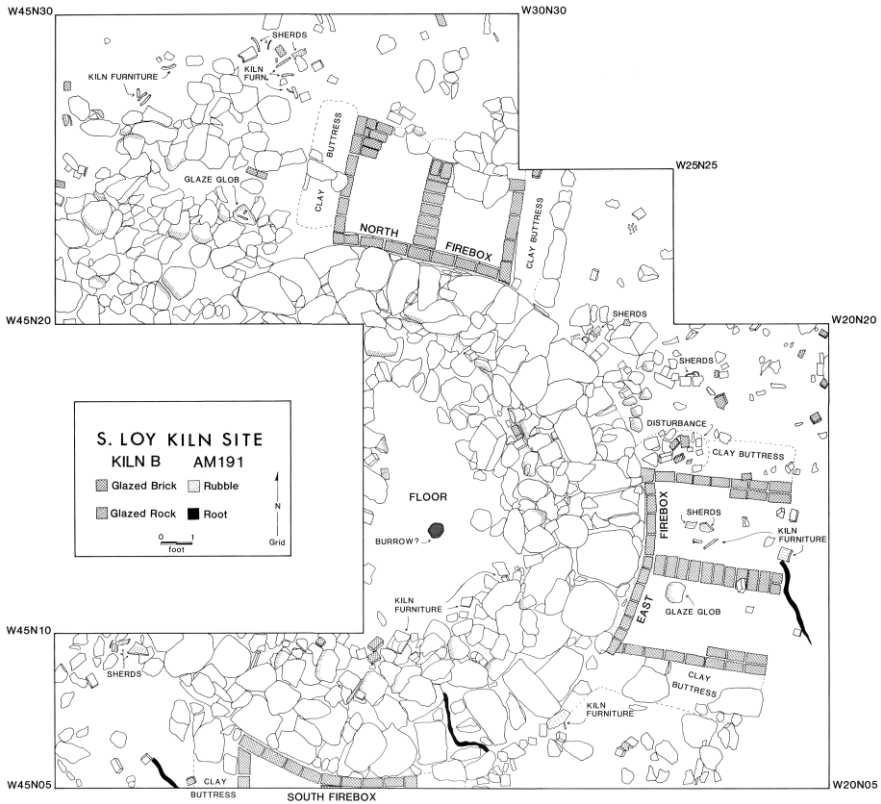


North Carolina Archaeology



North Carolina Archaeology

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NORTH CAROLINA'S REDWARE KILNS AND THE ART OF BURNING CLAY

by

Linda F. Carnes-McNaughton

Abstract

This paper summarizes archaeological investigations and historical research of North Carolina's redware pottery kilns. Temporal and regional variants of earthenware kilns are provided, along with interpretative information about the clay clans who operated these furnaces. Basic descriptive explanations of turning, glazing, and decorating redwares are given, and the methods by which these redwares were stacked, fired, and unloaded from the kilns are discussed. Drawing from discoveries made during the 1960s to 1980s and augmented by recent "rediscoveries" over the past two decades of North Carolina's backcountry redware production, this article lays the foundation for future research to document more fully these early craftsmen and their workshop sites, and to trace the traditions and continuity of this cottage industry through generational potters and communities across North Carolina.

A potter's kiln is an *abracadabra chamber* where raw wares, often glazed and sometimes decorated, are surrendered by the potter to undergo a metamorphosis by fire. Myriad pyrotechnic variables associated with this metamorphosis have for centuries caused potters great consternation, so much so that in some cultures clouds of superstition still surround the process. Whether the forces at work are natural or cultural, mysterious or powerful, the expectant potter confronts the unloading of a fired kiln with great anticipation and some trepidation. *Voila* moments come soon after a sealed furnace's door is opened, when the potter first peers inside to measure the magic in his or her pots. If the firing is successful, the creation process transforming raw clay to finished pot is complete. If the firing is disastrous, the magic is missing, the potter feels his or her efforts were futile, and the long process has failed.

Kilns

As the primary specialized structures used to burn raw wares to create pottery, kilns are designed with the final product in mind, be it

earthenware, stoneware, or porcelain ceramics. Thus, kilns are the most common and essential architectural feature on pottery production sites. They are by far the potter's most valuable piece of equipment. Differences in shape, size, proportion, method of air transfer, materials of construction, position on the landscape, fireboxes, and exits for exhaust are all critical components of the desired design of any kiln. These variables are directly related to the desired temperature and environmental control within the kiln chamber. Traditional kiln types found in America are categorized by how the heated air is transferred through the ware chamber during the firing process, the simplest being updraft and then crossdraft, followed by the more sophisticated downdraft models. Kilns designed for the firing of stoneware and porcelain bodies must be able to withstand intense heat (>2300 degrees F) and the subsequent expansion and contraction of the structural walls, floor, vault, and doorways. Kilns used for lower-fired earthenware must withstand some of these same factors, but to a lesser degree. So, for example, early earthenware was typically fired in a round or square updraft kiln with a centralized chimney exit, while higher-fired stoneware was successfully produced in downdraft kilns, sometimes equipped with detached, tall chimneys critical for exhaust. Each of these styles could have one or two exterior fireports around the perimeter, depending on its size. The rectangular groundhog kiln, a crossdraft design with the firebox located on the down slope and an integral chimney positioned on the upslope, could be adjusted to fire either earthenware or stoneware successfully, but was most often used for stoneware production in North Carolina. European prototypes have been documented for each of these kilns designs, and they were utilized by American potters with some regionally characteristic modifications.

Kilns were sometimes placed inside a potter's shop or shop annex, or as was often the case, they were placed outside away from the shop with a shed roof covering them to minimize the erosional effects of weathering. They might be positioned on flat ground or on a slope, depending on the type of kiln. Most groundhog kilns, for example, were built on a gentle slope and were semi-subterranean to take advantage of earthen buttressing and a cross draft flow of air. Construction materials ranged from handmade brick to local fieldstone, or a combination of both, which were sometimes reinforced with metal banding for structural support. The number of fireports and entryways varied according to kiln style. The number of ware chambers within a kiln was related to the type, height, and size of the furnace (i.e., tall-round bottle and beehive

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Figure 1. Illustration of a sixteenth-century kiln, from *The Three Books of the Potter's Art*, by Cipriano Piccalpasso of Durante, c. 1556.

kilns, or long-rectangular kilns) as well as the type of wares being fired (i.e., bisque versus glazed earthenware). And finally, the type of fuel used to burn the kiln was dependent on the regional natural resources available to a particular potter, whether it was wood or coal, and for later modern kilns, gas or oil. Given these many variables, it can easily be seen that through the course of history, many potters of the eighteenth and nineteenth centuries could envision kilns as structures which embodied organic, fire-breathing spirits, revered and feared for their power, mystery, and magic (Figure 1).

