). During analysis, bones identified were recorded as either fused or unfused; the bones were then placed into one of three general categories based on the age in which fusion generally occurs. This is more informative for unfused bones which fuse in the first year or so of life and for fused bones which complete growth at three or four years of age than for other bones. An element which fuses before or at eighteen months of age and is found fused archaeologically could be from an animal which died immediately after fusion was complete or many years later. The ambiguity inherent in age grouping is somewhat reduced by evaluating each element under the oldest category possible.

Evidence of sex was also noted if present. Spurs on the tarsometatarsus of Galliformes such as turkeys, chickens, and quails indicate male birds. Hens in laying condition are indicated by medullary deposits on bones (Rick 1975). Medullary bone is a source of calcium for females while laying eggs.

Modifications were classified as worked, burned, cut, hacked, sawed, as well as carnivore and rodent gnawed. Worked bones include those with marks inflicted by humans, not associated with butchery practices. Burned bone may result from the exposure of the end of a bone to fire while a cut of meat is roasted. Burns may also be inflicted if bones are burned intentionally or unintentionally after discard. Cuts are small incisions across the surface of bones. These marks were probably made by a knife as meat was removed from bone before or after the meat was cooked. Cuts may also be left behind 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 bones were discarded, but distinguishing this source of small cuts

requires access to higher powered magnification than was available during this study (Shipman and Ross 1983). Hack marks closely resemble cut marks in their shape and irregularity but are deeper and wider. They may indicate use of a cleaver or hatchet rather than a knife to dismember the carcass. The use of a large chopping tool would result in bone splinters and probably larger cuts of meat than a knife. The presence of parallel striations on the outer layer of compact bone was used as evidence that a bone had been sawed, presumably before the meat was cooked. Sawed bones are indicated on the figures by straight lines. Gnawing indicates that bones were not immediately buried after disposal. While burial would not insure an absence of gnawing, exposure of bones for any length of time might result in gnawing. Gnawing by carnivores and rodents would result in loss of an unknown quantity of discarded bone. Carnivores could include a variety of animals, such as dogs, foxes, raccoons, and cats, while rodents might be mice, rats, or squirrels.

Results: c. 1712–1750

The ca. 1712–1750 component was a small assemblage consisting of 1,483 bones weighing 9,741.49 gm and containing the remains of at least 30 individuals (Table 4). Domestic mammals contributed 95 percent of the biomass of taxa for which MNI was estimated (Table 5). The principle domestic mammal was cow (Bos taurus). Cows contributed 13 percent of the individuals and 45 percent of the total biomass. Pigs (Sus scrofa) contributed 10 percent of the individuals and 5 percent of the total biomass. Caprines (sheep/goat) were the least abundant of the domestic mammals, contributing only 7 percent of the individuals and 3 percent of the total biomass. Chickens (Gallus gallus) and a rock dove (Columbia livia) were the only domestic birds identified. Chickens contributed 10 percent of the individuals, but less than 1 percent of the total biomass. The rock dove was represented by a single individual.

Wild, non–commensal taxa contributed 50 percent of the individuals although only 4 percent of the biomass in the ca. 1712–1750 component (Table 5). The only wild mammal identified was a single raccoon (Procyon lotor). The raccoon contributed 3 percent of the individuals and less than 1 percent of the total biomass. Wild birds included three ducks (Anatidae), one of which was a goose (Chen spp.), and a turkey (Meleagris gallopavo). Two turtles were identified. The cooter (Pseudemys spp.) is a freshwater turtle and the sea turtle (Chelonidae) is marine, although it could have been taken from within the Charleston harbor. A wide range of fishes were identified, including two sharks. However, the sharks were identified from fossilized teeth and were not included in the MNI or biomass estimates. A single individual was identified as a tiger shark (Galeocerdo spp.) and the other as a sand tiger (Odontaspis spp.). The other fish identified are present in Charleston's inshore waters.

The only commensal taxa identified were two Old World rats (Rattus spp.), which contributed 7 percent of the individuals and only a trace amount to the biomass. Rats are commonly found in close association with humans, and it is assumed that they were not part of the diet.

The mammalian elements identified in the ca. 1712–1750 component are presented in Table 6, with the domestic mammal elements visually presented in Figures 4–6. The most skeletally complete mammal was the cow, represented by mostly equal numbers of elements from all skeletal categories. The pig and caprine were represented primarily by elements from the head. The rats were represented by two left femur fragments. The raccoon was represented by a single scapula fragment.

There was some evidence for age at death for the animals in the sample (Tables 7–9) and one indicator of sex. At least one of the pigs was a juvenile when it died, one was an adult, and the other was of indeterminate age at death. The juvenile was identified from a deciduous third premolar and three deciduous fourth premolars. The adult was identified from a third molar. When teeth are used to determine age, epiphyseal fusion can be difficult to interpret. One of these pigs was identified as a female from a canine tooth fragment. Relative ages for the four cows was determined from epiphyseal fusion. One juvenile, two probable subadults, and an adult were identified. A juvenile caprine was identified. The other caprine individual could only be determined as at least a subadult.

Modifications included working, burns, cuts, hacking, sawing, and carnivore gnawing (Table 10). The three primary modifications were burning, cutting, and hacking. Burns occurred on 32 percent of the modified bones, cutting on 28 percent, and hack marks on 26 percent. Carnivore gnawing occurred on 11 percent of the modified bones. Worked bones and sawing were observed on only 1 percent of the bones. The worked bone was in FS# 112 and appeared to be a utensil handle with some metal still attached.

Results: c. 1751–1820

The ca. 1751–1820 component was another small assemblage consisting of 1,550 bones weighing 4,025.41 gm and containing the remains of at least 42 individuals (Table 11). Domestic mammals contributed 99 percent of the biomass of taxa for which MNI was estimated (Table 12). The principle domestic mammal for the 1751–1820 component was pig (Sus scrofa). Pigs contributed 10 percent of the individuals and 20 percent of the total biomass. Cows (Bos taurus) and caprines (Caprine) each contributed 5 percent of the individuals. However, cows contributed 52 percent of the biomass, while caprines contributed 12 percent of the total biomass. At least one of the caprines was a sheep (Ovis aries).

Chickens (Gallus gallus) were the only domestic birds identified. Chickens contributed 24 percent of the individuals, but less than 1 percent of the total biomass.

Wild, non-commensal taxa contributed 44 percent of the individuals although less than 1 percent of the biomass in the 1751-1820 component (Table 12). The wild mammals identified were a rabbit (Sylvilagus spp.) and a deer (Odocoileus virginianus). Each contributed 2 percent of the individuals and less than 1 percent of the biomass. Wild birds included three ducks (Anatidae) and one individual from the dove family (Columbidae). Two turtles were identified. One pond turtle (Emydidae) and a sea turtle (Chelonidae) each contributed 2 percent of the individuals and less than 1 percent of the biomass. A wide range of fishes were identified, including both freshwater fish (Micropterus spp.) and sharks. Two of the sharks were identified from fossilized teeth and were not included in the MNI or biomass estimates. One of the fossils was identified as a tiger shark (Galeocerdo spp.) and the other as a sand tiger (Odontaspis spp.). The other marine fishes, including an Atlantic sturgeon (Acipenser oxyrhynchos), are present in Charleston's inshore waters.

The only commensal taxa identified were five Old World rats (Rattus spp.), which contributed 12 percent of the individuals and less than 1 percent of the biomass. Rats are commonly found in close association with humans, and it is assumed they were not part of the diet. A single human (Homo sapiens) was identified from an adult molar fragment. This human is not included in the summary table (Table 12).

The mammalian elements identified in the 1751-1820 component are presented in Table 13, with the domestic mammal elements visually presented in Figures 7-9. The most skeletally complete mammals were cows and caprines, represented by mostly equal numbers of elements from all skeletal categories. The pigs, rats, and rabbit were represented primarily by elements from the head. The sheep element was an occipital fragment, an especially diagnostic portion of the caprine skeleton.

There was some evidence for age at death for the animals in the sample (Tables 14-16) and one indicator of sex. At least one of the pigs was a juvenile when it died, one was at least a subadult, and the other two were of indeterminate age at death. The juvenile was identified from an unfused atlas, two unfused distal humerus, and an unfused (proximal and distal) radius shaft. The juvenile was very young; based on the size of the bones and the unfused atlas, it is likely that it was either a fetus or new-born. Relative ages for the two cows was determined from epiphyseal fusion. One juvenile and an adult were identified. One of the caprine individuals was determined to be an adult at death. The other was at most a subadult. One unidentifiable bird (UID Bird) was determined to be a juvenile. One chicken (Gallus gallus) was identified as a female based on the observation that a tarsometatarsus lacked a spur.

Modifications included working, burns, cuts, hacking, sawing, carnivore gnawing, and

rodent gnawing (Table 17). The three primary modifications were burning, cutting, and hacking. Burns occurred on 27 percent of the modified bones, cutting on 26 percent, and hack marks on 16 percent. Sawing was observed on 10 percent of the modified bones; 20 percent of the modified bones were gnawed by either carnivores or rodents. One worked bone was identified in FS# 210. This was a comb fragment.

Results: c. 1820–1850

The ca. 1820–1850 sample was the smallest component and consisted of 1,078 bones weighing 6,292.21 gm and containing the remains of at least 27 individuals (Table 18). Domestic mammals contributed 96 percent of the biomass of taxa for which MNI was estimated (Table 19). Pigs (Sus scrofa), cows (Bos taurus), and caprines each contributed 11 percent of the individuals. However, cows contributed 43 percent of the biomass, while pigs and caprines contributed 14 percent and 3 percent, respectively. Chickens (Gallus gallus) were the only domestic birds identified. Chickens contributed 15 percent of the individuals, but only 1 percent of the total biomass.

Wild, non–commensal taxa contributed 37 percent of the individuals and 2 percent of the biomass in the 1820–1850 component (Table 19). There were no wild mammals identified. Wild birds included a duck (Anatidae) and a turkey (Meleagris gallopavo). Two freshwater turtles were identified; a chicken turtle (Deirochelys reticularia) and a pond slider (Trachemys scripta). A wide range of fishes were identified, including a shark. The shark identified was a possible member of the Requiem shark family (cf. Carcharhinidae) and unlike the sharks identified from earlier components of the site, the tooth was not fossilized and has been included in the MNI and biomass calculations. The other fish, including an Atlantic sturgeon (Acipenser oxyrhynchos), are present in Charleston's inshore waters. These fish include hardhead catfish (Arius felis), gafftopsail catfish (Bagre marinus), seatrout (Cynoscion spp.), and mullet (Mugil spp.).

The commensal taxa identified were three Old World rats (Rattus spp.), which contributed 11 percent of the individuals and less than 1 percent of the biomass, and a single horse (Equus caballus) (Table 19). Combined, commensal taxa contributed 15 percent of the individuals. Rats and horses are commonly found in close association with humans, and it is assumed these animals were not part of the diet. The horse was identified from a tooth fragment.

The mammalian elements identified in the 1820–1850 component are presented in Table 20, with the domestic mammal elements visually presented in Figures 10–12. The most skeletally complete mammals were cows and caprines. However, vertebrae and ribs commonly

identified for cows, and none were identified for caprines. The forequarter and hindquarter elements for pigs each contributed 37 percent to the total number of pig elements identified.

There was some evidence for age at death for the animals in the sample (Tables 21–23) and one indicator of sex. At least one of the pigs was a juvenile when it died, one was at least a subadult, and the other was of indeterminate age at death. The same ages applied to the cows identified. A juvenile, a subadult, and an indeterminate individual were identified. Two adult caprines were identified. The third caprine individual was, at most, a subadult at time of death. This was estimated from an unfused calcaneus fragment. The calcaneus is a middle fusing bone. No unfused or early fusing bones were identified for caprines. Age at death could not be determined for any of the birds identified. However, a single male chicken was identified from the presence of a spur on a tarsometatarsus.

Modifications to the bones included working, burns, cuts, hacking, sawing, carnivore gnawing, and rodent gnawing (Table 24). The primary modification in the 1820–1850 collection was sawing, which was observed on 44 percent of the modified bones. The only other significant modifications were rodent gnawing and cuts, which contributed 19 percent and 17 percent to the total modifications, respectively. The single worked bone was in FS# 134 and was a UID Mammal fragment that was both polished and drilled.

Results: c. 1851–1900

The ca. 1851–1900 component consisted of 1,082 bones weighing 4,259.53 gm and containing the remains of at least 22 individuals (Table 25). Domestic mammals contributed 93 percent of the biomass of taxa for which MNI was estimated (Table 26). Pigs (Sus scrofa), cows (Bos taurus), and caprines each contributed 9 percent of the individuals in the 1851–1900 assemblage. However, cows contributed 32 percent of the biomass, while pigs and caprines contributed 8 percent and 5 percent of the biomass, respectively. Chickens (Gallus gallus) were the only domestic birds identified; contributing 14 percent of the individuals, but only 1 percent of the total biomass.

Wild, non–commensal taxa contributed 45 percent of the individuals although only 5 percent of the biomass in the 1851–1900 component (Table 26). The only wild mammal identified was a raccoon (Procyon lotor), which contributed 5 percent of the individuals and less than 1 percent of the biomass. Wild birds included a duck (Anatidae), a rail (Rallidae), and a passenger pigeon (Ectopistes migratorius). Each contributed 5 percent of the individuals and less than 1 percent of the biomass. Three turtles were identified and are species associated

with freshwater habitats. The turtles identified were a probable cooter (cf. Pseudemys spp.), a slider (Trachemys scripta), and a softshell turtle (Apalone spp.). Each contributed 5 percent of the individuals and less than 1 percent of the biomass. A member of the dogfish/angel shark order (Squaliformes) was identified, contributing 5 percent of the individuals and less than 1 percent of the biomass. The two other fish identified can be found in inshore waters around Charleston. These fish were an Atlantic sturgeon (Acipenser oxyrhynchos) and a gafftopsail catfish (Bagre marinus).

The only commensal taxa identified were two Old World rats (Rattus spp.), which contributed 10 percent of the individuals and less than 1 percent of the biomass, and a horse (Equus caballus). The horse was identified from two incisors. Rats and horses are commonly found in close association with humans, and it is assumed that they were not part of the diet.

The mammalian elements identified in the 1851–1900 component are presented in Table 27, with the domestic mammal elements visually presented in Figures 13–15. The most skeletally complete mammals were the cows, represented by mostly equal numbers of elements from all skeletal categories. The pigs were represented primarily by elements from the head. The remaining mammals were skeletally incomplete.

There was some evidence for age at death for the animals in the sample (Tables 28–30) and one indicator of sex. One of the pigs was a juvenile when it died and the other was a subadult. Both were identified from mandible fragments. One juvenile and a subadult cow were identified. The juvenile was identified from a deciduous premolar. Although there were only two fusing bones identified as caprine, a juvenile and an animal older than juvenile were identified. The juvenile was identified from an unfused acetabulum fragment. Age at death could not be determined for any of the birds. One chicken (Gallus gallus) was identified as a female based on the observation that a tarsometatarsus lacked a spur.

Modifications to the bones included working, burns, cuts, hacking, sawing, carnivore gnawing, and rodent gnawing (Table 31). The primary modification in the 1851–1900 collection was sawing, which was observed on 47 percent of the modified bones. The only other significant modifications were carnivore gnawing, cutting, and hacking, which contributed 15 percent, 14 percent, and 12 percent to the total modifications, respectively. Three worked bones contributed 2 percent of the modified bones. These were UID Mammal fragments from FS# 40 (a single–hole button), FS# 47 (a single–holed button), and FS# 121 (a blank from the manufacture of a button).

Discussion

Study of urban faunal assemblages raises interesting questions about the mechanisms by which animal products were distributed in Charleston and other urban centers. To what extent did meat arrive at residential and special function sites from markets and to what extent was on-site slaughter practiced? Ultimately we must ask if it is possible to distinguish between these two avenues. Three aspects of faunal assemblages may provide evidence for the source of meat for each site or household.

One of these lines of evidence is the number of different taxa present in an assemblage. Although wild mammals, turtles, alligators, fishes, and birds were sold in Charleston via markets and vendors, it is anticipated that households relying primarily upon purchased meats probably produced assemblages of discarded animal bones dominated by refuse from pigs, cows, caprines, and chickens. It has been found that high prestige households tend to have more wild animals in their deposits, perhaps because of a desire to set a diverse table and/or because they could obtain foods from their plantations or directly from hunters and fishers (Reitz 1987). On the other hand, when sample sizes are small, as they are in this study, the variety of taxa is usually limited. Hence, the limited range of animals in the Powder Magazine collection could simply be a reflection of small sample size rather than of acquisition of meat as rations or from markets.

When the summary tables from the four temporal units are considered (Tables 5, 12, 19, and 26), the remarkable thing about them is their similiarity. Unlike the First Trident Tannery and pre-Brewton collections (Table 1), 43 percent of the individuals in the 1712-1750 assemblage from the Powder Magazine are domestic animals (Table 5). In other respects, however, this early component from the Powder Magazine is like the other early collections. This suggests that some rations, particularly beef, were issued to soldiers at the Powder Magazine, so that they had somewhat more access to this resource than did other Charlestonians at this time. In considering the 19th-century assemblages, it is interesting that the percentage of domestic animals declines between the 1820-1851 and the 1851-1900 time periods. Perhaps the low level of domestic mammal individuals in the Pringle-Frost collection is not unique to that household but reflects a general decline in the availability of beef and pork in the city during the last half of the 19th century. Also intrigueing is the higher percentage of vermin in the later time periods compared to the 1712-1750 one.