Wares, Glazes, and Slips

In order to better understand archaeological examples of earthenware kilns so far found in North Carolina, a brief explanation of the type of ware fired in these kilns, and the principles of production of these wares, is useful. For example, the term *earthenware* is used here to describe an encompassing array of low-fired utilitarian ceramics, often made of gray to tan to red, naturally-colored clay. Use of the term *redware*, common amongst early potters, is a vernacular name given to wheel-turned or pressed red-bodied earthenware, primarily tablewares, storage vessels and presentation pieces. The clays used to make earthenware pottery contain, in varying quantities, silica, alumina, and water, along with other minerals and impurities to a lesser degree, such as oxides of iron, manganese, calcium, sodium, potassium, and titanium. The red paste or red body of earthenware is created by the inclusion of iron minerals in the clay which, when fired, makes the paste reddish in color. Red clay exists nearly everywhere in the world, and based on ancient archaeological finds in Egypt, Greece, Italy, England and America, it appears that it has been used globally since the genesis of pottery production. Earthenware clays contain less silica and more impurities than stoneware or porcelain clays. These two variables directly affect the firing temperature (and thus the kiln design) and the process required to successfully produce a useful earthenware pot.

As seen in the chart in Figure 2, the physical properties of earthenware are mutually related to each other. For example, the red-to-orange color of the body is a result of iron and other mineral inclusions; the opacity (sometimes called the diaphaneity) of the clay is also related to its impurities; and the low firing temperature of 1800 degrees F is related to the nature of the clay body. The fact that earthenware pottery is permeable (or porous) means it must be glazed in order to hold liquids (as with storage containers). And consequently, the type of glaze used to coat these wares must be compatible with the firing and melting temperature of the clay, thus explaining the early and consistent use of low-melting lead glazes on earthenware ceramics made during colonial America (ca. 1700s) and into the early 1900s in North Carolina.

Finally, the fact that earthenware is low-fired and porous relates to how fragile it is even after firing, making the rate of breakage proportionally higher than that of utilitarian stonewares or the delicate

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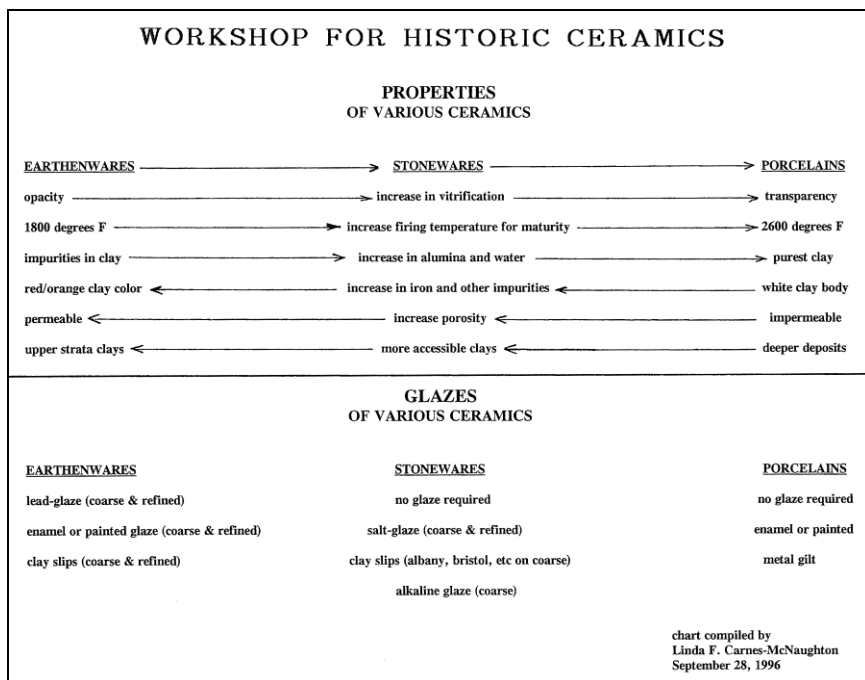


Figure 2. Chart of Physical Properties of Ceramics and Glazes. Created by Carnes-McNaughton.

porcelains which in colonial days were used sparingly by backcountry homesteaders. Despite their fragility and the presence of toxic lead glaze, earthenware vessels were used because they held heat well and excelled as baking and cooking containers. Also, because earthenware clays were readily available, these wares were much cheaper to manufacture than stoneware or porcelain wares whose clays were more difficult to locate and mine.

Lead glaze, as used on eighteenth and nineteenth century North Carolina earthenware, was made from lead ore often obtained by the potter through purchase or barter since it did not naturally occur in great quantities in the state. The lump ore had to be crushed in a stone mill and filtered or run through a sieve to remove inclusions before being mixed with water, clay slip, and other ingredients to render it useful. Greenware (slowly dried, unfired ware) was then dipped into this slurry, once or more, to produce an opaque coating which turned “glost” through the firing stage. Larger pots, too big for dipping, were coated by

swabbing or painting the glaze mixture onto the interior and/or exterior of the vessel, depending upon its intended use (e.g., milk crocks were often only glazed on the interior, while plate forms were sometimes glazed only on their top surface and not the underside). Formulas for lead glazing were well-kept secrets of the trade amongst potters and pottery families. Historical records from the state's Moravian potters indicate they preferred a formula of red lead ground and mixed with kaolin and flint. The kaolin (a high-grade, often white dense clay) was used to stiffen the glaze, preventing it from running or slipping from the clay surface. Although more typically found in European pottery workshops, the use of ground lead ore, once sifted, could be sprinkled on the pots to form a glassy coating (resulting in a "speckled" appearance) (Zug 1986:169). Other mineral oxides could be ground, sifted, and added to the lead glaze to obtain a desired color. Iron was used for brown tones and manganese for dark brown-purple hues. Most utilitarian lead-glazed earthenwares bear earthy warm tones of brown, ochre, yellow, orange, and red. Reduction firing of lead-glazed wares could often produce a dark olive green color (Zug 1986:4).

Utilized primarily for decorative purposes, colored slip clays were sometimes applied to outer or top surfaces of earthenwares and then sealed with a top coating of clear lead glaze, as commonly seen in eighteenth and nineteenth century redwares made in North Carolina. By definition, a slip is essentially a liquefied solution of clay and water. For an overall coating the slip was applied to the greenware or unfired earthenware body by dipping the vessel into the mixture, or by swabbing/painting the slurry onto the overall surface (like the surface of a plate to prepare it for decoration). When slip was used as a decorative element it was done by trailing the solution onto a pot or plate using a special container known as a slip cup which functioned much like a cake-icing applicator. Clays used for slips needed to be plastic (or malleable) but stiff enough not to run off the pot once applied. The water helped the clay to become plastic while it also reduced air bubbles. Silica in the clay, along with iron oxides, helped to reduce shrinkage of the slip and melted the paste or body components together during the firing process. The clay used for slips was pulverized or crushed and then mixed with water, and sometimes ground again to increase its fineness (Grigsby 1993:13).

Slip clays and lead glazes were colored by adding different minerals or other clays to the mixture before making the pot or decorating it with

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slip. For example, potter Hal E. Pugh (personal communication 2006) has described these known ingredients used for colorants as follows: kaolin to produce a white to cream to yellow glaze; red clay to produce a color similar to that made with iron oxide; iron oxide (cream to yellow to dark brown) to produce a yellow to green to amber glaze; copper oxide (light to dark green) to yield a green to black glaze; manganese oxide (purple to brown) to create a dark purple to purple-brown metallic glaze; and cobalt oxide (various shades of blue) to produce a bright blue to black glaze.

Once the slip was applied by use of a slip applicator (or “trailer”) made of horn, wood, pottery, or leather, and fitted with a hollow tube (such as a quill or reed), a lead glaze was then applied over the dried slip design before final firing. Sometimes the trailer held a single color of slip, but specially designed trailers of the eighteenth and nineteenth centuries held two or three colored slips in separate chambers, controlled by simple gravity feed or air flow through the nozzle. The trailed slip was allowed to dry before the final coating of lead glaze (sometimes clarified by adding arsenic) was applied to the finished piece (Grigsby 1993:16–19).

Other Old World decorative techniques found on lead-glazed earthenware, but not commonly used by North Carolina’s backcountry or Moravian potters, are marbling (or joggling), relief molding, combing, and sgraffito. Marbling is achieved by applying two or more colored slips onto a surface and then sharply twisting (or joggling) it to create abstract patterns on the surface of the vessel. Relief molding was done by pressing the clay into concave decorative molds (typically plate forms). This technique was popular in the northeastern United States and was used frequently in England, while only the Moravian potters of North Carolina used it for the production of flasks, figurines, sifters, and vases, often in zoomorphic designs. Combing, also known as feathering, was done by dragging a feather or stylus through two or more lines of semi-liquid slip of contrasting colors to produce abstract patterns. Finally, sgraffito (an Italian word meaning scratched) was accomplished by incising lines or patterns through an upper coating of slip to reveal a contrasting color (or darker) slip or clay body underneath (Grigsby 1993:62).

Loading the Kiln

After the manufacture of raw earthenware vessels, plain or decorated, glazed or unglazed, in myriad forms, the earthenware potter's next critical step of the process involved loading and burning the kiln. Loading, or charging an earthenware kiln, was a complicated chore (Comstock 1994:41–46). Positioning of the pots in the kiln required special knowledge, based on skill and experience, failures and successes. Loading a new kiln for the first time was perhaps the riskiest of all, since a potter could not be sure of the idiosyncrasies of heat and air transfer within the kiln's chamber (or chambers). Potters needed to know the hot and cool spots within the vault. It was important to know which pots required higher temperatures and which ones could bake with lower temperatures. The potter had to consider each pot's thickness, weight, dimensions, and shape in order to determine the best placement within the kiln. Large or heavy pieces were often placed on the kiln floor (usually on a bed of crushed quartz gravel to prevent sticking) and sometimes were inverted on their rims to provide better support. Specialized pieces of kiln furniture were made by the potter to be used in stacking smaller pieces into columns, called bungs, or to use as props to stabilize and separate larger pieces. Props, wads, spacers, and pugging coils are names for other types of hand-made kiln furniture, expediently made and used by the potter. To prevent sticking to other pots and the chamber floor, wares were sometimes coated in a grog mixture of quartz gravel and sand. The variety of kiln furniture found at a kiln site is known to reflect a potter's individual or idiosyncratic skills.

Tall-Chambered Kilns

In certain tall-chambered kilns (e.g., bottle kilns or hovel kilns and beehive kilns), stacks of pottery in graduated sizes (such as milk crocks, bowls, or jars) were nested (inverted on rims) within each other for firing. Large bowls and pancheon forms could be placed horizontally in a kiln, if space allowed, usually on shelves. An unglazed, container-like vessel called a sagger was another specially designed form of kiln furniture used primarily to stack plates, bowls, and tobacco pipes. Trivets, stilts, and pins (made of fire resistant clays) were used in conjunction with saggars to separate the plates or bowls to prevent them from melting together. Movement or slumping of any item in a kiln could mean disaster, especially if columns of wares fell into each other

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or “kissed” and stuck together. Customized saggars with special cut-outs to accommodate jug necks, handles, and shoulders were used to form columns, or bungs, of wares. Slip-decorated plates required particular care to fire successfully as they needed to be kept separate from other wares at all times to prevent their surface slip and glaze from running or bleeding onto other vessels and from sticking together. Historical examples of decorated plates also indicate that some were fired while being propped in a vertical position, against the chamber wall or against a kiln shelf.

Low-Vaulted Kilns

In low-vaulted kilns, such as a groundhog kiln, earthenware pots were rarely stacked. Instead, they were placed directly on the ware floor, with the tallest pieces in the center and shorter pieces ranging outward towards the walls in areas of decreasing slope. Kiln furniture is thus rarely found in association with groundhog kilns known to produce earthenware pottery (tobacco pipe saggars and pins being an exception).

Firing the Kiln

Once the kiln was loaded, the entryway was bricked up and sealed with a mud of clay or lime mortar before the firing ports were fueled. Depending on the type of kiln, firing ports ranged in number from one to several, each requiring maintenance and monitoring during the burning process. While a potter would sometimes hire extra labor to assist with firing, the size of the kiln was a direct reflection of the workforce. A single potter, who worked part-time as a farmer, would not have required a large kiln, while more commercial endeavors or shops with multiple potters may have needed a large kiln or multiple ones. Capacity of the kiln was measured in gallonage and varied greatly depending on its shape (e.g., round, square, or rectangular). An average groundhog kiln held about three to four hundred gallons of ware, whereas an updraft round kiln may have averaged about 600–1000 gallons of stackable pots (Comstock 1994:44). In eighteenth and nineteenth century North Carolina, the most predominant source of fuel used in these kilns was local wood. Wood, which had to be harvested from surrounding forests and cut into proper lengths for stoking the firebox (which also regulated the size of the wood slabs) was another labor-intensive chore associated with pottery-making enterprises. Availability of fuel factored directly into the size of a kiln, since a potter without wood on his land had to buy

or barter for a supply source. Estimates of fuel needed to fire a kiln to the maximum temperature required (for earthenwares an average of 1800 degrees F) was based on a potter's experience and skill. But a variety of factors also played a part in controlling the temperature and timing of the burn, and subsequently the cooling down of the kiln in order to prevent cracking or structural damage or worse, vault collapse.

To draw off the moisture from the pots loaded in the kiln, the potter initiated a slow fire. This also served to gradually heat up the kiln structure to eliminate thermal shock or stress. In order for the water, in the form of steam, to escape the pots and the kiln chamber, the firing ports were left open and after some time, the temperature was gradually increased. During the firing process, the earthenware pots are literally melted as they go through a sequence of physical and chemical alterations determined by the amount of silica, alumina, iron oxide, and other impurities in the clay (Rhodes 1968:153–188). Monitoring the firing process was a challenging task for the potter and kiln workers. For earthenware, which has less silica but more impurities than stoneware, the shrinkage rate is reduced. Small pieces of broken ware were often fashioned into tag-shaped chips, sometimes perforated with a hole, to use as testers. These were called draw-trials or draw-tiles, and could be placed in the kiln before firing, then drawn (extracted) out a fire port or peek hole via an iron rod run through the perforation. These testers served a similar function as today's pyrotechnic cones used to measure the conditions inside the kiln during firing (for clay body as well as glaze requirements).