Two other lines of evidence involve the types of cow bones identified and the presence of sawed bones. It has been argued in other contexts that many households, particularly affluent ones, slaughtered on their own property some if not much of the meat they consumed (Reitz and Zierden 1991). This interpretation is based on the observation that elements from the entire carcass are found in faunal assemblages from many prestigious households. It is likely that these households could draw upon their own herds for meat. In many cases, they also had enough dependents that they could use most of the meat before it spoiled. A smaller

household might not have its own herds and might have difficulty disposing of meat before it spoiled. Sawing is a method of processing meat to produce small portions and is usually associated with butcher shops rather than home-butchering. If sawing was a common butcher shop technique and an uncommon household treatment, this may also be indicative of commercial butchery and sale of meat.

An assemblage representing purchase of meat from a butcher shop, therefore, should have two characteristics. These would be a high percentage of bones from the body (the ribs, vertebrae, forequarters, and hindquarters) and a high percentage of sawed bones. On-site butchering would be characterized by bones from the entire skeleton and a low percentage of sawed bones.

In order to evaluate whether a faunal assemblage has a high percentage of bones from the body, we can compare the archaeological assemblage with the normal distribution of elements. For this study, the four components will be combined into two assemblages: pre-1800 and post-1800. This represents the early period when the site held the powder magazine and the later period when the site's function was unknown but probably included a domestic component. The figures presented include a composite residential plot and the log ratio diagram for the special function Beef Market for comparison. It can be seen in Figures 2 and 3 that the Powder Magazine elements, for both the pre-1800 and post-1800 contexts, best fit the residential plot and that there was not a substantive difference in the types of cuts of meat obtained between the 18th century and the 19th century. On the other hand, neither the pre-1800 nor post-1800 Powder Magazine assemblages appear similar to the undisturbed skeleton. This suggests that there was a great deal of post-mortem disturbance, which is consistent with purchase of some butchered meats. In most cases there is a distinct tendency for elements to be from the body or head, with elements from the foot most likely to be underrepresented or absent altogether. This probably indicates the use of purchased meats and some on-site butchery. It also strongly suggests that someone stationed at the Powder Magazine lived there in a domestic fashion.

Sawing is another line of evidence. Higher percentages of sawed bones found in middle-class deposits are consistent with purchase of meat from markets (Reitz 1990). It should be noted that sawing was observed on less than 1 percent the bones from the pre-1800 context but on 7 percent of the bones from the post-1800 context. This significant difference indicates a possible increased use of butcher-purchased meat after 1800 at the Powder Magazine site, in spite of the probability that in the early 18th-century at least some meat at the site was obtained from the market.

Tentatively, therefore, we may conclude that while the four temporal units from the Powder Magazine site represented by small samples, it seems likely that each acquired some portion of their meat from butcher shops, vendors, or the public market and that some meat

was obtained through other activities. However, before 1800 purchase of meats, or acquisition of rations, seems limited. Initially it seemed unlikely that soldiers stationed at the Powder Magazine would be responsible for raising and butchering their own livestock, but the vertebrate evidence suggests that the site may have had a domestic, residential component, with some of the soldiers living on the property. Although species identified, element distributions, and bone modifications all indicate this, of particular interest is the presence of a fetal or very young pig in the 1751–1820 component. This may be evidence that livestock were being raised on the property by soldiers guarding the Powder Magazine. Another explanation of the residential character of the pre–1800 Powder Magazine assemblage may be that refuse from surrounding residences were tossed onto the property, but this seems unlikely due to crossmending of broken cultural materials found inside and outside the Powder Magazine structure (Martha A. Zierden 1994, pers. comm.). The use of the Powder Magazine during the 19th century is unclear but appears to have included some residential use just as the 18th–century occupation did. The post–1800 pattern is more characteristic of a subsistence strategy based on purchased meats.

An unexpected outcome of this study is related to the issue of public health. There is strong evidence in these data that the quantity of vermin in the city increased during the 19th century. While this evidence had been considered previously (Reitz 1990; Zierden et al. 1983), the Powder Magazine site provides unequivocal evidence of this trend.

Conclusions

Although the opportunity to study the Powder Magazine faunal materials was a valuable addition to understanding the faunal assemblages from Charleston, it appears to have raised more questions than it has answered. As the only special function structure studied since the Beef Market, the possibility of adding to the data base for military collections was, and is, important. However, it seems apparent that the subsistence strategy at the Powder Magazine site, even in the early 18th century, was consistent with other residential collections from Charleston.

Until more data are collected, the best conclusion is that the Powder Magazine served as both a special function structure used for military storage and as a residence to the soldiers stationed there before 1800. After this time, it appears that the structure may have been used primarily as a residence where market purchased meats were common. Any other use of the structure after 1800 was probably secondary in nature.

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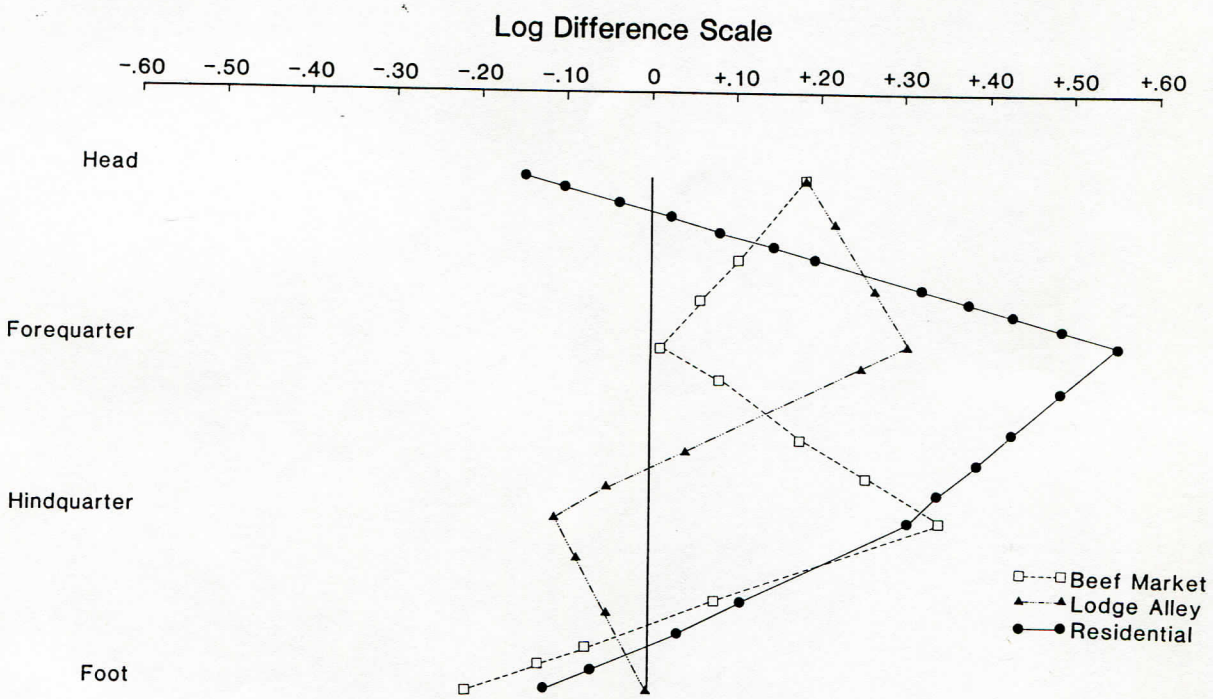

Figure 1. Ratio diagram of identified cow body parts to the Standard cow for Charleston (Reitz and Zierden 1991).

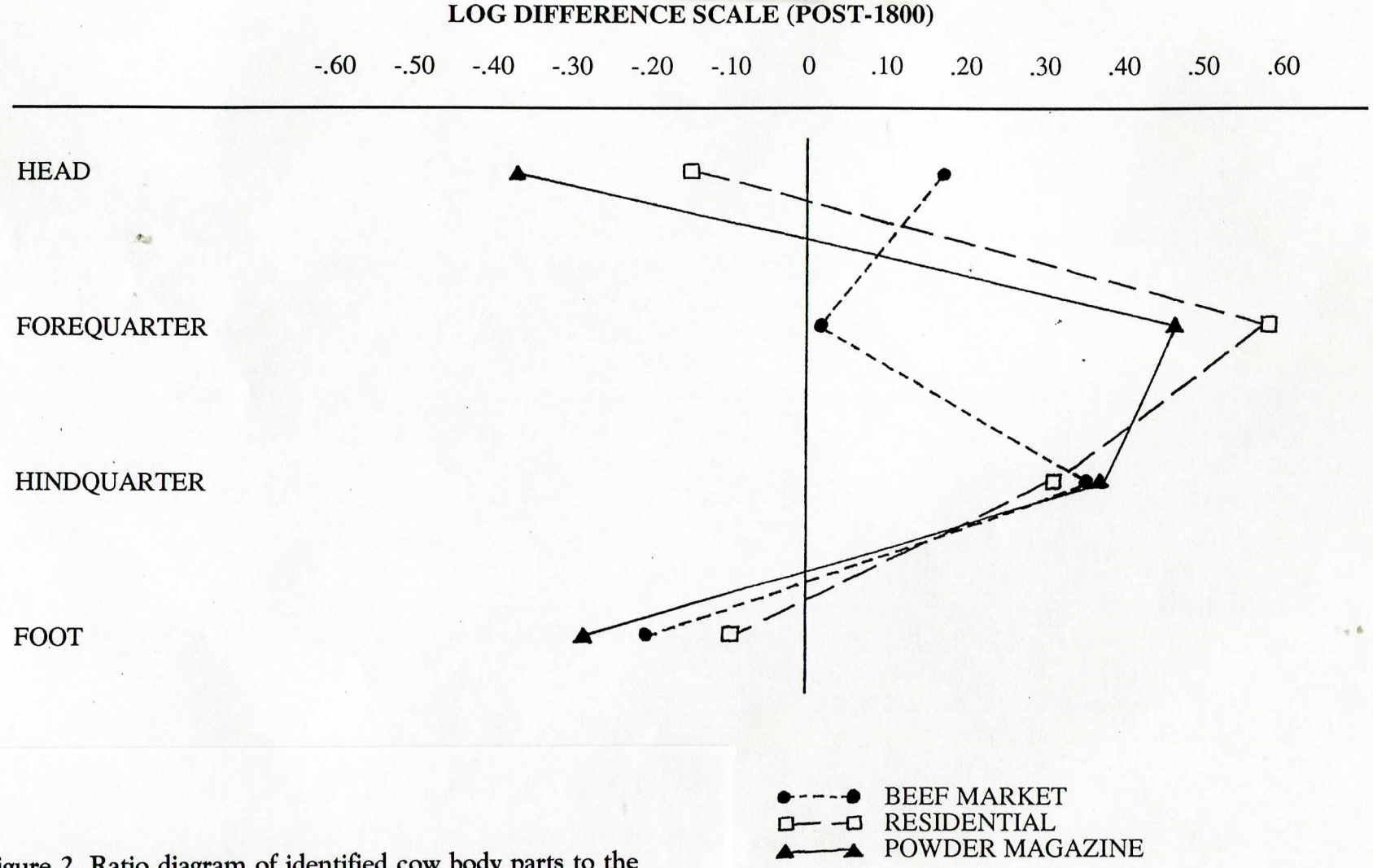

Figure 2. Ratio diagram of identified cow body parts to the Standard cow for pre–1800 Powder Magazine component.

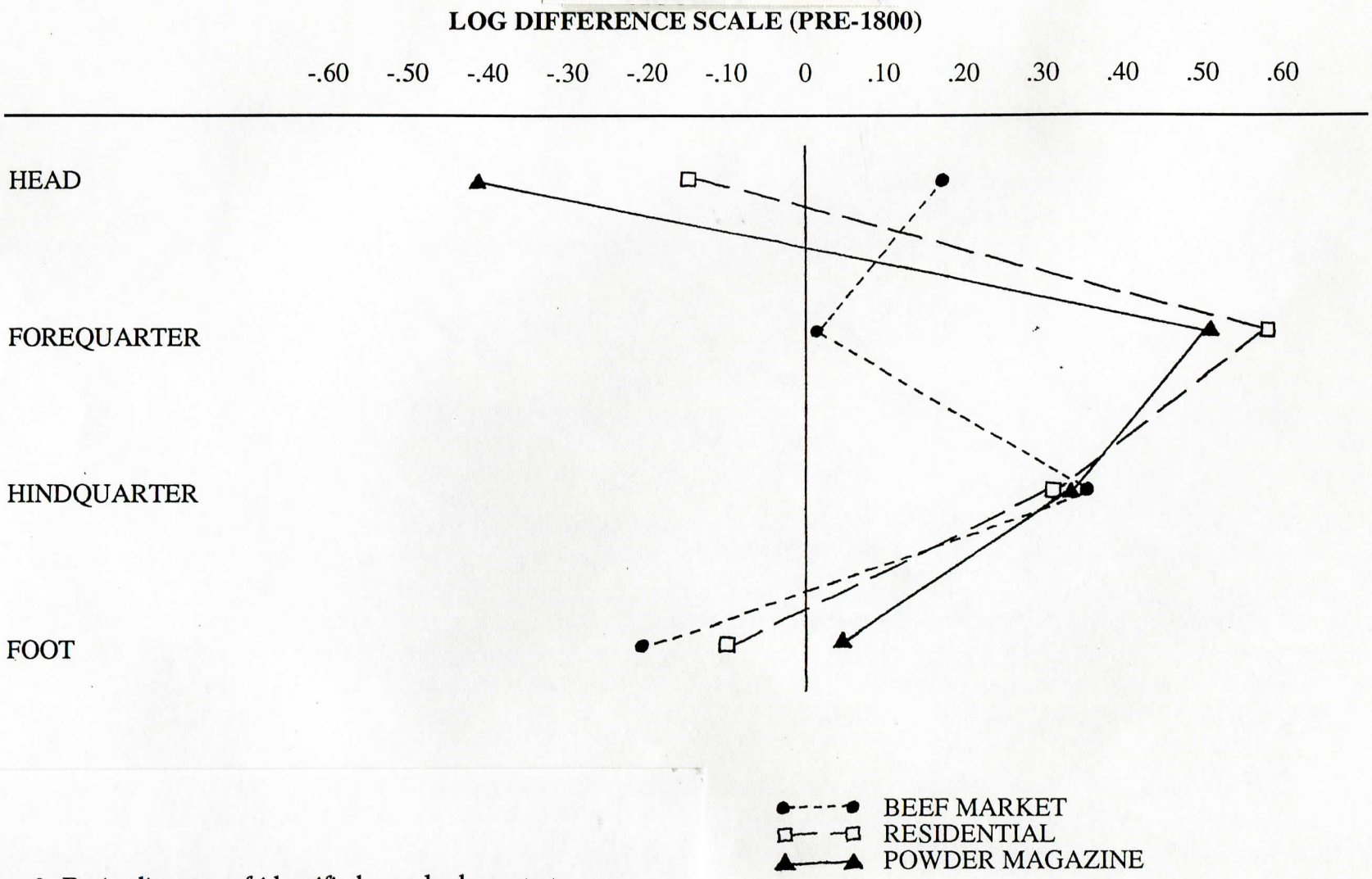

Figure 3. Ratio diagram of identified cow body parts to Standard cow for post–1800 Powder Magazine component.