For colonial-period earthenware potters, the time required to properly fire a kiln-load of wares was based on visual cues, tester trials, experience, and judgment. The burning time also depended on the size of the kiln, the amount and type of wares being baked, the efficiency of the fuel and ultimately the weather. Eugene Comstock, reporting on earthenware kilns of the Shenandoah Valley, states that, "Earthenwares had the shortest cycle, 20 to 25 hours, and the fires, usually fueled with oak, were kept in the lower holes for about 15 hours" (Comstock 1994:45). Hardwood fires were later stoked with pine which burned quicker and hotter, until the desired temperatures were reached at about 1800 degrees Fahrenheit. Once the burning cycle was completed the kiln was allowed to cool down gradually, again to minimize thermal shock to the structure as well as to its contents. This took another two to three days. For the potter, the period of waiting for the kiln to cool was

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fraught with anticipation, assessment, anxiety, and, moreover, exhaustion. Burning the kiln provided a “natural periodicity to pottery making, a time when one cycle was ending and another had not yet begun” (Rhodes 1968:190). Even for the experienced potter, where anxiety gives way to confidence or indifference, the suspense remains when opening the kiln. For the backcountry potters of early North Carolina, understanding the diverse ways that fire produces pottery was an art in itself.

North Carolina Kiln Sites

From the eighteenth to the early twentieth century, kiln building in North Carolina was a folk tradition primarily distilled from Old World influences passed along by generations of potters. Kiln building was a conservative exploit where the size, shape, and design of the kiln reflected the experience of the builder (often the potter) and the period customs of the cultural community it served. Through the collaborative efforts of archaeologists, historians, folklorists, collectors, descendant groups, and ceramic enthusiasts, several early pottery kiln sites have been identified and a few excavated or tested in North Carolina during the past thirty years. Archaeologically, these specialized craft sites are most often recognized by evidence of structural remnants of the kilns and by waster piles of broken, discarded vessels. The archaeological potential of a pottery manufacturing site depends on several factors. For example, how large was the operation? Did it have multiple kilns? How long did it last? What are the post-depositional factors (natural and cultural) which have impacted the site? Did the waster pile(s) get hauled away to be used in roadways or spread into adjacent ravines or gulleys for fill? Did the kiln(s) collapse or get razed? Has the site been graded or landscaped for other construction purposes? In some cases, pottery manufacturing sites, their kiln remains, and waster piles have become the target of collectors in search of whole or intact pots that may have been discarded by the potter because of some firing or glaze flaw or cracking. Some collectors have gone so far as to become vandals as they randomly dig potholes into archaeological features seeking a stamped or signed handle, shoulder, or body sherd to “enrich” their own collections, or to market sherds to other collectors as the next best thing to whole pots. Joseph et al. have pointed out in their discussion on the loss of Georgia folk pottery sites that, “While there are no statistics on the number of waster dumps which have been impacted by vandalism, the percentage is undoubtedly high” (Joseph et al. 2004:125).

In 2005, the author gave a compendium paper at the annual meeting of the Southeastern Archaeological Conference that summarized the archaeological research of pottery sites in North Carolina (Carnes-McNaughton 2005). The purpose of the paper was to assess what has been learned through archaeological research of these specialized craft sites and to make recommendations for future research and preservation. As part of that discussion, it was stated that a total of 45 pottery sites (for earthenware and stoneware production) have been archaeologically documented throughout various regions of the state, assigned a state site number, and had their completed site data logged in the archives. Of those 45 sites, only a handful have received scientific study by professional archaeologists, while another small group have been tested and their locations verified by site visits and documentation. This small number, less than one percent if one considers local estimates of over 500 sites statewide, represents only a glimpse of what can be learned from these valuable historic resources. Moreover, a recent public exhibition hosted at the North Carolina Pottery Center in Seagrove, North Carolina, called “Slipped, Dipped and Dotted: Eighteenth to Twenty-first Century North Carolina Earthenwares,” (curated by Linda Carnes-McNaughton and modern potters Hal E. Pugh, Eleanor Minnock-Pugh, and David and Mary Farrell) produced a summary of research on backcountry earthenware potters. The names of 58 potters at work during this time, living and operating outside of the well-known Moravian tradition with its dozens of potters (masters, journeymen and apprentices combined), were identified. This list is likely to grow substantially as research into clay clans and Piedmont potters continues.

Recorded earthenware and stoneware sites in the state are clustered in 13 central counties in the Piedmont and Mountain regions of the state. Several clusters of sites were identified as the result of systematic county-wide survey projects (Buncombe, Alamance, Chatham, Catawba, and Randolph counties) while others were the result of individual discoveries (Davie, Cleveland, and Lee counties), inadvertent finds from construction sites (Cumberland County), or targeted historical research projects (Person, Moore, Lincoln, and Forsyth counties). For this article on earthenware kilns, 12 of these sites will be described. Of this small but elite group, four sites have received complete archaeological excavation (and site analysis) and include the Krause-Butner site, the Shepherd Mountain site (Philip Jacob Myer), the Daniel Seagle site, and the Solomon Loy site. Two sites are undergoing periodic excavation (the William Dennis site and the Heinrich Schaffner site), while the

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remaining six sites have only received limited testing or surface reconnaissance and mapping (the John Phillips-Joseph Loy site, the Thomas Dennis site, the David Hockett site, the William F. James site, and two sites of possible Loy family association. These “dirty dozen” sites hold vast and valuable information about the production of earthenware pottery in North Carolina’s early backcountry.

Undoubtedly, dozens (if not scores) of other earthenware pottery sites now await further discovery, documentation, and where possible, scientific excavation. That a select few of these sites can be preserved for future generations interested in North Carolina’s rich and long pottery heritage should be a straightforward, achievable goal through education, enrichment, and protective purchasing of the properties on which they are located.

Kiln Sites That Have Received Limited Investigation

Six of the earthenware pottery sites, whose locations were verified and subsequently mapped, have been recorded in the state archives, and have received only partial archaeological testing or none at all. Since these sites will be most briefly described, we will start with them. The name given to each site is associated with an historical reference to a particular potter. The site number, as recorded in the state site files, is provided for each one.

Thomas Dennis Kiln Site (31RD982)

The Thomas Dennis site (31RD982) was discovered by Hal E. Pugh in the early 1970s (reported in 1988) during a survey of potters in Randolph County. In addition to this site, he has recorded five other kiln/shop sites including the William Dennis site (31RD981), the Nathan Dicks site (31RD983), the first J.M. Hays site (31RD984), the David Hockett site (31RD985), and the second J.M. Hays Site (31RD986) (Pugh 1986). Since then, Hal E. Pugh and Eleanor-Minnock Pugh have identified and studied several more pottery sites all associated with an historic Quaker community in the vicinity of New Salem in Randolph County. Since the two Dennis sites and the Hockett site have received additional archaeological research they will be mentioned here as well.

Thomas Dennis was the son of William Dennis, whose father was also named Thomas Dennis (III), representing three generations of potters. Thomas’s (the son) pottery site was surface collected by the

Pughs on several occasions and produced earthenware sherds and kiln furniture, thus indicating a manufacturing site. Examples of the wares generated at this site reflect strong similarities to the work of Thomas's father, William Dennis, produced at site 31RD981. Large pieces of plate sagers were recovered there, along with elaborately slip-trailed decorated plate fragments, some with a dark brown slip undercoating. Replicas of these decorated plates have been reproduced by the Pughs at their New Salem Pottery. An early whole vessel form was also found at this site which revealed unusual rim design as if it were done by two sets of hands, leading one to speculate that an adult and child were working side by side on this cylindrical jar form. Thomas Dennis apparently left the pottery trade in North Carolina and relocated to Indiana in 1821, along with other members of his family (Pugh 1986:7). While this site has not yet been tested to reveal direct evidence of a remnant kiln structure, it is nonetheless valuable given its association with multiple generations of Dennis family potters. Thomas Dennis's products reflect the region's Quaker tradition of slip-trailed decorated lead-glazed earthenware pottery, which was most likely fired in square updraft kilns (as revealed at the William Dennis and David Hockett kiln sites).