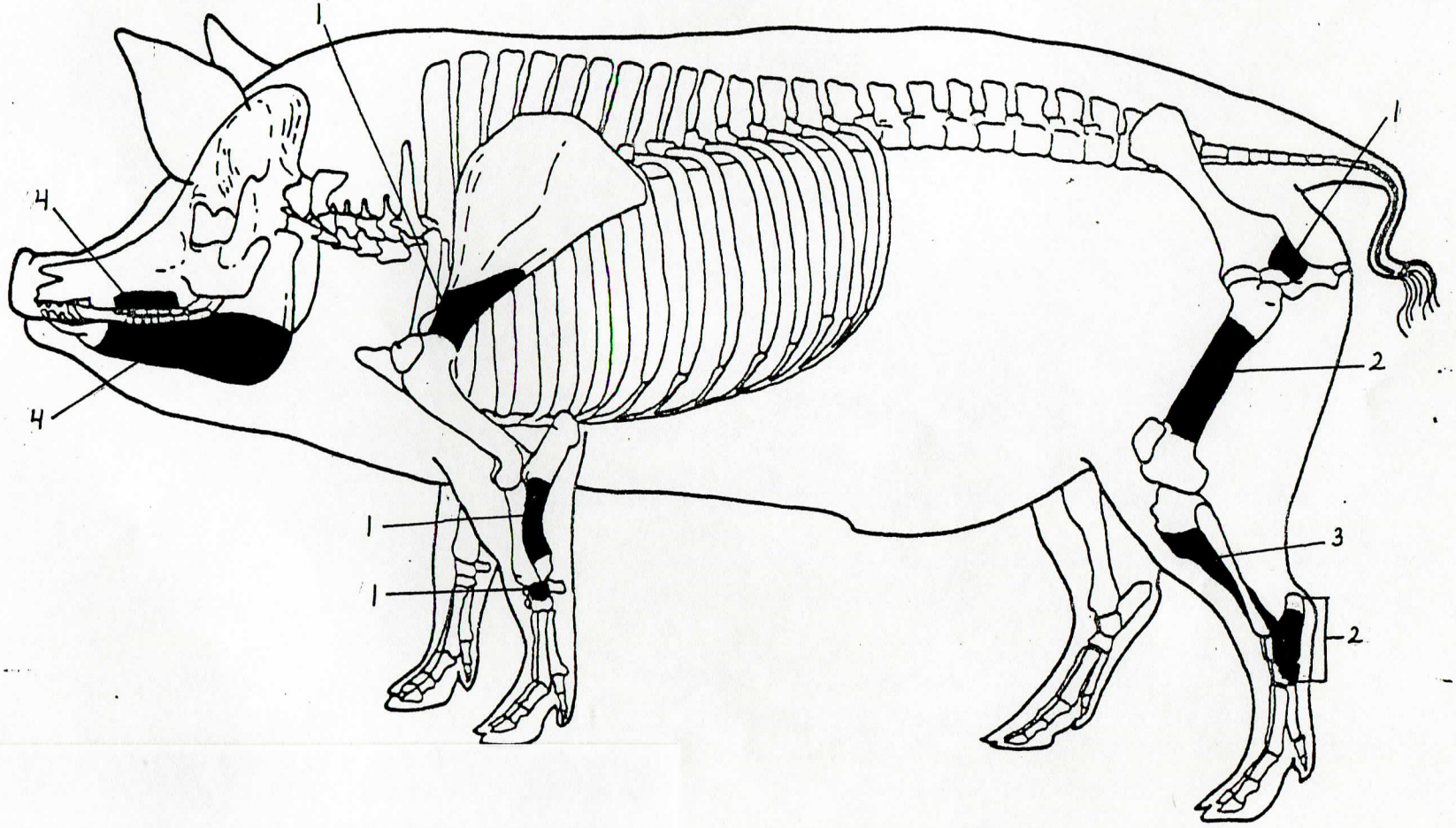

Figure 4. Powder Magazine (1712–1750), Pig Elements

Identified. Not illustrated are 13 teeth. N=32.

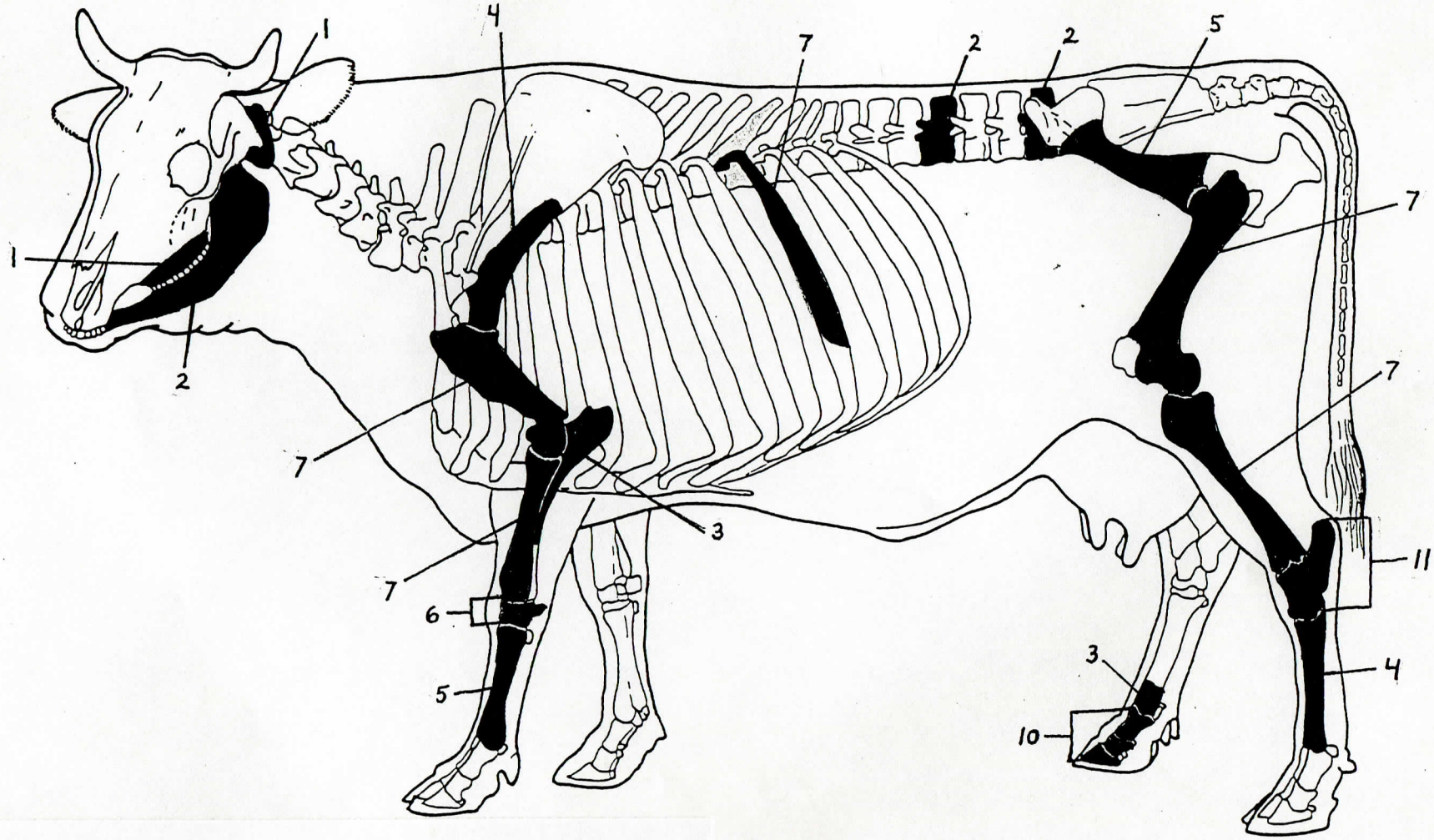

Figure 5. Powder Magazine (1712–1750), Cow Elements Identified. Not illustrated are 4 skull fragments and 8 teeth. N=106.

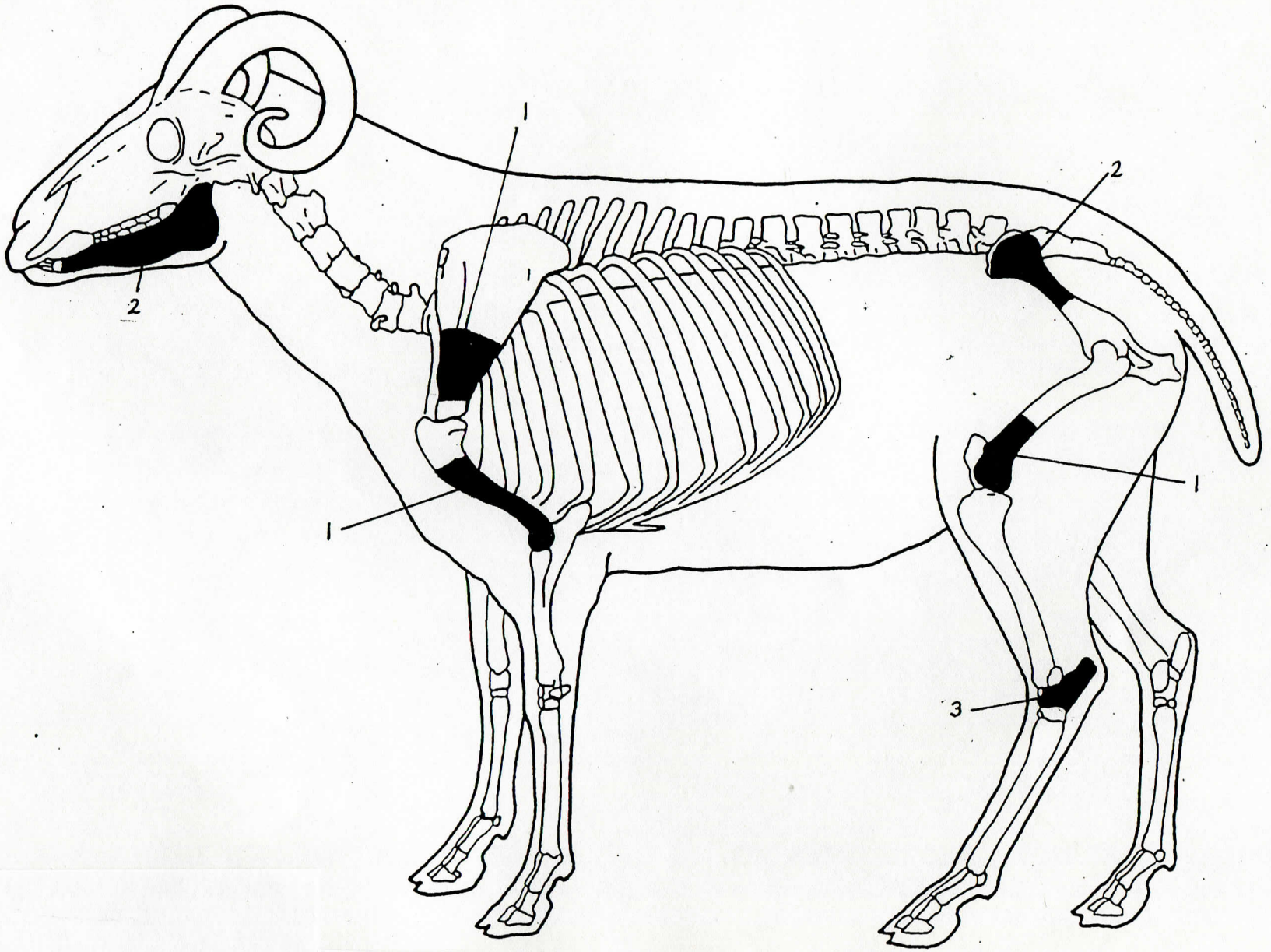

Figure 6. Powder Magazine (1712–1750), Caprine Elements Identified. Not illustrated are 8 teeth. N=18.

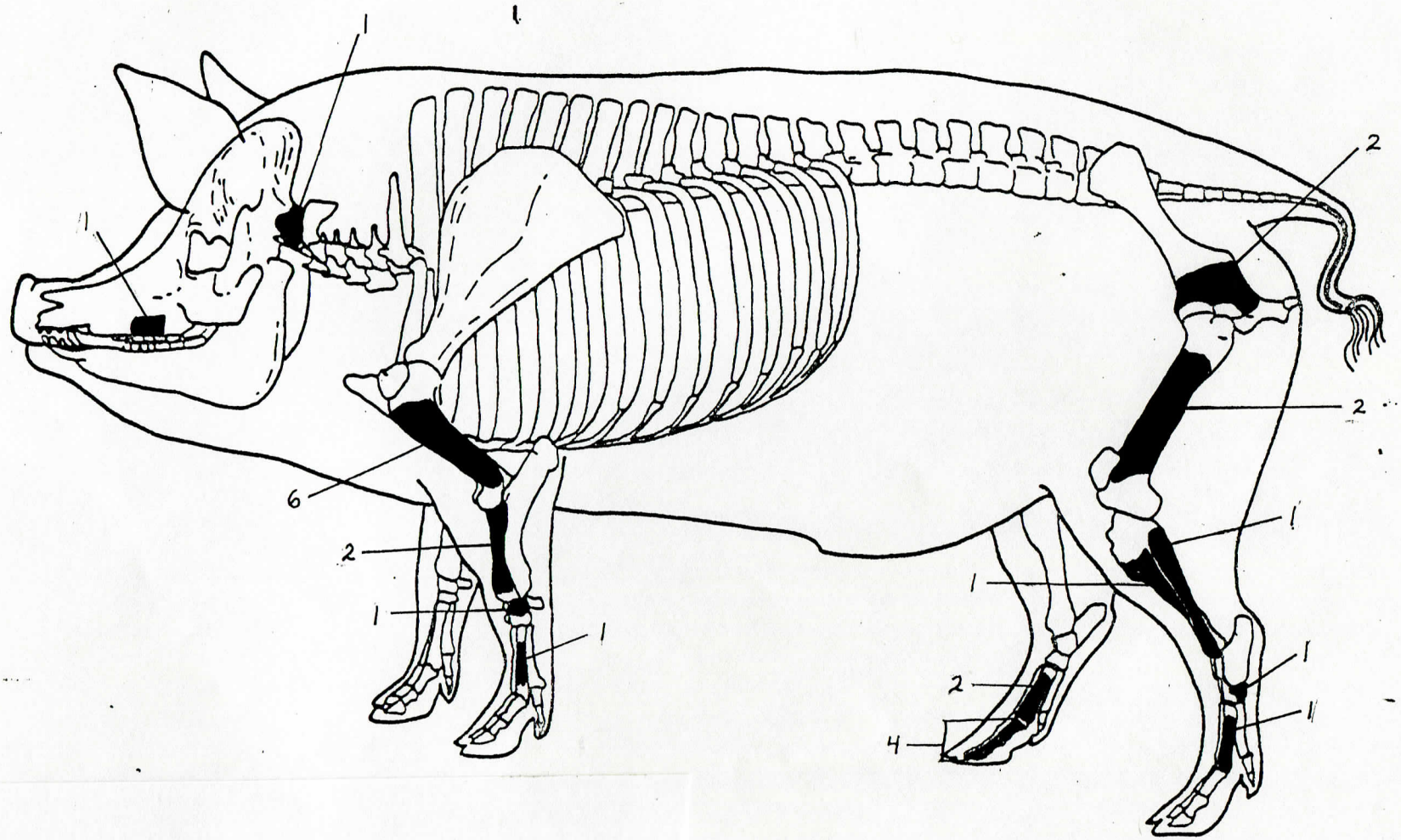

Figure 7. Powder Magazine (1751–1820), Pig Elements

Identified. Not illustrated are 2 skull fragments and 11 teeth.

N=39.

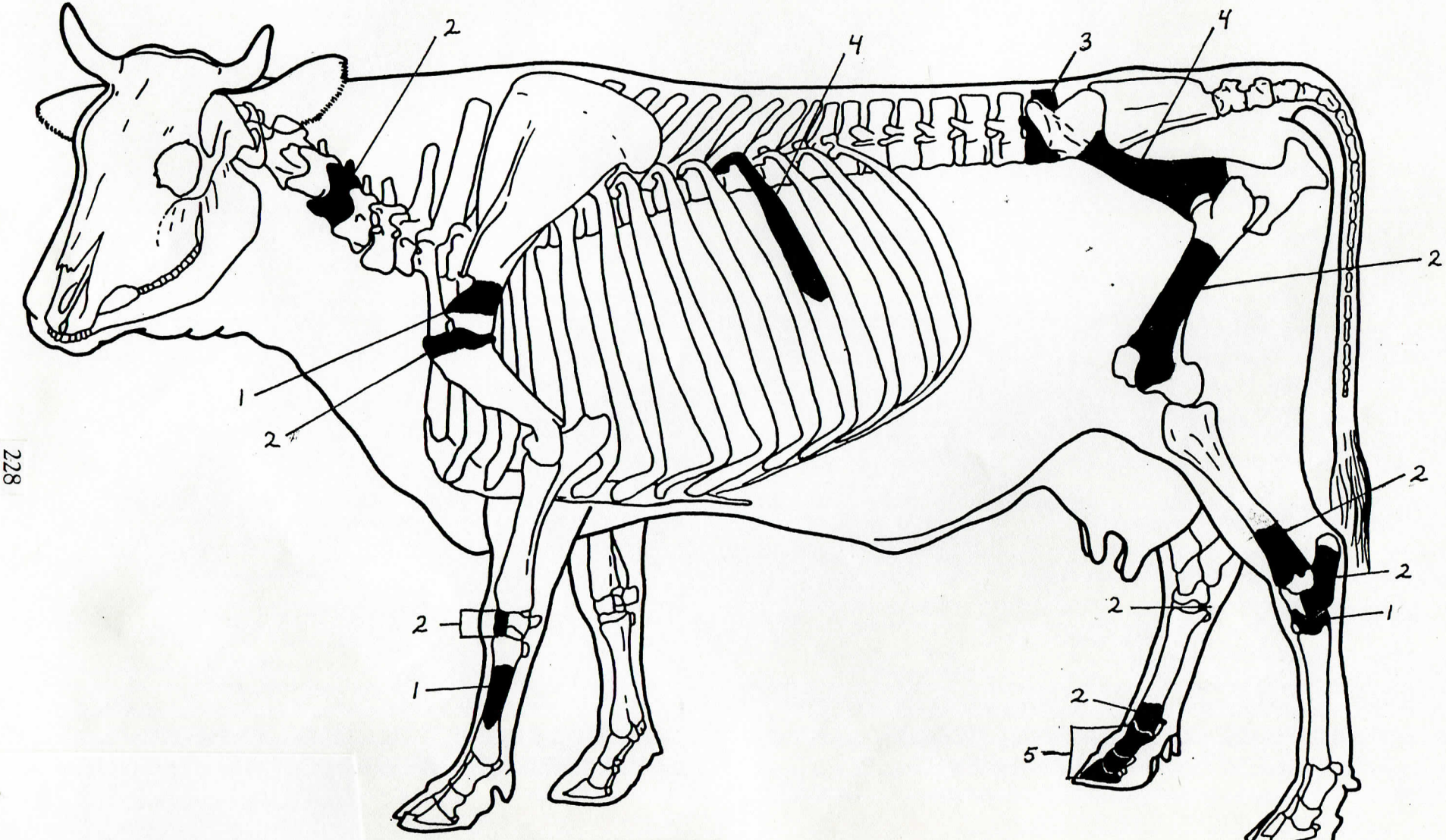

Figure 8. Powder Magazine (1751–1820), Cow Elements

Identified. Not illustrated are 4 teeth. N=39.