David Franklin Hockett Kiln Site (31RD985)

A partially standing kiln, seen in Figure 3, remains at the David Franklin Hockett site (31RD985) near New Salem. Historical records indicate that this pottery shop and kiln was operated in the 1870s–1920s period (Pugh n.d.). This kiln site was discovered by Hal E. Pugh and W. Calvin Hinshaw in 1987. Local tradition suggests that it stood fairly intact until 1955 when the upper portion collapsed inward. The kiln measures approximately 10.2 ft by 10.0 ft square, is constructed of local field stone (a type of schist with high talc content), has an interior lining made of hand-pressed brick, and tapers upward to a height of about six feet on its corners. It was built into an embankment and the front sides are buttressed with clay packed behind a stone wall extending out perpendicular from the front two corners about three feet each way, making the front wall width almost 17 ft across. The central stoke hole is positioned below the interior floor on the front wall, and is partially collapsed but measures 1.3 ft wide and 1.2 ft in height from the floor of the firebox. The interior lining at the entranceway suggests that it was

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Figure 3. The David Hockett kiln ruins in Randolph County. Photograph by Carnes-McNaughton.

once arched. Exterior wall thickness is estimated to be about two feet, though no interior measurements could be safely recorded. Using a flashlight, the interior was examined from the front portal, and it did not exhibit any obvious glaze residue on the brick liner. The interior liner appeared to have been domed and fitted with a top chimney for heat exhaust (but now caved in). From the exterior, its design and foundation closely resemble a nineteenth century iron furnace, like those seen in western North Carolina. Local informants recall its original height to be about 10 ft. The slightly subterranean opening (in the lower front wall of the kiln) was used to access the chamber for loading and unloading, and also served as the single firebox for this simple updraft kiln.

David Franklin Hockett (b. 1848 – d. 1926) made extruded, unglazed agricultural tiles (of earthenware) in this kiln along with a limited line of lead-glazed earthenware vessels. During one site visit, unglazed extruded drain tile fragments were surface collected, along with a brick and one lead-glazed earthenware sherd. Although no archaeological work has been done on this kiln site to further reveal its architectural features, the discovery of this square kiln is important in substantiating the unique square-shaped kilns associated with the New

Salem Quaker pottery tradition (see discussion of the William Dennis site below), a kiln-type previously unrecorded at any other North Carolina pottery sites.

William Franklin James Kiln Site (31DE170)

The William Franklin James (or W. F. James) pottery site (31DE170) in Davie County was recorded by Steve Compton in 2000. Located near the village of Farmington, this was the operation of William Franklin James who was known as “Potter Bill,” and perhaps before him by his father, potter William Alexander James (Compton 2000). Based on a circa 1920 photograph of Potter Bill standing beside his earthenware kiln, the structure appears to have been made of local fieldstone, perhaps lined with more thermally-tolerant brick, with a single access point to its interior in the lower portion of the front wall. Pieces of wood cover the top opening or chimney which is situated directly above the access hole and firebox. This suggests that it is an updraft kiln. Its overall shape, whether square or rectangular, cannot be determined from this image. It also appears to be positioned on a slight rise or knoll, and is buttressed on each side by soil. Its elevated position from the surface of the ground may have served to shed rain water away from the foundation walls of the furnace. Compton’s research revealed several interesting connections between the James family potters and area Quaker potters. Compton posits that William Alexander James was influenced by neighboring Quaker potters when he lived in Surry County (future Yadkin County), prior to his move into Davie County during the 1840s era (Compton 2000).

If not Quaker-influenced, William Alexander James may have been Moravian trained, perhaps by Heinrich Schaffner (whose kiln is currently undergoing excavation by Old Salem archaeologists). Compton suggests that William Alexander James could have been apprenticed to Heinrich Schaffner before subsequently passing along the earthenware technology to his son, W. F. James. Vessel forms and glazes exhibit striking similarities to some late Moravian wares, and local history has long suggested a possible relationship between these two sets of potters (Compton 2000). As such, this site may represent the expanded influence of the Moravian pottery traditions to other counties and potters in the nineteenth century Carolina backcountry. Earthenware produced at this site also testifies to the continued production and use of these low-fired ceramic vessels well into the mid and late nineteenth century era,

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surpassing the period of transition by stoneware pottery which had eclipsed the market by the early 1830s.

Solomon Loy Kiln Sites (31AM191 and 31AM192)

The final three locations in this category of unexcavated earthenware manufacturing kiln sites are associated with the Loy family of potters, and are grouped together for this reason. The first site, located in Alamance County (in a zone that was part of Chatham County prior to 1897), is site 31AM192 discovered in 1985 during a county-wide survey project conducted by the Research Laboratories of Anthropology at the University of North Carolina (Carnes 1986). The four-week survey resulted in the discovery of seven new pottery sites which were subsequently recorded on state site forms and archived. This site, located in the middle of a large pasture, was evidenced by a large mound of rubble from which several large trees extended skyward. Situated less than a quarter mile from the known location of the first Solomon Loy site, this site was known by local landowners as an “early crockery” field. Permission was gained to allow archaeologists to dig two test trenches into the mound. The author reported on the results of these test trenches in 1986, and in her dissertation in 1997, from which the following descriptions are drawn (Carnes 1997:147–149).

The test trenches excavated at 31AM192 were intriguing, not because of the structural information they provided, but because of the artifacts discovered during this work. The suspected kiln site, a mounded feature, appeared to be roughly circular and covered with large stones and mature trees. It measured almost 21 ft in diameter and about four feet higher than the surrounding terrain. The extensive network of tree roots made excavation of the trenches extremely difficult. One 3 ft by 4 ft test trench was excavated in the northeast quadrant of the rubble mound. Numerous large fieldstones were encountered, but none appeared to be *in situ* kiln foundations. A single handmade brick was found along with several unglazed and lead-glazed earthenware sherds. Work in this unit was eventually abandoned due to thick tree roots.

A second trench measuring 2 ft by 4 ft was then excavated in the northwest quadrant of the mound. This test unit produced more earthenware sherds, glazed and unglazed, as well as kiln furniture. Ribbed, extruded handles were recovered along with a heavily glazed slab (perhaps a shelf used as kiln furniture), and rims and bases of

several straight-sided, unglazed earthenware crocks. Lead-glazed earthenware sherds in a variety of earthy tones were found in addition to five slip-trailed decorated plate rims. The rim profiles, vessel forms, and glaze colors of these artifacts virtually matched those found at 31AM191, known as the Solomon Loy Site, where later excavations on one kiln yielded identical straight-sided earthenware crocks and glaze patterns. Interestingly, of the 497 artifacts excavated from the two test trenches, all were earthenware, and not a single sherd of stoneware was found. This finding certainly suggested that this kiln site pre-dated the popularity of stoneware production in this area, and/or may have been used exclusively for the manufacture of earthenware pottery. Given the glazed fieldstone rubble and evidence of kiln furniture and lead glaze residue found there leaves little doubt that a kiln once stood on this location. The footprint suggests it was a circular kiln, but perhaps not well-built or too small to properly fire the potter's expanding repertoire of vessel forms. It could be that this was reason enough to abandon this furnace and build another, larger kiln nearby. The undeniable similarities of kiln furniture (shelf and prop pieces) and the earthenware sherds (in form and decoration) recovered from 31AM192 and 31AM191 make a convincing argument that Solomon Loy was the potter at both sites. The overall absence of stoneware sherds or related kiln furniture from 31AM192 indicates that this site pre-dated 31AM191 and may have been Solomon Loy's first kiln (Carnes 1997:149).

During on-going research of the Solomon Loy kiln sites, several local landowners were interviewed to gain knowledge of other possible Loy family kilns in the Snow Camp area of southern Alamance County (formerly a portion of Chatham). Stoneware kiln sites for at least four Loy descendants (John, Will, Albert, and Mebane Loy) were found, mapped, and recorded in the 1986 survey. Two of these furnaces were groundhog kilns (Carnes 1986).

Joseph A. Loy Kiln Site (31PR59)

Finding another Loy-related earthenware site in distant Person County, 40 mi to the north of the Alamance County sites, was a research bonus. The Joseph A. Loy pottery site (31PR59) was discovered through the diligent efforts of his descendants, Allen and Hugh Campbell from Blacksburg, Virginia. Joseph Loy (b. 1812 – d. 1861) was the younger brother of Solomon Loy, one of several who were potters during the early to mid-1800s (including brothers John and Jeremiah; see Figure

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15). Allen Campbell is the great-granddaughter of Joseph Loy and granddaughter of George Haywood Loy, Joseph's son who also became an earthenware and stoneware potter. Joseph's wife was Sarah Tapley Phillips (b. 1813 – d. 1888), who descended from another clay clan, the Phillips (see note below).

In 1992, using family records, property plats, maps, and interviews of local residents, the Campbells were able to locate what they believed to be the homeplace of George Haywood Loy near the Hurdle Mills community in Person County (Campbell and Campbell 1992). After initial contact with the author at a public lecture on research conducted at the Solomon Loy site, the Campbells returned to Person County, and in a large, open, cultivated field south of Alderidge Creek, began a surface inspection. They then sent a photograph of their sherd harvest to me, which led to an on-site meeting of the parties. With the property owner's permission, plans were made to test the site in-between crop plantings. With a team of volunteers and a magnetometer in tow, a one-day test project was designed and then implemented in March 1993. The magnetometer, a specialized fluxgate gradiometer model from Britain, was designed to identify kiln/furnace features. This one was owned and operated by the late Tom Hargrove, a specialist in geophysical studies of archaeological sites, who was eager to try it out on a kiln.

Based on the densest sherd concentration noted by the Campbells during their surface reconnaissance, a datum point was established and a survey grid was put in place. The magnetometer was used to detect anomalies to determine where test units would be placed. Results of the magnetometer were somewhat ambiguous since the signals targeted every object of fired clay (e.g., sherds and kiln furniture) encountered. Using pin flags to mark locations of "hits," or areas of thermally-altered (burned) soil or objects, the team moved across the hilltop, systematically excavating small test units to expose the magnetometer's findings. By day's end, 15 2 x 2-ft units and one expanded 5 x 5-ft unit were excavated to below the modern plowzone layer. In two units, portions of a large stone foundation were exposed about eighteen inches below the surface. Given the alignment of the stones and evidence of glaze residue in the feature, it appeared to be one wall of a kiln. Although the kiln wall was only partially exposed by the test unit excavations, recovered artifacts suggest that it was an updraft furnace used to burn lead-glazed earthenware. Its comparative data remains limited at this time (Carnes-McNaughton 1997:150–151).

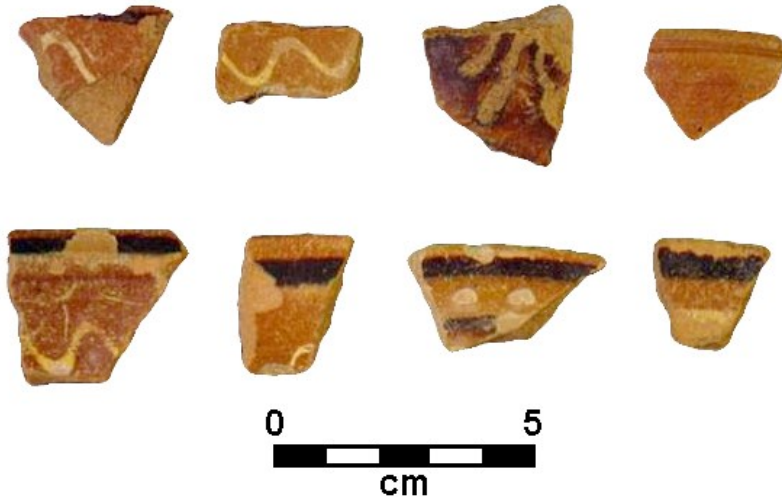


Figure 4. Sample of artifacts recovered from excavations at the Joseph A. Loy Site. Photograph by Carnes-McNaughton.

Among the artifacts excavated from this site were numerous green-colored (copper-oxide), slip-trailed decorated, lead-glazed earthenware sherds representing cups, large pitchers, baluster candlesticks, and plates, examples of which are shown in Figure 4. Hand-formed clay marbles were found, in addition to several glazed and unglazed pieces of kiln furniture (e.g., slabs/shelves, clay wads, and separators). Domestic-related materials, such as creamware (a refined earthenware imported from Britain) fragments, spun-back metal “coin” buttons, dark green wine bottle glass, and wrought iron nails, suggest an early date for this site (ca. 1790s to 1820s). One creamware plate fragment marked “B B & I” was identified as Baker, Bevans, and Irwin, a pottery manufacturer from Glamorgan in Swansea, Wales, and dated to 1813–1838. The absence of stoneware sherds at this pottery site also indicates a pre-1820s period of production (Carnes-McNaughton 1997:151).

Given the apparent early date of operation for this site, bolstered by archaeological and historic evidence, it appears that this site was owned and operated by Joseph Loy as an earthenware production site from ca. 1820s to 1850s. His sons, George Haywood and John Henry, may have briefly worked here as well, where they would have learned the earthenware trade. One slip-trailed decorated, lead-glazed earthenware

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plate stamped "G H Loy" was photographed in a private collection, testifying to his success as an earthenware potter. Several other salt-glazed stoneware crocks have also been documented, further indicating his later success at production of this ceramic type. Joseph died in 1861, but pottery production at this location appears to have ceased long before his death.