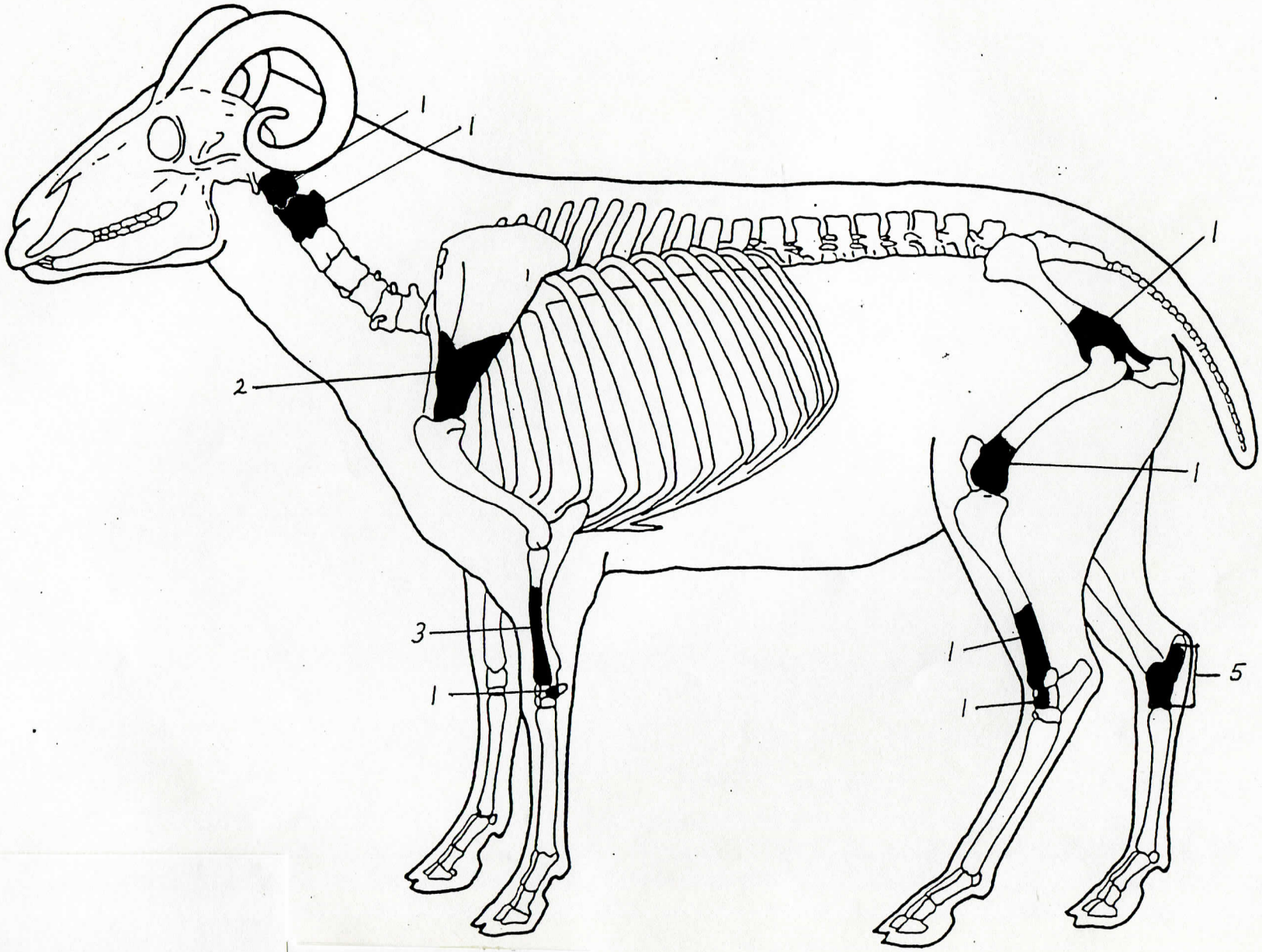

Figure 9. Powder Magazine (1751–1820), Caprine Elements Identified. Not illustrated are 9 teeth. N=26.

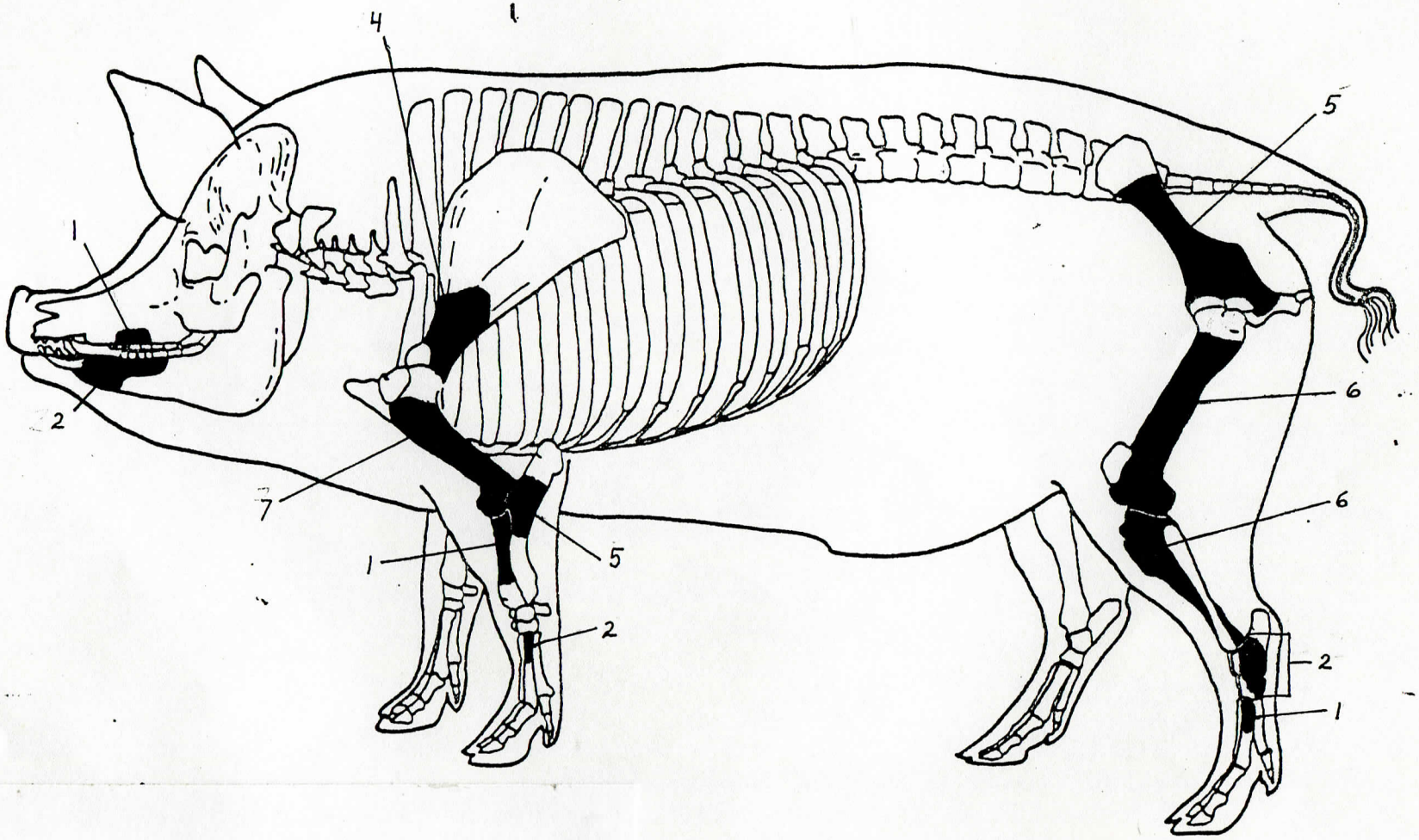

Figure 10. Powder Magazine (1820–1850), Pig Elements

Identified. Not illustrated are 4 teeth. N=46.

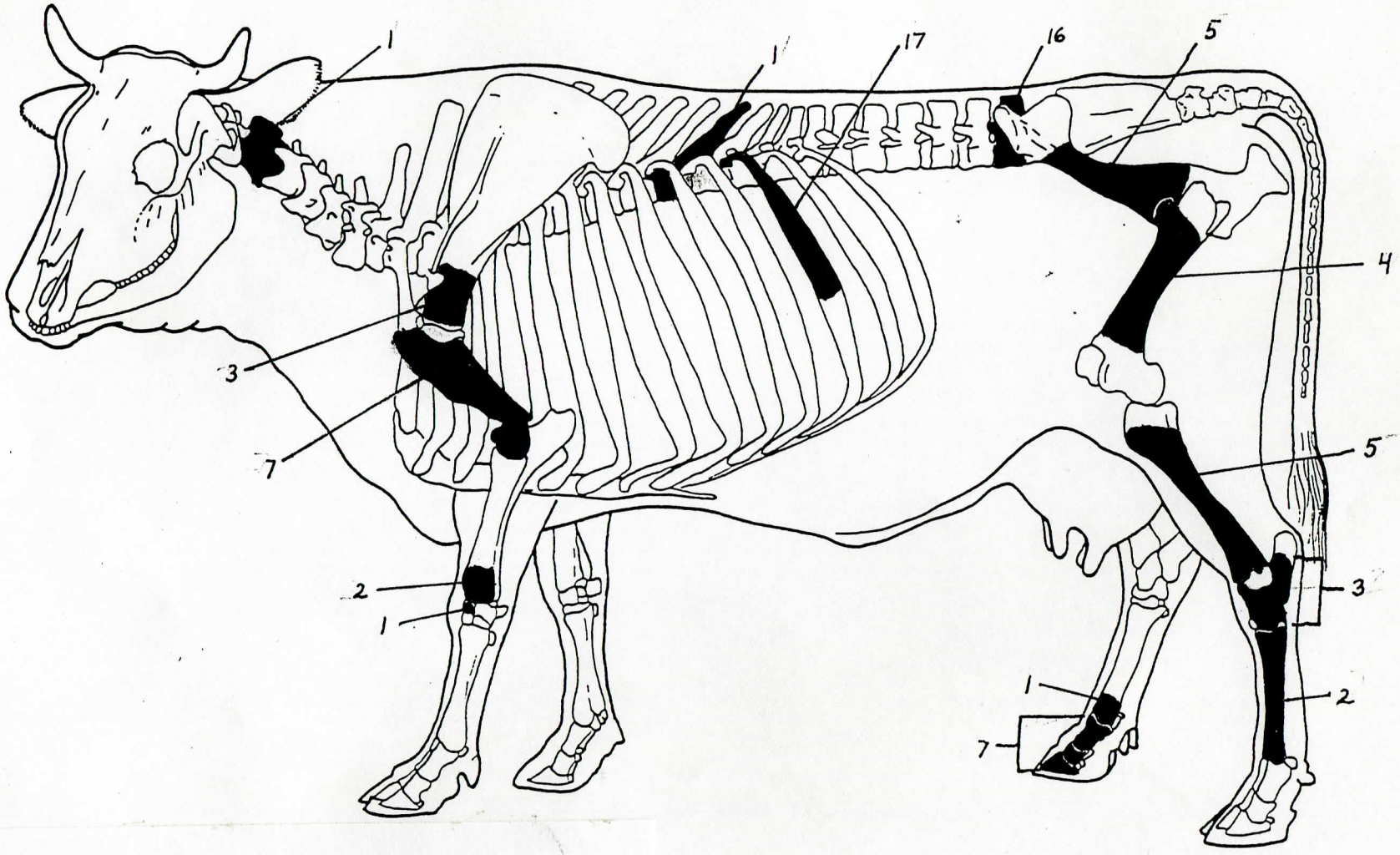

Figure 11. Powder Magazine (1820–1850), Cow Elements Identified. Not illustrated are 6 teeth. N=81.

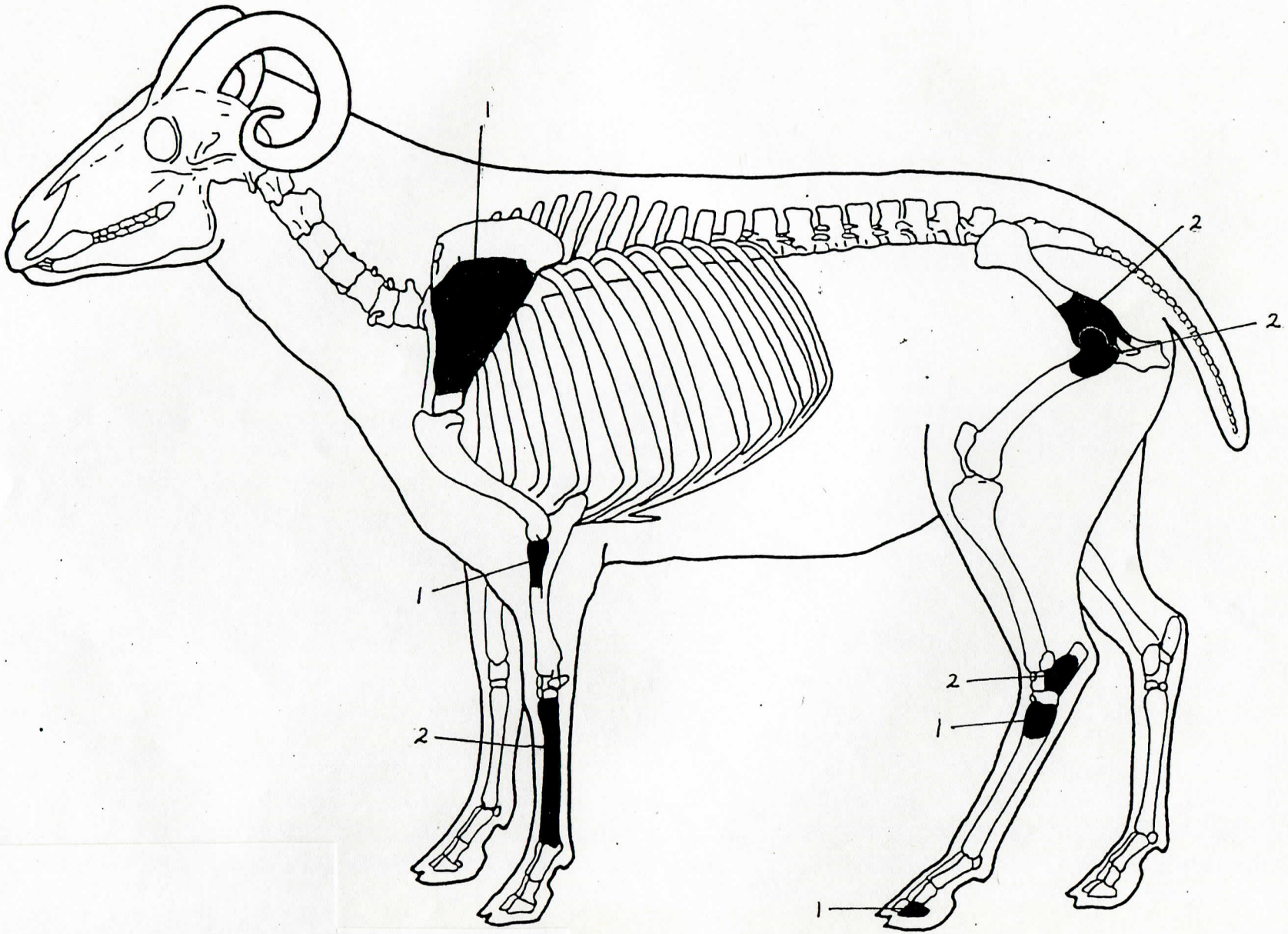

Figure 12. Powder Magazine (1820–1850), Caprine Elements Identified. Not illustrated are 7 teeth. N=19.

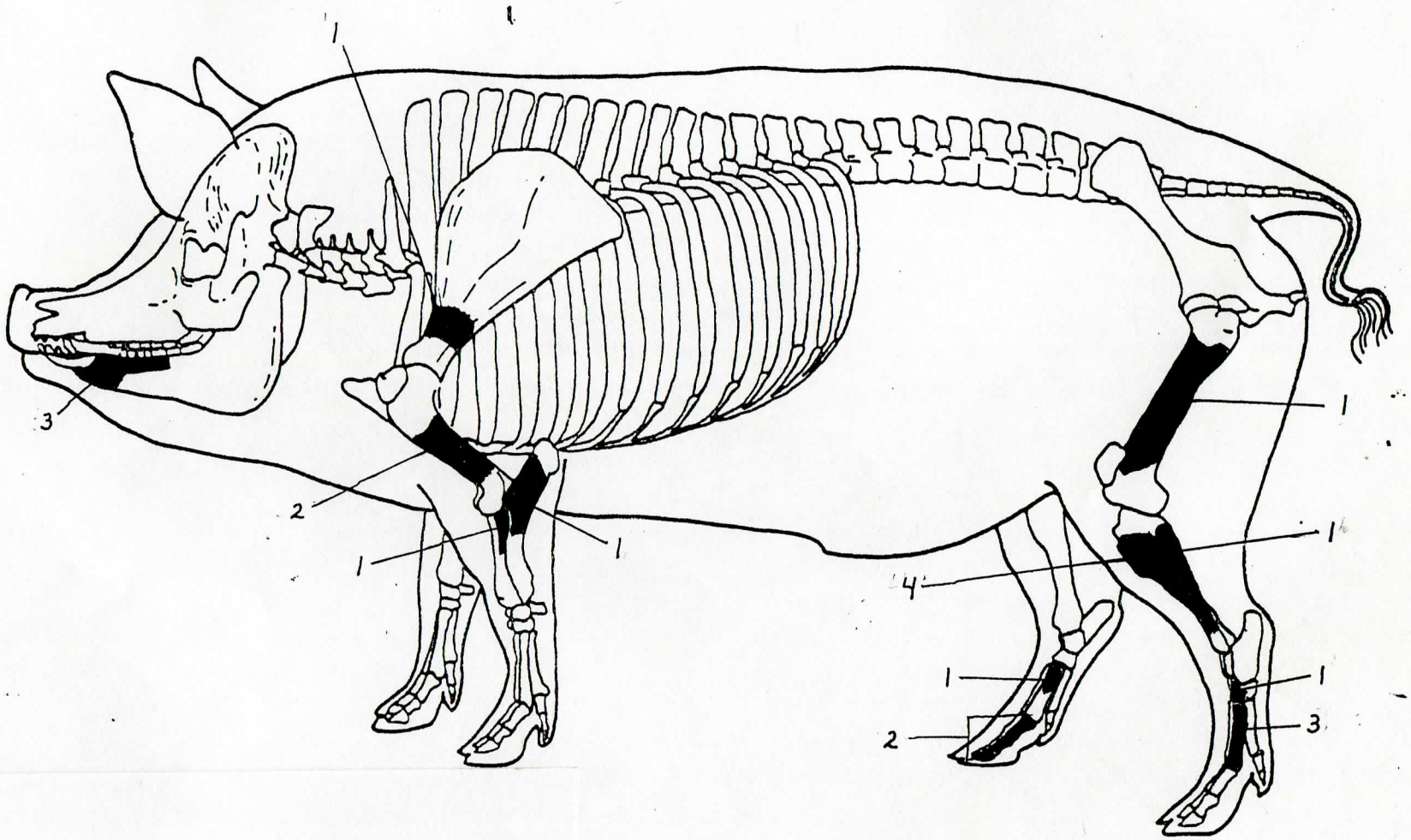

Figure 13. Powder Magazine (1851–1900), Pig Elements Identified. Not illustrated are 20 teeth. N=41.

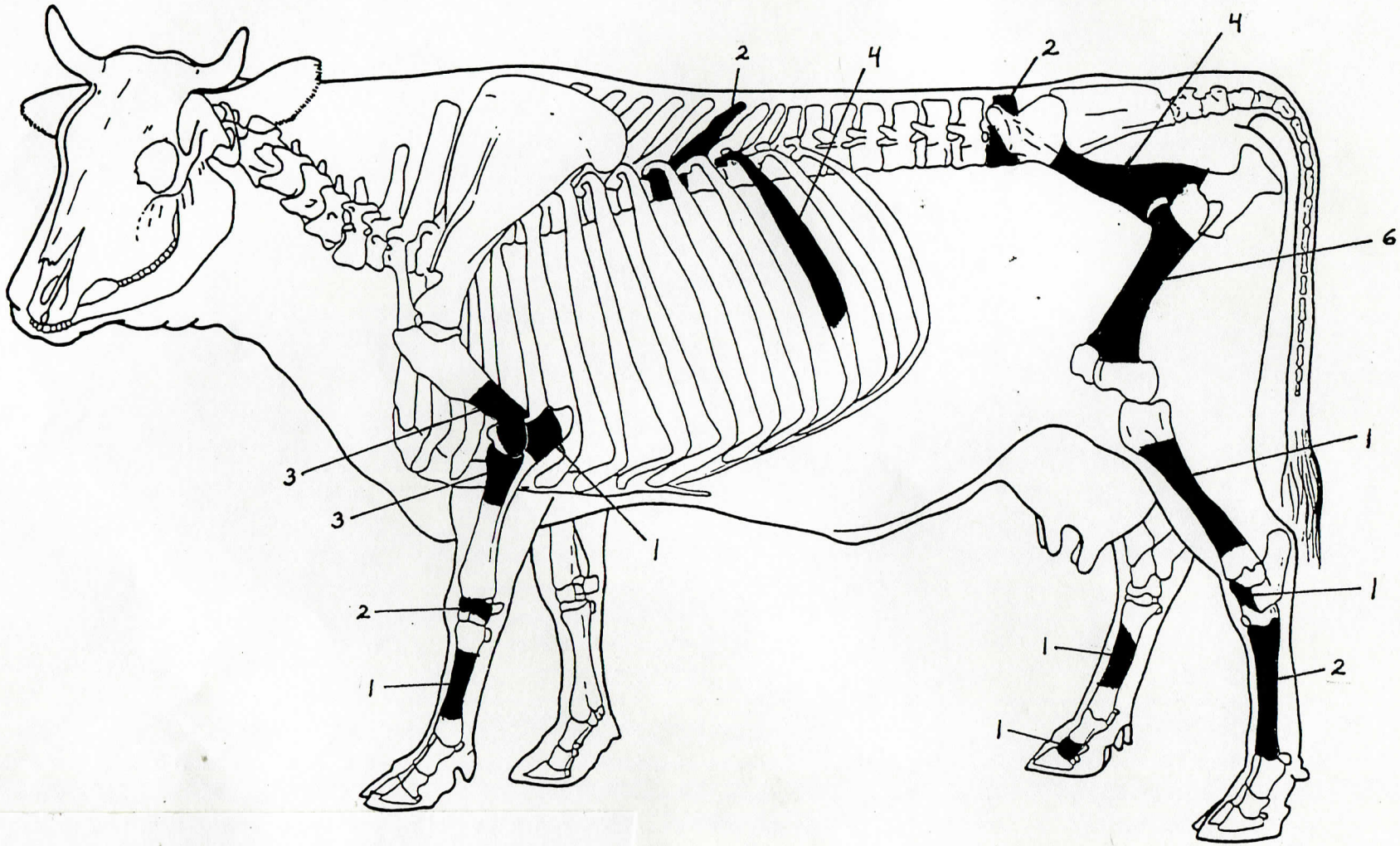

Figure 14. Powder Magazine (1851–1900), Cow Elements Identified. Not illustrated are 12 teeth. N=46.

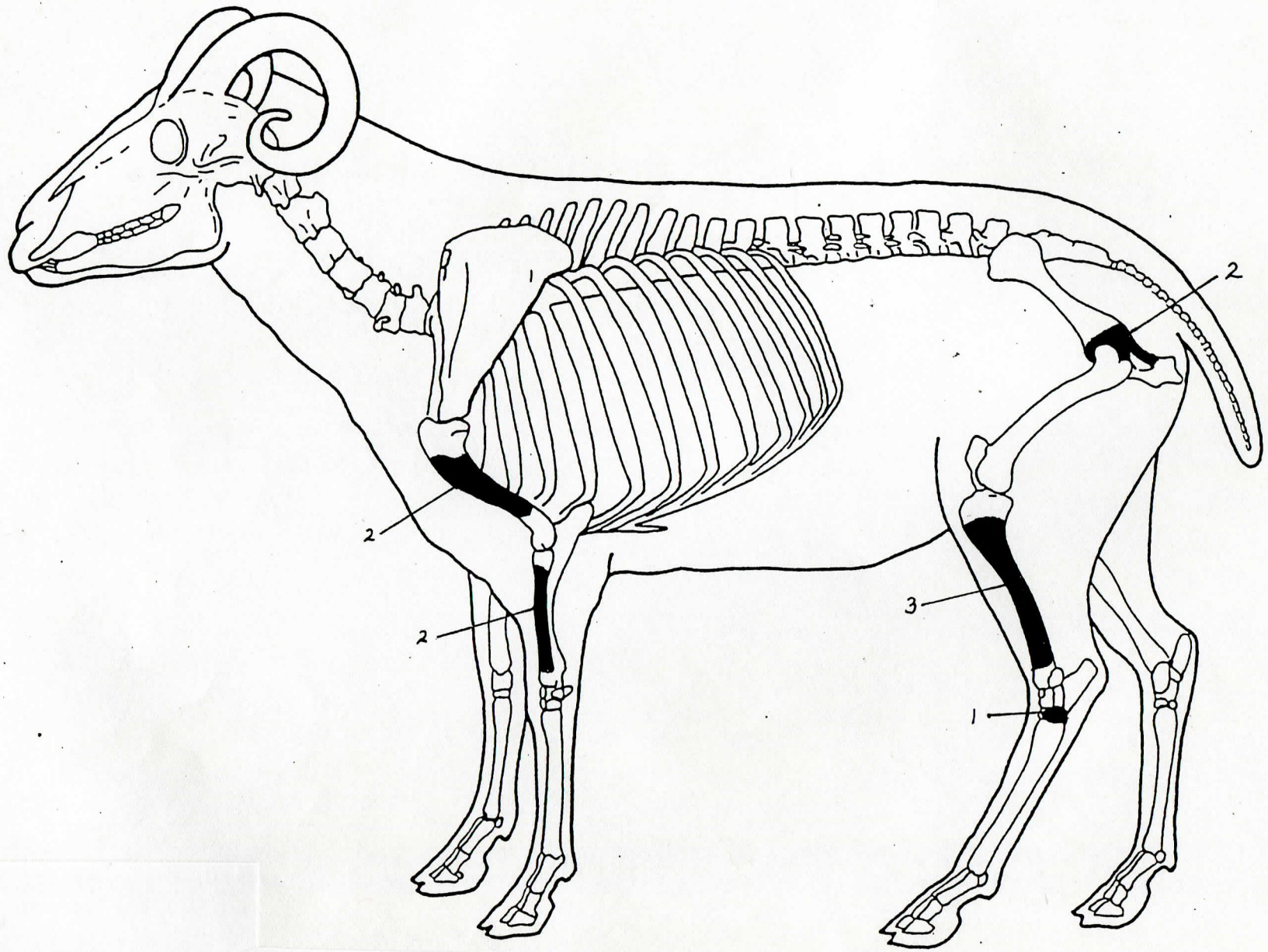

Figure 15. Powder Magazine (1851–1900), Caprine Elements Identified. Not illustrated are 1 skull fragment and 7 teeth. N=18.

Table 1. Charleston Summaries (Pre-1800).

	1ST TRIDENT		PRE-BREWTON		BEEF MARKET	
	MNI	%	MNI	%	MNI	%
Domestic Mammals	4	26.7	9	23.1	33	42.3
Domestic Birds	1	6.7	4	10.3	7	9.0
Wild Mammals	1	6.7			12	15.4
Wild Birds	2	13.3	4	10.3	7	9.0
Reptiles	1	6.7	2	5.1	2	2.6
Sharks and Fishes	5	33.3	18	46.2	15	19.2
Commensal Taxa	1	6.7	2	5.1	2	2.6
TOTALSS	15		39		78	

Note: First Trident Tannery data are from Zierden et al. (1983); pre-Brewton data from Reitz (1990); and Beef Market data from Calhoun et al. (1984).

Table 2. Charleston Summaries (Post-1800).

	GENERAL		PRINGLE-FROST	
	MNI	%	MNI	%
Domestic Mammals	250	31.4	10	12.5
Domestic Birds	118	14.8	5	6.3
Wild Mammals	67	8.4	4	5.0
Wild Birds	80	10.1	8	10.0
Reptiles	39	4.9	3	3.8
Sharks and Fishes	145	18.2	31	38.3
Commensal Taxa	97	12.2	19	23.8
TOTALS	796		80	

Note: General Pattern and Pringle-Frost data are from Reitz (1990).

Table 3. Allometric Values Used In Study.

Faunal Category	N	Y-Intercept (a)	Slope (b)	r^2
	Bone Weight (kg) to Body Weight (kg)			
Mammal	97	1.12	0.90	0.94
Bird	307	1.04	0.91	0.97
Turtle	26	0.51	0.67	0.55
Chondrichthyes	17	1.68	0.86	0.85
Osteichthyes	393	0.90	0.81	0.80
Non-Perciformes	119	0.85	0.79	0.88
Siluriformes	36	1.15	0.95	0.87
Perciformes	274	0.93	0.83	0.76
Serranidae	18	1.51	1.08	0.85
Centrarchidae	38	0.76	0.84	0.80
Sparidae	22	0.96	0.92	0.98
Sciaenidae	99	0.81	0.74	0.73

Note: Key to abbreviations: Formula is $Y=ax^b$; where Y is biomass or meat weight, X is bone or shell weight, a is the Y-intercept, and b is the slope; N is the number of observations (Reitz and Cordier 1983; Reitz et al. 1987; Wing and Brown 1979).

Table 4. Powder Magazine (1712-1750): Species List.

	NISP	MNI		WT, GM	BIOMASS	
		#	%		KG	%
UID Mammal	817			3782.45	43.65	40.89
Rattus spp.	2	2	6.67	1.03	0.03	0.03
Old World rat						
Procyon lotor	1	1	3.33	0.51	0.01	0.01
Raccoon						
Artiodactyla	14			95.31	1.59	1.49
Sus scrofa	32	3	10.00	355.52	5.20	4.87
Pig						
Bos taurus	106	4	13.33	4201.22	47.98	44.94
Cow						
Caprine	18	2	6.67	187.16	2.92	2.74
Sheep/Goat						
UID Bird	234			142.64	1.86	1.74
Anatidae	42	3	10.00	44.87	0.65	0.61
Ducks						
Chen spp.	1	(1)		5.26	0.09	0.08
Goose						
Gallus gallus	35	3	10.00	35.43	0.52	0.49
Chicken						

Table 4. Powder Magazine (1712-1750): Species List (cont.).

	NISP	MNI		WT, GM	BIOMASS	
		#	%		KG	%
Meleagris gallopavo	1	1	3.33	4.14	0.07	0.06
Turkey						
Columbia livia	1	1	3.33	0.85	0.02	0.02
Rock dove						
UID Turtle	29			33.68	0.33	0.31
Emydidae	4			21.29	0.25	0.23
Pond turtles						
Pseudemys spp.	1	1	3.33	36.02	0.35	0.33
Cooter						
Chelonidae	59	1	3.33	131.74	0.83	0.78
Sea turtles						
Galeocerdo spp.	2	(1)		0.94		
Tiger shark						
Odontaspis spp.	1	(1)		1.16		
Sand tiger						
Rajiformes	1	1	3.33	0.96	0.12	0.11
Skates and Rays						
UID Fish	70			9.63	0.18	0.17
Siluriformes	1			0.07	tr.	tr.
Catfishes						

Table 4. Powder Magazine (1712-1750): Species List (cont.).

	NISP	MNI		WT, GM	BIOMASS	
		#	%		KG	%
Ariidae	2			0.66	0.01	0.01
Sea catfishes						
Arius felis	2	1	3.33	0.72	0.01	0.01
Hardhead catfish						
Triglidae	1	1	3.33	0.28	0.01	0.01
Searobins						
Serranidae	1			0.29	tr.	tr.
Sea basses						
cf. Centropristis spp.	1	1	3.33	0.17	tr.	tr.
possible Sea bass						
Centrarchidae	1	1	3.33	0.17	tr.	tr.
Sunfishes						
Sparidae	1	1	3.33	0.21	tr.	tr.
Porgies						
Pogonias cromis	1	1	3.33	2.13	0.07	0.06
Black drum						
Mugil spp.	1	1	3.33	0.16	0.01	0.01
Mullet						
UID Vertebrate	___	_		644.82	____	
TOTALS	1483	30		9741.49	106.76	

Table 5. Powder Magazine (1712-1750): Summary.

	MNI		BIOMASS	
	#	%	kg	%
DOMESTIC MAMMALS	9	30.0	56.10	95.4
DOMESTIC BIRDS	4	13.3	0.54	0.9
WILD MAMMALS	1	3.3	0.01	tr.
WILD BIRDS	4	13.3	0.72	1.2
TURTLES	2	6.7	1.18	2.0
SHARKS, RAYS, AND FISHES	8	26.7	0.22	0.4
COMMENSAL TAXA	2	6.7	0.03	tr.
TOTALS	30		58.80	

Table 6. Powder Magazine (1712-1750): Element Distribution.