Additional research has been undertaken by other Loy descendants and Steve Compton since this testing project was completed. Compton, utilizing primary data gathered by the Campbells in 1992, continued to connect the dots of lineage between this branch of Loys and the Phillips family, earlier of Alamance County (Compton 2001). Compton identified Sarah Loy's father, John Phillips, as a potter operating in Person County, possibly as early as 1794, and by 1820 he is listed as a potter in the census. Benjamin Phillips, Sarah's half brother, the son of John Phillips, and, as seems to be the case, his first wife, Nancy Cooper Phillips, is listed as a potter in 1820 in this county (Compton 2001:5). Compton suggests that Joseph and Sarah settled on land provided by John Phillips, his father-in-law, which was later expanded by the addition of another 100 acres in 1833. According to the Campbells' 1992 research, Joseph and Sarah Loy's middle son, George Haywood, was given the land containing Joseph's kiln (and home site) by his mother in 1866, five years after his father's death. The Loys' son, John Henry, eventually moved back to Alamance County to do potting, but was wounded at Fredericksburg in 1862 and died of his wounds in January 1863.

Intriguing new research has recently come to light by way of another Loy family descendant, Barry Loy of Wenham, Virginia, who traces his ancestry down from Solomon Loy's sister, Mary Lou (or Polly) Loy (b. 1800) (Loy 2006–2007). Polly gave birth to an illegitimate son, whom she named William Henry Loy, who was Barry's great-great-grandfather. In a sworn oath filed in Orange County in 1827, Polly identified the father of her illegitimate son as Baalem Williams, a known acquaintance of Solomon Loy and his brothers, William, John A. and nephew George Haywood Loy, who was likely associated with the pottery industry himself.

Barry Loy has discovered correspondence between George Haywood Loy (in Person County) and his uncle, John A. Loy, who was potting at the time in Alamance County. The letter, dated June 1863, is

fascinating for many reasons. In the contents, G. H. Loy discusses his return to “pottering” because severe rains have destroyed his crops and he must make money. He asks his uncle for information about “glazing with copper and how to mix it,” and requests that he send the formula soon so he can “glaze some greenware in the kiln that is nearly ready to burn.” This clearly suggests that he is still firing earthenware pots, along with his stoneware, since only low-fired earthenware can be glazed with copper oxide (to produce green-tinted, lead-glazed ware). The 1863 letter makes reference to a special burial sermon to be delivered soon for “Father and Brother preached on the fifth of August” — a reference to his father, Joseph A. Loy, who died in 1861, and his recently departed brother, John Henry, who died in the Civil War in early 1863.

Since the purpose of this article is to discuss the archaeological evidence of earthenware kilns, exploring additional Loy connections to the pottery industry will continue, but for more information see Hunter and Beckerdite (2010). The Joseph A. Loy pottery site remains a target for future exploration, pending the owner’s permission, and provided that continued agricultural operations do not destroy the subsurface features. To learn if Joseph fired a round, square, or rectangular updraft kiln is a viable and important research question which needs to be answered.

Henry Loy/Jacob Albright Kiln Site (31AM278)

The last of the six kiln sites described in this section is another Alamance County earthenware site believed to be associated with the Loy family of potters. Referred to by its state site number 31AM278, this site was discovered in 1998 by Mr. Whitey Graham, an avocational archaeologist, while surface collecting for prehistoric artifacts. Located about eight miles north of the Snow Camp community (and the two Solomon Loy kiln sites), the site is situated in a cultivated field, not far from a spring head. Graham brought unglazed and lead-glazed earthenware sherds, along with some kiln furniture, to archaeologists’ attention at the Research Laboratories of Archaeology at the University of North Carolina, who in turn contacted the author to schedule a site visit. Permission was obtained from the property owner to conduct a systematic surface collection, again between cultivation cycles, and to map the site. The systematic inspection produced hundreds of lead-glazed earthenware sherds (some of which were slip-trailed decorated), abundant kiln furniture (mostly stacking shelves or slabs), and some datable European ceramics (creamwares) along with dark green wine

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Figure 5. Sample of slip-trailed decorated sherds from site 31AM278. Photograph by Carnes-McNaughton.

bottle glass (all of which help to date the site). As seen in Figure 5, these artifacts not only testify to the presence of an earthenware kiln below the surface and a pottery operation dating from the late 1700s to early 1800s, but they also reflect the successful hand of a skilled potter familiar with slip-trailed decoration.

Subsequent historical research into property deeds and land records yielded a few clues as to who this potter was, with the closest associations being the Albright, Russell, and Loy families. It is known that Henry Loy (b. 1777 – d. 1832), the father of potters Solomon, John A., Jeremiah, and Joseph A. Loy (see Figure 15), was a potter trained in the earthenware tradition who married into the Albright family in 1796 by his marriage to Sophia, the daughter of Jacob Albright and Sally Wolf (Carnes-McNaughton 1997:95–102). Members of the Wolf family, like the Phillips family, were potters who intermarried with the Loys. The Albrights became prominent land owners in St. Asaphs' District of the new frontier in what was Orange County at that time. Henry and

Sophia's son, Jeremiah, married into the Holt family, another prominent and eventually prosperous clan, by his marriage to Anna Holt in 1838 (Carnes-McNaughton 1997:98). That Henry may have joined in the pottery-making business with his father-in-law, Jacob Albright, is strongly suggested by family records; partnerships like this were common practice in the day of clay clans. Deed records indicate that portions of this tract were once owned by Jacob Albright (1778), then Joseph Albright, and then Andrew Albright (1815). An 1803 deed listed another portion of the tract as owned by Martin Hurdle during a period when this area was part of Orange County. Later deeds, from the early 1900s, list a Milton Loy as partial owner. The site is, in fact, situated in what is now known as Albright Township. The land transferred to the Russell family by 1875 and then descended through that family to the current owners, long after anyone living had a memory of the pottery shop that once existed on this tract. While direct evidence of Henry Loy owning and operating this shop cannot be presently teased out of the current land records, a comparison of the artifacts from this site and other Loy sites offer promising clues. Stylistic similarities of the decorative slip-trailed motifs and the vessel profiles to those found at the Solomon Loy sites (31AM192 and 31AM191) suggest this as the site of Henry Loy's early shop. To date, no excavation or testing has been conducted to locate the kiln foundation, which was more than likely an updraft furnace. Future work at this site remains important to understanding the Loy family's pottery genesis in North Carolina (also see Hunter and Beckerdite [2010] for more information on the St. Asaphs' pottery tradition).

Kiln Sites Undergoing Periodic Investigation

Two earthenware kiln sites undergoing periodic excavations will now be considered. One is the William Dennis site (31RD981) in the Quaker community of New Salem, Randolph County, and the other is the Heinrich Schaffner site (also known as the Schaffner-Krause site; Daniel Krause was a potter who assumed operation after Schaffner's death in 1877) in the Moravian community of Salem in Forsyth County (Hartley 2005). Old Salem archaeologist Michael Hartley (2009) has written on the details of the Moravian potters and their wares, so only a brief description of the Heinrich (Henry) Schaffner kiln site will be offered here for comparative purposes. This is one of three kilns discussed in this article which is associated with the enclave of Moravian potters of Forsyth County (the others are the Krause-Butner kiln and the Philip

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Jacob Meyer kiln) where more than 40 potters, masters, journeymen, and apprentices worked for more than 150 years (Bivins 1972:45–72).