	RAT	RACCOON	PIG	COW	CAPRINE
HEAD			21	15	10
VERTEBRA/RIB				12	
FOREQUARTER		1	2	21	2
FOREFOOT			1	11	
FOOT				13	
HINDFOOT			2	15	3
HINDQUARTER	2	_	6	19	3
TOTALS	2	1	32	106	18

Table 7. Powder Magazine (1712-1750): Epiphyseal Fusion, Pig.

	UNFUSED	FUSED	TOTALS
EARLY FUSING:			
SCAPULA, DISTAL		1	1
MIDDLE FUSING:			
TIBIA, DISTAL	2	_	2
TOTALS	2	1	3

Table 8. Powder Magazine (1712-1750): Epiphyseal Fusion, Cow.

	UNFUSED	FUSED	TOTALS
EARLY FUSING:			
HUMERUS, DISTAL	1		1
SCAPULA, DISTAL		3	3
RADIUS, PROXIMAL		3	3
ACETABULUM		3	3
METAPODIALS, PROXIMAL		4	4
1ST/2ND PHALANX, PROXIMAL		5	5
MIDDLE FUSING:			
TIBIA, DISTAL		1	1
CALCANEUS, PROXIMAL		1	1
METAPODIALS, DISTAL	4	1	5
LATE FUSING:			
HUMERUS, PROXIMAL	1		1
RADIUS, DISTAL	2		2
ULNA, PROXIMAL		1	1
FEMUR, PROXIMAL		1	1
FEMUR, DISTAL	4		4
TIBIA, PROXIMAL	4		4
TOTALS	16	23	39

Table 9. Powder Magazine (1712-1750): Epiphyseal Fusion, Caprine.

	UNFUSED	FUSED	TOTALS
EARLY FUSING:			
HUMERUS, DISTAL		1	1
MIDDLE FUSING:			
CALCANEUS, PROXIMAL	1		1
LATE FUSING:			
FEMUR, DISTAL	1	_	1
TOTALS	2	1	3

Table 10. Powder Magazine (1712-1750): Modifications.

	WORKED	BURNED	CUT	HACKED	SAWED	C. GNAW
UID Mammal	1	13	15	12		7
Artiodactyla						2
Pig		1	2			1
Cow			7	14	1	1
Caprine			1	2		2
Anatidae		1				
Chicken		1		1		
UID Turtle			1	1		
Cooter			1	1		
Chelonidae			4			
Ariidae			1			
UID Vertebrate	_	22	1	_	_	_
TOTALS	1	38	33	31	1	13

Note: C. Gnaw refers to carnivore gnawing.

Table 11. Powder Magazine (1751-1820): Species List.

	NISP	MNI		WT, GM	BIOMASS	
		#	%		KG	%
UID Mammal	810			2038.88	25.03	13.44
Sylvilagus spp.	4	1	2.38	0.91	0.02	0.01
Rabbit						
UID Rodent	4			0.27	0.01	0.01
Rattus spp.	34	5	11.90	9.89	0.21	0.11
Old World rat						
Homo sapiens	1	1	2.38	0.52		
Human						
Artiodactyla	13			48.17	0.86	0.46
Sus scrofa	39	4	9.52	313.79	36.90	19.81
Pig						
Odocoileus virginianus	3	1	2.38	5.33	0.12	0.06
Deer						
Bos taurus	39	2	4.76	922.57	97.39	52.30
Cow						
Caprine	26	2	4.76	173.21	21.61	11.60
Sheep/Goat						
Ovis aries	1	(1)		24.83	0.47	0.25
Sheep						
UID Bird	127			50.66	0.73	0.39
Anatidae	10	3	7.14	5.00	0.09	0.05
Ducks						

Table 11. Powder Magazine (1751-1820): Species List (cont.).

	NISP	MNI		WT, GM	BIOMASS	
		#	%		KG	%
Gallus gallus	103	10	23.81	89.04	1.21	0.65
Chicken						
Columbidae	1	1	2.38	0.27	0.01	0.01
Doves						
UID Turtle	8			16.60	0.21	0.11
Emydidae	3	1	2.38	4.45	0.09	0.05
Pond turtles						
Chelonidae	3	1	2.38	10.46	0.15	0.08
Sea turtles						
Chondrichthyes	2	1	2.38	0.50	0.07	0.04
Cartilaginous fishes						
Carcharhinidae	4			1.03	0.13	0.07
Requiem sharks						
Galeocerdo spp.	1	(1)		0.69		
Tiger shark						
Odontaspis spp.	1	(1)		0.71		
Sand tiger						
UID Fish	272			20.61	0.34	0.18

Table 11. Powder Magazine (1751-1820): Species List (cont.).

	NISP	MNI		WT, GM	BIOMASS	
		#	%		KG	%
Acipenser oxyrhynchos	4	1	2.38	19.88	0.32	0.17
Atlantic sturgeon						
Siluriformes	2	1	2.38	0.15	tr.	tr.
Catfishes						
Serranidae	12	2	4.76	1.57	0.03	0.02
Sea basses						
Micropterus spp.	1	1	2.38	0.16	tr.	tr.
Bass						
Sciaenidae	3			4.55	0.12	0.06
Drums						
Cynoscion spp.	11	2	4.76	1.86	0.06	0.03
Seatrout						
Micropogonias undulatus	1	1	2.38	0.58	0.03	0.02
Atlantic croaker						
Mugil spp.	7	1	2.38	0.57	0.02	0.01
Mullet						
UID Vertebrate	___	_		257.70	____	
TOTALS	1550	42		4025.41	186.23	

Table 12. Powder Magazine (1751-1820): Summary.

	MNI		BIOMASS	
	#	%	kg	%
DOMESTIC MAMMALS	8	19.5	155.90	98.5
DOMESTIC BIRDS	10	24.4	1.21	0.8
WILD MAMMALS	2	4.9	0.14	0.1
WILD BIRDS	4	9.8	0.10	0.1
TURTLES	2	4.9	0.24	0.1
SHARKS, RAYS, AND FISHES	10	24.4	0.53	0.3
COMMENSAL TAXA	5	12.2	0.21	0.1
TOTALS	41		158.33	

Note: Human individual is not included.

Table 13. Powder Magazine (1751-1820): Element Distribution.

	RABBIT	RAT	PIG	DEER	COW	CAPRINE
HEAD	4	10	14	3	4	9
VERTEBRA/RIB		10	1		9	2
FOREQUARTER		7	8		3	5
FOREFOOT			2		3	1
FOOT			6		9	1
HINDFOOT			2		3	5
HINDQUARTER	_	7	6	_	8	3
TOTALS	4	34	39	3	39	26

Table 14. Powder Magazine (1751-1820): Epiphyseal Fusion, Pig.

	UNFUSED	FUSED	TOTALS
EARLY FUSING:			
HUMERUS, DISTAL	2		2
RADIUS, PROXIMAL	1	1	2
ACETABULUM		1	1
1ST/2ND PHALANX, PROXIMAL	1	2	3
MIDDLE FUSING:			
METAPODIALS, DISTAL	2		2
LATE FUSING:			
RADIUS, DISTAL	1	_	1
TOTALS	7	4	11

Table 15. Powder Magazine (1751-1820): Epiphyseal Fusion, Cow.

	UNFUSED	FUSED	TOTALS
EARLY FUSING:			
SCAPULA, DISTAL	1		1
ACETABULUM		3	3
1ST/2ND PHALANX, PROXIMAL	2	2	4
MIDDLE FUSING:			
TIBIA, DISTAL	1		1
CALCANEUS, PROXIMAL	1		1
METAPODIALS, DISTAL		1	1
LATE FUSING:			
FEMUR, DISTAL	_	1	1
TOTALS	5	7	12

Table 16. Powder Magazine (1751-1820): Epiphyseal Fusion, Caprine.

	UNFUSED	FUSED	TOTALS
EARLY FUSING:			
SCAPULA, DISTAL		2	2
ACETABULUM		1	1
MIDDLE FUSING:			
TIBIA, DISTAL		1	1
CALCANEUS, PROXIMAL		1	1
LATE FUSING:			
RADIUS, DISTAL	1	1	2
FEMUR, DISTAL	_	1	1
TOTALS	1	7	8

Table 17. Powder Magazine (1751-1820): Modifications.

	WORKED	BURNED	CUT	HACKED	SAWED	C. GNAW	R. GNAW
UID Mammal		5	19	14	11	8	3
Rat			1				
Artiodactyla			1			1	
Pig			3	1		1	4
Cow			5	5	3	1	3
Caprine			3	2		2	
UID Bird						1	2
Chicken			3				2
UID Fish		1					
UID Vertebrate	1	31	1	—	—	—	—
TOTALS	1	37	36	22	14	14	14

Note: C. Gnaw and R. Gnaw refer to carnivore and rodent gnawing, respectively.

Table 18. Powder Magazine (1820-1850): Species List.

	NISP	MNI		WT, GM	BIOMASS	
		#	%		KG	%
UID Mammal	722			2203.22	26.84	35.20
Rattus spp.	26	3	11.11	9.84	0.21	0.27
Old World rat						
Equus caballus	1	1	3.70	0.90	0.02	0.03
Horse						
Artiodactyla	5			24.40	0.47	0.62
Sus scrofa	46	3	11.11	761.53	10.32	13.54
Pig8						
Bos taurus	81	3	11.11	2728.40	32.53	42.67
Cow						
Caprine	19	3	11.11	167.36	2.64	3.46
Sheep/Goat						
UID Bird	100			70.26	0.98	1.29
Anatidae	5	1	3.70	7.93	0.13	0.17
Ducks						
Gallus gallus	40	4	14.81	51.59	0.74	0.97
Chicken						
Meleagris gallopavo	7	1	3.70	35.62	0.53	0.69
Turkey						

Table 18. Powder Magazine (1820-1850): Species List (cont.).

	NISP	MNI		WT, GM	BIOMASS	
		#	%		KG	%
Emydidae	3			12.15	0.17	0.22
Pond turtles						
Deirochelys reticularia	1	1	3.70	4.59	0.09	0.12
Chicken turtle						
Trachemys scripta	1	1	3.70	1.09	0.03	0.04
Yellow-bellied turtle						
cf. Carcharhinidae	3	1	3.70	1.10	0.14	0.18
possible Requiem sharks						
UID Fish	12			2.39	0.06	0.08
Acipenser oxyrhinchos	1	1	3.70	9.36	0.18	0.24
Atlantic sturgeon						
Arius felis	1	1	3.70	0.46	0.01	0.01
Hardhead catfish						
Bagre marinus	1	1	3.70	1.20	0.02	0.03
Gafftopsail catfish						
Sciaenidae	1			4.83	0.12	0.16
Drums						
Cynoscion spp.	1	1	3.70	0.10	0.01	0.01
Seatrout						

Table 18. Powder Magazine (1820-1850): Species List (cont.).

	NISP	MNI		WT, GM	BIOMASS	
		#	%		KG	%
Mugil spp.	1	1	3.70	0.11	tr.	tr.
Mullet						
UID Vertebrate				193.78		
TOTALS	1078	27		6292.21	76.24	

Table 19. Powder Magazine (1820-1851): Summary.

	MNI		BIOMASS	
	#	%	kg	%
DOMESTIC MAMMALS	9	33.3	45.49	95.6
DOMESTIC BIRDS	4	14.8	0.74	1.5
WILD BIRDS	2	7.4	0.66	1.4
TURTLES	2	7.4	0.12	0.2
SHARKS, RAYS, AND FISHES	6	22.2	0.36	0.8
COMMENSAL TAXA	4	14.8	0.23	0.5
TOTALS	27		47.60	

Table 20. Powder Magazine (1820-1850): Element Distribution.

	RAT	HORSE	PIG	COW	CAPRINE
HEAD	9	1	7	6	7
VERTEBRA/RIB	2			35	
FOREQUARTER	3		17	12	2
FOREFOOT			2	1	2
FOOT				8	1
HINDFOOT			3	5	3
HINDQUARTER	12	_	17	14	4
TOTALS	26	1	46	81	19

Table 21. Powder Magazine (1820-1850): Epiphyseal Fusion, Pig.

	UNFUSED	FUSED	TOTALS
EARLY FUSING:			
HUMERUS, DISTAL	1	1	2
SCAPULA, DISTAL		1	1
RADIUS, PROXIMAL		1	1
ACETABULUM	1	2	3
MIDDLE FUSING:			
TIBIA, DISTAL	1	1	2
LATE FUSING:			
FEMUR, PROXIMAL	1		1
FEMUR, DISTAL	3		3
TIBIA, PROXIMAL	4	_	4
TOTALS	11	6	17

Table 22. Powder Magazine (1820-1850): Epiphyseal Fusion, Cow.

	UNFUSED	FUSED	TOTALS
EARLY FUSING:			
HUMERUS, DISTAL		2	2
ACETABULUM		3	3
METAPODIALS, PROXIMAL		1	1
1ST/2ND PHALANX, PROXIMAL	2	4	6
MIDDLE FUSING:			
TIBIA, DISTAL	2	1	3
METAPODIALS, DISTAL	1	1	2
LATE FUSING:			
HUMERUS, PROXIMAL	2		2
RADIUS, DISTAL		1	1
FEMUR, PROXIMAL	1	—	1
TOTALS	8	13	21

Table 23. Powder Magazine (1820-1850): Epiphyseal Fusion, Caprine.

	UNFUSED	FUSED	TOTALS
EARLY FUSING:			
RADIUS, PROXIMAL		1	1
ACETABULUM		2	2
METAPODIALS, PROXIMAL		3	3
MIDDLE FUSING:			
CALCANEUS, PROXIMAL	1		1
METAPODIALS, DISTAL		1	1
LATE FUSING:			
FEMUR, PROXIMAL	1	1	2
TOTALS	2	8	10

Table 24. Powder Magazine (1820-1850): Modifications.

	WORKED	BURNED	CUT	HACKED	SAWED	C. GNAW	R. GNAW
UID Mammal	1	4	5	6	49	5	11
Pig			10	1	5	1	11
Cow		1	11	10	22	4	8
Caprine			1	1			1
Anatidae							1
Chicken			1				
Turkey			1				1
Sturgeon	_	_	1	1	—	—	—
TOTALS	1	5	30	19	76	10	33

Note: C. Gnaw and R. Gnaw refer to carnivore and rodent gnawing, respectively.

Table 25. Powder Magazine (1851-1900): Species List.

	NISP	MNI		WT, GM	BIOMASS	
		#	%		KG	%
UID Mammal	816			2130.37	26.04	48.49
UID Rodent	1			0.05	tr.	tr.
Rattus spp.	16	2	9.09	4.06	0.09	0.17
Old World rat						
Procyon lotor	1	1	4.54	2.70	0.06	0.11
Raccoon						
Equus caballus	2	1	4.54	1.67	0.04	0.07
Horse						
Artiodactyla	2			3.56	0.08	0.15
Sus scrofa	41	2	9.09	300.51	4.47	8.32
Pig						
Bos taurus	46	2	9.09	1364.50	17.44	32.48
Cow						
Caprine	18	2	9.09	177.71	2.78	5.18
Sheep/Goat						
UID Bird	65			41.98	0.63	1.17
Anatidae	2	1	4.54	0.46	0.01	0.02
Ducks						
Gallus gallus	33	3	13.64	34.29	0.53	0.99
Chicken						

Table 25. Powder Magazine (1851-1900): Species List (cont.).

	NISP	MNI		WT, GM	BIOMASS	
		#	%		KG	%
Rallidae	1	1	4.54	0.32	0.01	0.02
Rails						
Columbidae	1			0.35	0.01	0.02
Doves						
Ectopistes migratorius	3	1	4.54	0.89	0.02	0.04
Passenger pigeon						
UID Turtle	9			12.30	0.17	0.32
Emydidae	2			1.85	0.05	0.09
Pond turtles						
cf. Pseudemys spp.	1	1	4.54	3.36	0.07	0.13
possible Cooter						
Trachemys scripta	4	1	4.54	26.10	0.28	0.52
Yellow-bellied turtle						
Apalone spp.	1	1	4.54	3.20	0.07	0.13
Softshell turtle						
Squaliformes	1	1	4.54	0.36	0.05	0.09
Dogfish and angel sharks						
UID Fish	10			2.32	0.06	0.11
Acipenser oxyrhinchos	4	1	4.54	5.58	0.72	1.34
Atlantic sturgeon						

Table 25. Powder Magazine (1851-1900): Species list (cont.).

	NISP	MNI		WT, GM	BIOMASS	
		#	%		KG	%
Ariidae	1			1.28	0.02	0.04
Sea catfishes						
Bagre marinus	1	1	4.54	0.23	tr.	tr.
Gafftopsail catfish						
UID Vertebrate				139.53		
TOTALS	1082	22		4259.53	53.70	

Table 26. Powder Magazine (1851-1900): Summary.

	MNI		BIOMASS	
	#	%	kg	%
DOMESTIC MAMMALS	6	27.3	24.69	92.7
DOMESTIC BIRDS	3	13.6	0.53	2.0
WILD MAMMALS	1	4.5	0.06	0.2
WILD BIRDS	3	13.6	0.04	0.1
TURTLES	3	13.6	0.42	1.6
SHARKS, RAYS, AND FISHES	3	13.6	0.77	2.9
COMMENSAL TAXA	3	13.6	0.13	0.5
TOTALS	22		26.64	

Table 27. Powder Magazine (1851-1900): Element Distribution.

	RAT	RACCOON	HORSE	PIG	COW	CAPRINE
HEAD	4		2	23	12	8
VERTEBRA/RIB	1				8	
FOREQUARTER	2			5	7	4
FOREFOOT					3	
FOOT				3	2	
HINDFOOT				4	3	1
HINDQUARTER	9	1		6	11	5
TOTALS	16	1	2	41	46	18

Table 28. Powder Magazine (1851-1900): Epiphyseal Fusion, Pig.

	UNFUSED	FUSED	TOTALS
EARLY FUSING:			
RADIUS, PROXIMAL		1	1
METAPODIALS, PROXIMAL		2	2
MIDDLE FUSING:			
METAPODIALS, DISTAL		2	2
LATE FUSING:			
FEMUR, DISTAL	1		1
TIBIA, PROXIMAL	2	_	2
TOTALS	3	5	8

Table 29. Powder Magazine (1851-1900): Epiphyseal Fusion, Cow.

	UNFUSED	FUSED	TOTALS
EARLY FUSING:			
HUMERUS, DISTAL		2	2
RADIUS, PROXIMAL		3	3
ACETABULUM		1	1
METAPODIALS, PROXIMAL		1	1
1ST/2ND PHALANX, PROXIMAL		1	1
LATE FUSING:			
FEMUR, PROXIMAL	3		3
FEMUR, DISTAL	1	_	1
TOTALS	4	8	12

Table 30. Powder Magazine (1851-1900): Epiphyseal Fusion, Caprine.

	UNFUSED	FUSED	TOTALS
EARLY FUSING:			
ACETABULUM	1	1	2
TOTALS	1	1	2

Table 31. Powder Magazine (1851-1900): Modifications.

	WORKED	BURNED	CUT	HACKED	SAWED	C. GNAW	R. GNAW
UID Mammal	3	4	15	9	70	20	6
Artiodactyla				1			
Pig			3	2	1	1	
Cow			4	6	12	2	3
Caprine			1	3		3	1
UID Bird			1				
Chicken				1			1
UID Vertebrate	_	2	1	—	—	—	—
TOTALS	3	6	25	22	83	26	11

Note: C. Gnaw and R. Gnaw refer to carnivore and rodent gnawing, respectively.

APPENDIX A: MEASUREMENTS.

SPECIES	ELEMENT	DIMENSION	MEASUREMENT, MM
Sus scrofa	Astragalus	Bd	23.4
		GLm	37.6, 41.9
		GLl	45.0
	Humerus	Bd	40.2
	3rd Metacarpal	Bp	22.4
	3rd Metatarsal	Bp	12.1, 14.7
		GL	66.6
		Bd	12.7
	4th Metatarsal	Bp	16.3
		GL	73.3
		Bd	13.8
	1st Phalanx	Bp	16.3
		GL	35.2
		Bd	14.9
	3rd Phalanx	DLS	26.3
		Ld	24.8
	Radius	Bp	26.5
	Ulna	BPC	22.1
Bos taurus	Astragalus	GLm	63.9
		GLl	59.5
		Bd	39.9
	Calcaneus	GB	46.6
	Humerus	BT	71.1
		Bd	74.9
	Metacarpal	Bp	67.1, 62.7
		Bd	59.6
	Metatarsal	Bp	51.6, 48.3
		Bd	61.7
	1st Phalanx	Bp	33.2, 36.0, 31.7, 29.1, 28.6, 29.9, 26.0
		GL	59.0, 64.0, 58.7
		GLpe	61.9, 61.3
		Bd	28.8, 29.5, 31.1, 30.7, 30.4, 25.7, 25.4, 26.5, 24.0
	2nd Phalanx	Bp	30.3, 31.4, 31.4
		GL	42.4, 42.1, 36.8
		Bd	26.0, 25.4, 28.5
	3rd Phalanx	DLS	68.6, 77.6, 73.5, 72.3, 68.5
		Ld	55.6, 60.5, 54.4, 48.6
	Radius	BFp	71.1, 80.5
		Bp	78.5
	Scapula	LG	64.0, 65.3
		BG	54.5, 55.0
		GLP	74.6
	Tibia	Bd	66.9

APPENDIX A: MEASUREMENTS (cont.).

SPECIES	ELEMENT	DIMENSION	MEASUREMENT, MM
Bos taurus (cont.)	Tibia (cont.)	Dd	46.2
Caprine	Astragalus	GLl	32.1, 27.1, 25.3
		GLm	28.9, 24.1
		Bd	19.1, 14.9
		Dl	17.6
	Calcaneus	GB	16.2
		GL	47.5
	Femur	Bp	47.9
	Humerus	BT	30.6
		Bd	32.6
	Metacarpal	Bp	22.5
		GL	132.1
		Bd	24.4
	Metatarsal	Bp	23.7
	Radius	BFp	31.7
		Bd	31.8
	Scapula	BG	21.5
		GLP	32.5
	Tibia	Bd	27.9

APPENDIX B: SAMPLES STUDIED, FS#.

1712-1750

31	60	103	169	203	231	255
32	61	112	172	204	234	256
36	62	123	173	205	236	258
46	63	124	174	209	241	260
48	65	135	175	213	245	269
49	69	136	178	214	246	
50	71	145	182	223	247	
51	76	158	183	226	251	
57	78	164	184	228	252	
58	80	168	200	229	254	

1751-1820

38	68	163	186	205	219	250
42	105	167	188	206	221	253
43	113	170	190	207	222	259
45	139	171	191	208	230	268
52	142	177	192	210	235	
53	147	179	194	211	237	
55	157	180	196	217	244	

1820-1850

28	84	114	129	138	148	202
29	86	115	130	141	149	216
39	89	117	134	143	150	227
70	106	120	137	144	187	233

1851-1900

8	26	59	87	100	123	201
10	30	67	88	101	124	215
12	33	72	90	102	125	224
13	35	73	91	107	126	
17	37	75	92	108	127	
18	40	77	93	109	128	
20	41	79	94	110	131	
21	44	81	95	111	133	
22	47	82	96	116	146	
23	54	83	97	121	185	
24	56	85	99	122	193	

APPENDIX II

Palynological and Parasitological Analysis of Sediments from the Powder Magazine

Karl J. Reinhard

Introduction

The Powder Magazine was used for various purposes from 17122 onward. Excavations of the Powder Magazine were designed to evaluate the use of the structure throughout its history. Originally, the building was used as Charleston's source of gunpowder. When it reverted to private ownership after 1800, it was used for a variety of purposes, including wine cellar, livery stable, printing shop and general storage. Since 1901, the building has been a museum.

Pollen and parasite samples were collected from excavation in the building interior and also from the exterior. The samples dated to all periods of use. Palynological evaluation of the soils has the potential of defining specific aspects of the building's use as well as the general environment of the building. Parasitological analysis has special importance in this study of the Powder Magazine in verifying that certain sediments came from livery stall levels. Parasite eggs, especially roundworm eggs, are particularly useful in identifying which animals were kept in archaeological sites.

Materials and Methods

The processing of the sediments is identical to that for the Nathaniel Russell House except that many additional preparations of soil from suspected livery stall deposits were scanned for parasite eggs specific to horses. The procedure described below is repeated from the Nathaniel Russell House report (Reinhard in Zierden 1996).

The samples were processed by Dennis Gryder at the Texas A&M University Palynology Laboratory following techniques developed on Charleston samples between 1988 and 1990 and published formally in 1992 by Warnock and Reinhard. Modification of this procedure is the reduction of sonication following the discovery that sonication beyond a minute duration destroys some type of pollen grains (Kalinska and Reinhard, in revision). Therefore, the processing follows the most recent developments in processing procedure.

Sediment processing dissolves and divides various soil components to concentrate organic debris containing parasite eggs and pollen grains in a way that can be quantified in terms of

number of eggs or pollen per gram or milliliter of sediment. Thirty milliliters of soil were first measured. A tablet of *Lycopodium* spores was added to each sample. Each *Lycopodium* spore table tcontains 11,300 plus or minus 400 spores. Therefore, approximately 377 spores are present per milliliter of soil. This known number of exotic enables accurate measurement of the parasite eggs and pollen grains per milliliter of soil by calculating a ratio of eggs or pollen to known spores.

The individual samples were first treated with 30% hydrochloric acid (HCl) in 300 milliliter beakers. Hydrochloric acid dissolves calcium carbonate. The acid was slowly added to the soil samples unitl all acid/carbonates reactions ceased. Distilled water was then added to the samples. After the carbonates were removed, the samples were sedimented and screened to remove any large, heavy components. Sedimentation was accomplished by rigorously swirling the samples in the beakers until the soils were in suspension. The beaker was then set aside for 30 seconds to allow heavy fractions to settle out. The supseratant was then poured through a 0.25 millimeter mesh screen into a 500 milliliter beaker. This process was repeated until the supernatant was nearly clear. The remains left on the screening were dried on blotter paper and examined for macroscopic remains. Any heavy sand sediment remaining in the original 300 milliliter beakers was discarded. The microscopic remains in the 500 milliliter beakers were then concentrated by centrifugation, and then washed three times in distilled water to remove any traces of hydrochloric acid which would otherwise react with chemicals in later processing stages.

The samples were treated with 72% hydrofluoric acid which will dissolve any fine silicates in the sample. This was accomplished by transferring the concentrated remains to 700 milliliter plastic beakers and 50 milliliters of hydrofluouric acid was added to each sample. The samples were set aside for 24 hours to allow for completion of the reaction, stirring approximately every 7 hours to ensure complete interaction between remains and acid. After 24 hours, distilled water was added to the samples and the mixtures were left to settle for 2 hours. The supernatant was then aspirated off, with care taken not to disturb any sedimented remains. This water wash was repeated two more times. The remaining sediments were then concentrated by centrifugation into 50 milliliter centrifuge tubes. Distilled water was added and the tubes were placed in a sonicator and sonicated for 1 minute. This treatment loosens fine organic debris and separates microscopic particles. After sonication, the microscopic remains were transferred to 12 milliliter glass centrifuge tubes.

After the microscopic remains were concentrated by centrifugation and the supernatant poured off, a heavy density mixture of zinc bromide (specific gravity 2.0) was added to the tubes. The tubes were then spun in a centrifuge at 1,500 r.p.m. for 15 minutes. This process results in the separation of light organic remains, including parasite eggs, from heavier organic detritus. The heavy detritus sinks to the bottom of the tubes, while the light organic remains float to the surface of the heavy density mixture and are easily removed. The light organic remains formed a dark band at the top of the tubes. These light organic remains were then pipetted into 50 milliliter beakers. The samples were rinsed with distilled water and spun down in 12 milliliter glass centrifuge tubes until all evidence of the heavy density mixture was gone.

At this point, a subsample from each sample was transferred to glass vials in glycerol for

parasite egg examination. The remaining samples were washed twice with glacial acetic acid and then acetolysis solution was added to dissolve cellulose and related compounds. Acetolysis solution consists of nine parts acetic anhydride to one part sulphuric acid. After acetolysis, the samples were rinsed with glacial acetic acid and then three water washes. Finally, to dissolve humic compounds, the samples were treated for thirty seconds in five percent potassium hydroxide and then washed repeatedly with distilled water. The samples were then transferred to two dram vials with alcohol. Glycerin was added and the alcohol was vaporized with low heat.

Microscope preparations of each sample were made by placing a drop of glycerol with suspended sediment on a microscope slide. The microscope preparations were then scanned at a 240 power of magnification for parasite eggs and 500 power for pollen grains. When potential parasite eggs were encountered, they were examined at 500 power. Examination was done with a Jenaval microscope under differential interference phase contrast. The steps of processing are summarized in Table 1.

Results

The Laboratory and provenience numbers are presented in Table 2. The pollen grain concentrations and parasite egg concentrations are listed by sample in Table 3, and arranged by temporal units in Table 4. It is significant in this analysis that sample numbers 11–19 come from interior excavations.

Several interesting trends can be seen in these data. With regard to the parasite eggs, all samples positive for parasite eggs come from the interior of the building. Secondly, the highest pollen concentrations come from the interior of the building. This indicates that preservation potential was best within the Powder Magazine. No sample dating to the 1712–1750 temporal division contained sufficient pollen for interpretation. Fortunately, at least one pollen sample from each of the other three temporal divisions contained sufficient amounts of pollen for environmental interpretation.

The parasite egg counts are presented in Table 5. Three genera were found: Ascaris, Trichuris, and Capillaria. The ascarid eggs are either one of two species: *Ascaris lumbricoides* (giant roundworm of humans) or *Ascaris suum* (giant roundworm of pigs). The trichurid eggs are consistent with those of the human whipworm *Trichuris trichiura* or the pig whipworm *T. suis.* However it is possible that these whipworm eggs are from another species. The Capillaria eggs are of two distinct morphologies. The two eggs from sample 14 are relatively thin walled and reticulated (have net–like patters of surface ornamentation). The egg proportions, size, and wall morphology are most consistent in my experience to that of *Capillaria aerophila,* a parasite of dogs. The capillarid egg from sample 15 is thick–walled with large, distinct pits in its surface. I have no idea what species produced this egg. I have never seen this surface sculpture before. It is important to note that horses are parasitized by neither trichurids nor capillarids. After extensive examination of samples 14 and 15, not a single egg of a species infective to horses was encountered.

The pollen count from sediments that have poor pollen preservation are listed in Table 6. The counts from those sediments that had relatively good preservation are listed in Table 7. As mentioned previously, the only samples that contained high amounts of pollen were from the interior. Of these, samples 11, 14, 15, and 16 had sufficient pollen preservation for environmental reconstruction, although sample 11 has reduced preservation and therefore less interpretive potential than the others. It is of interest that pine pollen was poorly preserved in all samples with the exception of sample 16 which had relatively good preservation of most types. However, the pollen of *Trifolium*–type in sample 16 was variably preserved.

Discussion: Parasitology

The parasite genera found in the analysis provide some insight into what animals were involved in adding to the deposits within the structure. The value of the different genera relates to the diagnostic level one can achieve with them. Ascarid eggs can be used to diagnose specific species. In the case of the Powder Magazine, the ascarid eggs belong to either *A. lumbricoides* or *A. suum.* Since ascarid eggs are disseminated in feces, one can conclude that human or pig feces made up a small component of sample 15 sediments. *Trichuris* or *Capillaria* eggs have less diagnostic precision. The eggs of *Trichuris* are diagnostic to the genus, and if sufficient numbers of eggs are present, the metric analysis can be used to identify species. However, it should be noted that this point is currently disputed by Patrick Horne who has discovered the ranges of egg sizes published by different authors varying significantly for the same species (personal communication). Therefore, diagnosis of *Trichuris* species is difficult. However, there is no *Trichuris* species which infects horses. Therefore, the eggs indicate a source different from horses which in turn suggests that the identification of samples 14 and 15 as derived from horse stalls is inaccurate. The morphology of the capillarid eggs varies from species to species. The two key variants are egg thickness and egg shell exterior ornamentation. The capillarid eggs from sample 14 are very distinct and are consistent with a canid capillarid, *Capillaria aerophila.* They have moderately thick walls with a reticulate (net–like) surface. It is probable that dogs added to the deposits in sample 14. I have never seen the morphology of the capillarid egg from sample 15. There are more described species of *Capillaria* than any other roundworm genus and they inhabit all vertebrate classes. However, the eggs are described only for species that infect domestic animals. Therefore, identifying the species from the egg is challenging, even when diagnosing infections from fresh feces of known animals. Diagnosis of capillarid species from potentially mixed deposts which includes eggs of unknown morphology approaches impossibility. However, no capillarid species infect horses. In conclusion, the parasite eggs indicate that sample 14 contains fecal deposits of dogs and that of sample 15 from pigs or humans and an unknown animal.

One horse parasite that is cosmopolitan and produces a very distinctive egg is the horse pinworm, *Oxyuris equi.* These eggs have been found in archaeological sites and are clear evidence of horses. I searched extensively through preparations from samples 14 and 15 and found no evidence of this horse parasite, nor any other horse parasite. Therefore, there is no parasitological evidence that these deposits represent livery stable deposits.

Discussion: Palynology

The pollen evidence from those samples that have relatively good preservation show a distinct trend through time. Sample 16 dates to approximately 1800. The pollen spectrum is dominated by non–arboreal taxa. Grass is most common. However, more telling than the grass pollen with regard to landscaping around the building is the presence of *Chrysanthemum* and *Trifolium* (clover of various types) pollen. Both of these types are insect pollinated and therefore should not make up more than 2% of the pollen spectrum. However, *Chrysanthemum* makes up 5%% of the pollen and *Trifolium* 11% of the pollen spectrum. This indicates that both chrysanthemums and clover were planted in the yard. This shows that after the military use of the Powder Magazine, the environment contain some flower gardens. Only 5% of the pollen came from trees, and only *Pinus* is represented in the sample. Since *Pinus* pollen is blown from long distances, this does not indicate anything significant about the local environment of the Powder Magazine. There are no pollen grains from other trees, which indicate that trees were rare or absent in the immediate vicinity of the Magazine.

The samples dating to 1820 to 1850 and 1850–1900 (samples 14 and 15) show a dramatic increase in arboreal pollen, especially that of pine, although the diversity of hardwood taxa increases. One vexing aspect of these counts is that pine pollen is especially poorly preserved as indicated by the large number of pine pieces encountered in these samples. This suggests that the pine was subjected to different conditions that the other pollen and may have come in from some other source. The *Trifolium* pollen is still present, but the *Chrysanthemum* type pollen is gone. Ragweed pollen (*Ambrosia* type) increases after 1800 and there is general increase in the diversity of herbaceous pollen. Therefore, between 1800 and 1820–50, local flower gardens were replaced by an increase in trees and weeds.

The trend in arboreal pollen is consistent with previous analyses of the John Rutledge house and Miles Brewton house. There is a general decline of hardwood pollen at these sites in teh 1800s and an increase of pine. The abundance of non–arboreal pollen in sample 16 probably swamps out the arboreal component which makes this sample appear anomalous in comparison to other Charleston samples from the same period.

The dietary taxa in all samples are maize and other cereal grains [*Zea mays* (whole and torn) and Large Poaceae (whole and torn)). These do not occur in high amounts, yet the torn condition of some of the grains is consistent with pollen from milled cereals.

Conclusion

The analysis of the samples from the Powder Magazine is insightful with regard to domestic animal presence and local environment. The small numbers of parasite eggs found idicates that the sediments were composed only in small part of feces. The diversity of eggs indicates that at least two animals contributed to the deposits, neither of which were horses. The pollen data for the 1700s is poor due to bad preservation. However, the local environment of 1800 is dominated

by planted flowers which gives way within 20 years to weeds and trees.

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TABLE 1: Summary of processing procedure. Parasite subsample is removed after step 9.

Step #	Procedure	Goal
1	measure sample	quantification
2	add Lycopodium tablet	quantification
3	HCl treatment	Dissolves carbonates
4	H_20 wash	Removes HCl
5	Swirl technique	separates large silicates
6	screening	Removes macrofossils
7	HF treatment	dissolves small silicates
8	H_20 wash	Removes HF
9	Sonication	disperses sediments
10	Acetic Acid wash	Removes H_20
11	Acetolysis treatment	dissolves cellulose
12	Acetic Acid wash	removes acetolysis solution
13	H_20 wash	removes acetic acid
14	KOH treatment	dissolves humics
15	H_20 wash	removes humic break down products
16	Transfer to ETOH	removes H_20
17	Transfer to glycerin	archive preparation

TABLE 2: Laboratory with field provenience.

Lab #	FS #	Field Provenience	
1	FS 59	N135E115	Zone 2 Level 1
2	FS 69	N145E???	F24 Level 4
3	FS 89	N130E115	F33
4	FS 112	N150E115	F15
5	FS 133	N150E111.5	Zone 2
6	FS 134	N140E110	F42 Level 5
7	FS 136	N150E111.5	F15 Level 2
8	FS 138	N140E115	F45-8
9	FS 139	N150E115.5	F25
10	FS 150	N140E110	F42 Level 10
11	FS 157	N115E102	Zone 2
12	FS 169	N115E102	F53
13	FS 171	N125E102	Zone 2 Level 2
14	FS 185	N115E115	Zone 1a
15	FS 187	N115E115	Zone 18
16	FS 188	N115E115	Zone 2
17	FS 250	N125E105	Zone 2 Level 2
18	FS 251	N120E115	F72
19	FS 254	N125E105	Zone 3

TABLE 3: Pollen grain and parasite egg concentrations listed by lab number and FS number. Concentrations are in terms of pollen or parasites per milliliter of sediment.

Lab #	Field Provenience	Parasite Eggs	Pollen Grains
1	FS 59	0	45
2	FS 69	0	42
3	FS 89	0	20
4	FS 112	0	0
5	FS 133	0	0
6	FS 134	0	21
7	FS 136	0	9
8	FS 138	0	0
9	FS 139	0	26
10	FS 150	0	63
11	FS 157	42	2,843
12	FS 169	0	0
13	FS 171	36	665
14	FS 185	228	29,260
15	FS 187	217	19.760
16	FS 188	31	25,333
17	FS 250	0	2,280
18	FS 251	0	95
19	FS 254	0	589

TABLE 4: Pollen concentrations arranged by temporal subdivisions. Sample number proceeds pollen concentration value.

1712-1750	
lab 2	42
Lab 4	0
Lab 7	9
Lab 12	0
Lab 18	95
1750-1820	
Lab 9	26
Lab 11	2,843
Lab 13	665
Lab 16	25,333
Lab 17	2,280
1820-1850	
Lab 3	20
Lab 8	0
Lab 15	19,760
1850-1900	
Lab 1	45
Lab 5	0
Lab 6	21
Lab 10	63
Lab 14	29,260

TABLE 5: Parasite egg counts by genus.

Sample #	*Ascaris*	*Trichuris*	*Capillaria*
11		3	
13		1	
14		3	2
15	3	4	1
16		1	

TABLE 6: Pollen counts from samples exhibiting relatively poor preservation. Low tracer spore count for number 5 is suggestive of laboratory loss.

	1	2	3	4	5	6	7	8	9	10
Tracer Spores	34	23	18	37	4	18	42	21	58	18
Pinus (whole)	1		1							1
Poaceae	1		2			1			1	1
Quercus	1									
Ambrosia-type	1									
Myrtaceae							1			
Fabaceae									1	
Ligulaflorae									1	
Cheno Am										1

TABLE 6, continued:

	12	13	17	18	19
Tracer Spores	38	12	7	16	40
Pinus (whole)		5	10		32
Pinus (pieces)		5	55		69
Poaceae			8	2	1
Quercus					
Ambrosia-type					
Myrtaceae					
Fabaceae					
Ligulaflorae		1			
Cheno Am		1	1		3
Ulmus		1			
Unidentifiable		1			
Helianthus-type		1		1	1
Caryophyllaceae				1	
Zea mays (torn)				1	

TABLE 7: Pollen counts from samples with relatively good preservation tabulated by sample number and date. Samples 14-16 had better preservation that 11 as indiacetd by pollen concentrations in Table 4. Asterisk indcates a pollen cluster.

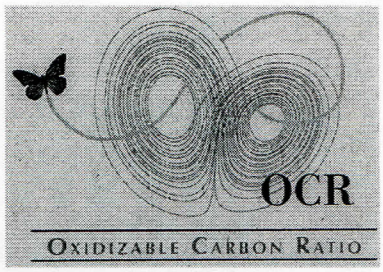
	11(1880)	14(1850-1900)	15(1820-1850)	16(1800)
Tracer spores	27	3	4	3
Poaceae	93	97	100	145
Zea mays (whole)				1
Zea mays (torn)		2	1	1
Large Poaceae (torn)	2	1		
Large Poaceae	2	1		
Fabaceae			1	T
Trifolium	1	5	3	22
Chrysanthemum type				11
Ambrosia type	2	15	15	1
Helianthus type		4		
Aster type			7	
Cheno Am	7	7	6	5
Caryphyllaceae		1	1	
Lamiaceae		1		
Caprifoliaceae			1	
Morus			1*	2

Lycopersicon type			1	
Malvaceae			1	
Typha			1	
Polygonum			1	
Fern				2
Brassicaceae				1
Ilex			1	
Rhus			1	
Pinus (whole)	83	74	52	8
Pinus (pieces)	24	28	11	2
Populus			4	
Ostrya/Carpinus	1	2		
Salix	1	T	2	
Liquidambar	1	1	1	
Quercus	1	6	5	
Castanea		2		
Carya			1	
Unidentifiable	3	2	6	1

Calculated OCR DATE Report

For The Charleston Museum

03-May-96



Sample Id:	ACT # 1918		
Site Id #:	38 CH 97		
Location:	N130 E115		
Feature Type:	Cultural		
Feature Designation:	34		
Sample Recieved:	4/3/96		
Calculated OCR DATE:	38	YBP(1950)	+/- 1

Sample Id:	ACT # 1919		
Site Id #:	38 CH 97		
Location:	N130 E115		
Feature Type:	Cultural		
Feature Designation:	33		
Sample Recieved:	4/3/96		
Calculated OCR DATE:	77	YBP(1950)	+/- 2

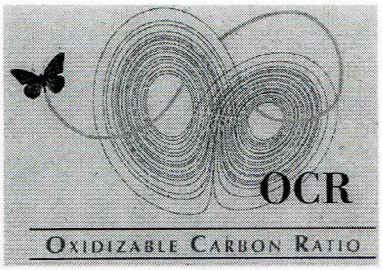
Sample Id:	ACT # 1920		
Site Id #:	38 CH 97		
Location:	N145 E120		
Feature Type:	Cultural		
Feature Designation:	24		
Sample Recieved:	4/3/96		
Calculated OCR DATE:	230	YBP(1950)	+/- 6

Sample Id:	ACT # 1921		
Site Id #:	38 CH 97		
Location:	N150 E111.5		
Feature Type:	Cultural		
Feature Designation:	ERIOR MIDDEN		
Sample Recieved:	4/3/96		
Calculated OCR DATE:	84	YBP(1950)	+/- 2

Calculated OCR DATE Report

For The Charleston Museum

03-May-96



Sample Id:	ACT # 1922		
Site Id #:	38 CH 97		
Location:	N140 E110		
Feature Type:	Cultural		
Feature Designation:	42		
Sample Recieved:	4/3/96		
Calculated OCR DATE:	110	YBP(1950)	+/- 3

Sample Id:	ACT # 1923		
Site Id #:	38 CH 97		
Location:	N150 E111.5		
Feature Type:	Cultural		
Feature Designation:	15		
Sample Recieved:	4/3/96		
Calculated OCR DATE:	233	YBP(1950)	+/- 6

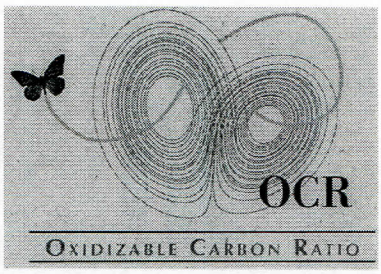
Sample Id:	ACT # 1924		
Site Id #:	38 CH 97		
Location:	N150 E111.5		
Feature Type:	Cultural		
Feature Designation:	25		
Sample Recieved:	4/3/96		
Calculated OCR DATE:	98	YBP(1950)	+/- 2

Sample Id:	ACT # 1925		
Site Id #:	38 CH 97		
Location:	N145 E115		
Feature Type:	Cultural		
Feature Designation:	21		
Sample Recieved:	4/3/96		
Calculated OCR DATE:	103	YBP(1950)	+/- 3

Calculated OCR DATE Report

For The Charleston Museum

03-May-96



Sample Id:	ACT # 1926		
Site Id #:	38 CH 97		
Location:	N140 E110		
Feature Type:	Cultural		
Feature Designation:	42		
Sample Recieved:	4/3/96		
Calculated OCR DATE:	99	YBP(1950)	+/- 2

Sample Id:	ACT # 1927		
Site Id #:	38 CH 97		
Location:	N115 E102		
Feature Type:	MRT Soil		
Feature Designation:	INAL GROUND		
Sample Recieved:	4/3/96		
Calculated OCR DATE:	250	YBP(1950)	

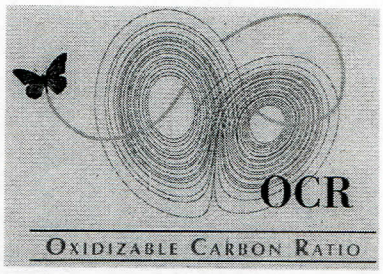
Sample Id:	ACT # 1928		
Site Id #:	38 CH 97		
Location:	N115 E118		
Feature Type:	Cultural		
Feature Designation:	HORSE STALL		
Sample Recieved:	4/3/96		
Calculated OCR DATE:	101	YBP(1950)	+/- 3

Sample Id:	ACT # 1929		
Site Id #:	38 CH 97		
Location:	N115 E115		
Feature Type:	Cultural		
Feature Designation:	ORSE STALL 2		
Sample Recieved:	4/3/96		
Calculated OCR DATE:	132	YBP(1950)	+/- 3

Calculated OCR DATE Report

For The Charleston Museum

03-May-96



Sample Id:	ACT # 1930		
Site Id #:	38 CH 97		
Location:	N125 E105		
Feature Type:	Cultural		
Feature Designation:	ONE 2 MIDDEN		
Sample Recieved:	4/3/96		
Calculated OCR DATE:	193	YBP(1950)	+/- 5

Sample Id:	ACT # 1931		
Site Id #:	38 CH 97		
Location:	N125 E105		
Feature Type:	Cultural		
Feature Designation:	ONE 3 MIDDEN		
Sample Recieved:	4/3/96		
Calculated OCR DATE:	256	YBP(1950)	+/- 7

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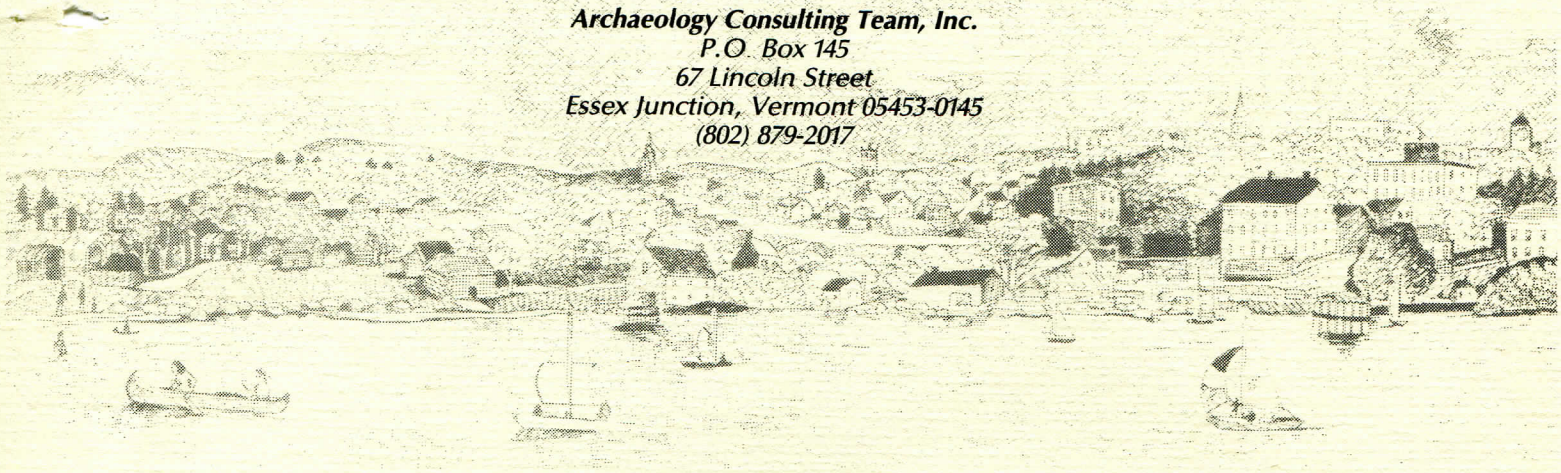

May 3, 1996

Ms. Martha Zierden
The Charsleston Museum
360 Meeting Street
Charleston, SC 29403

Dear Ms. Zierden:

Thank you for sending us the soil samples from the archaeological site 38-CH-97 for OCR_{DATE} analyses. These samples were received on April 3, 1996, in good condition. Prior to our analyses, we screened the samples through a 2mm-meshed screen to remove any cultural material. The coarse fraction including some cultural material was found in these samples, and is being returned to you for further study. The OCR_{DATE} analyses were conducted in accordance with the procedures outlined in:

Frink, D.
1992 *The Chemical Variability of Carbonized Organic Matter Through Time.* Archaeology of Eastern North America, Vol. 20:67-79.

using the data format and formula as presented in:

Frink, D.
1994 *The Oxidizable Carbon Ratio (OCR): A Proposed Solution to Some of the Problems Encountered with Radiocarbon Data.* North American Archaeologist. Vol.15 (#1).

The results of the OCR analyses for your samples are presented on the separate computer printouts. The bottom line OCR_{DATE} and the confidence interval have been rounded nearest year. Also, the expression of results has been adjusted to "years before present"—defined as 1950, to correspond with ^{14}C radiocarbon

data. For example, your sample from Feature 24 (ACT #1920) should read OCR_{DATE}: 230 ± 6 YBP (calendar date, 1720). Further rounding may be prudent (e.g., 230 ± 10 YBP).

I hope that the OCR_{DATE} data provided will be helpful in your evaluation of 38-CH-97. If you have further questions on the OCR procedure, please don't hesitate to give us a call. To aid us in improving this dating technique, we would appreciate it if you would send us information on how the OCR_{DATE} corresponds to other data classes for these samples.

Sincerely,

Douglas S. Frink