*Schaffner-Krause Kiln Site (31FY395*81*55)*

Work began on the Schaffner-Krause kiln site in 1999 as a field school project of the Old Salem Department of Archaeology, under the direction of archaeologist Michael Hartley. Historical data indicate that Swiss-born Schaffner arrived from Germany in 1833 and by the next year was given permission to set up a pottery shop in the Builder's House on Lot 81 after a brief partnership with John Holland which lasted only a few months (Hartley 2005:10–11). Schaffner, having been trained as a potter in Germany, built what appears to be a modified version of a rectangular-shaped German Cassel kiln, although archaeological work may reveal more architectural details of this furnace. A Cassel kiln, as described by Daniel Rhodes (1968), functions as a crossdraft furnace, with a firebox at one end and an exhaust chimney at the other end of a rectangular foundation. Zug has drawn architectural parallels between the Cassel kiln of German origin and the alkaline-glazing stoneware groundhog kilns of the western mountain and valley region of North Carolina. He further draws similarities between the salt-glazing stoneware groundhogs kilns used in the eastern piedmont region of North Carolina to the Newcastle kiln of English origin, a design cousin to the Cassel kiln (distinctions being loading door placement, stoke hole placement, height of the vault, and position on the landscape) (Zug 1986:223–224).

Apparently, the Schaffner kiln, later used by Krause until the late 1890s, stood on the lot until the early 1900s. Excavations at the site have now revealed the foundation remains of a dry house, the shop ruins, a well, and the footprint of a rectangular kiln measuring 14 ft long by 5 ft wide, not including the firebox end. The kiln foundation is composed of local field stone and is lined with handmade bricks. Artifacts from the site indicate a wide variety of utilitarian lead-glazed earthenwares were produced there, only a few of which were slip-trailed decorated. Kiln furniture, tobacco pipe heads, and potters' tools were also recovered along with press-molded tablewares, imitative of European creamwares, decorated with applied sprigs or molded relief (Hartley 2005:14–32). The importance of this kiln site cannot be underestimated. As only the second furnace thus far found in this unique Moravian pottery tradition (the other being the Krause-Butner kiln), information about it adds

greatly to the understanding of direct Old World influences on kiln styles in North Carolina, including those in the non-Moravian backcountry settlements.

William Dennis Kiln Site (31RD981)

The second kiln to have undergone periodic excavation is the site of the William Dennis pottery, located in the Quaker community of New Salem and on property owned by Hal E. Pugh and Eleanor Minnock-Pugh. The site was discovered by Pugh during installation of a garden plot in the early 1970s. Over the next decade the Pughs surface-collected the site several times, primarily during cultivation activities, and began historical research to identify the former potter. Just uphill from the site they discovered what appeared to be the homeplace associated with this pottery kiln, both situated along an old roadbed, now recognized as a remnant of a colonial period trading path which crossed Polecat Creek just west of the site. Through their diligent research efforts they soon discovered that the potter who lived and made earthenware pottery on this site was a Quaker named William Dennis. In 1988, Hal E. Pugh published preliminary historical research about this potter and other potters who lived in the Quaker community during the eighteenth and nineteenth centuries (Pugh 1988; also see Pugh and Pugh 2010b). Details of this research on other Quaker pottery families and locations are offered in an article by the Pughs in *Ceramics in America* (Pugh and Pugh 2010a). Born in 1769, William Dennis was the son of a potter, Thomas Dennis. William Dennis married Delilah Hobbs in 1790, and together they had 10 children, among them a son also named Thomas, who learned the pottery trade (his site is 31RD982, previously described). Dates of operation for William's shop range from the early 1780s to termination and abandonment in 1832 when he and his family, along with other members of the community, migrated to Indiana to protest slavery. Historical records indicate that a black potter named George Newby, apprenticed to William Dennis in 1813, may have migrated north with the potter and his family (Pugh 1988).

The Pughs eventually solicited the help of the author to create a research design for future excavation at the site. This collaborative effort was initiated in the fall of 1997. Based on the Pughs' observations there were two areas of activity. One appeared to be a pottery waster deposit (the garden plot) and another, uphill, appeared to be a house site, based on the assemblage of domestic-related debris, including tobacco pipes,

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creamware and pearlware sherds, wine bottle glass, window glass, iron nails, buttons, gunflints, and furniture hardware. A quick analysis of the refined imported wares produced a mean ceramic date of 1815 (Carnes-McNaughton and Pugh 2000).

In partnership with the Pughs and with the assistance of a small team of volunteers (neighbors and colleagues), fieldwork began with geophysical surveys using a soil resistivity instrument and a fluxgate gradiometer operated by the late Tom Hargrove. Two 20-meter square areas were tested at the house site and the suspected kiln site. Finally, a controlled metal detector survey was done at the house site to identify activity in and around the house, which indicated significant subsurface integrity. A decision was made, however, to focus the initial excavations on the waster pile/kiln area. In this area, the two geophysical surveys revealed a distinct subsurface anomaly, appearing circular in shape with a linear projection towards the northwest. This feature was flagged for ground-truthing through excavation.

Periodic investigations continue at the William Dennis site by volunteers working on holidays and long weekends. The site is backfilled and covered after each excavation episode in order to preserve the features. The first excavation “season” took place in March 1998, guided by the geophysical results. A grid of 2 x 2-ft units was imposed over the feature, given its apparent shallow nature and small size (estimated to be 10 ft in diameter). Soils were filtered through 1/4-inch mesh screens, and soil samples were taken at various intervals and locations. As work progressed through two or three weekend sessions, several small units began to expose bright red clay soils (from thermal alteration), unglazed and lead-glazed sherds, pieces of kiln furniture, bricks, and portions of a fieldstone foundation measuring two-feet thick. Still assuming at the time that the footprint of this kiln was a round updraft model (similar to the Philip Jacob Meyer kiln at Shepherd Mountain), units were excavated to follow out this foundation wall. Unit 10 revealed a distinct outside edge of the wall, but instead of curving into a circle, the wall was *straight*, indicating the presence of a square or rectangular kiln, aligned north–south. Eight contiguous units were then excavated (in another weekend session) exposing a large portion of the kiln, including two corners and evidence of an interior brick liner, giving conclusive evidence of a square furnace, as seen in Figure 6, measuring 10 x 10 ft. The geophysical maps were reexamined and questions were raised about the circular anomaly shown where a square kiln was found.



Figure 6. Photograph of the William Dennis square kiln foundation after partial excavations in 2001. Photograph by Carnes-McNaughton.

One explanation given was that thermally altered soils, resulting from multiple firings of the kiln, produced a “halo” effect radiating outward from the furnace beyond the foundation perimeter. This appears to be the case.

As work continued on the Dennis site, hundreds of artifacts, mostly sherds and kiln furniture, were recovered, tagged, bagged, and stored at the Pughs’ house for future analysis. In May 2000, the author and Hal Pugh taught a class on archaeology and historic preservation of kiln sites, sponsored by the North Carolina Pottery Center, Inc. During this session, five additional units were excavated and mapped. Another session was conducted in 2001 by which time about two-thirds of the kiln foundation was exposed and 23 2 x 2-ft units had been excavated. The furnace is identified as a small updraft kiln built out of local fieldstone and lined with handmade brick. The fieldstone foundation is mortared together with local pottery clay. Being similar in design to the partially standing Hockett kiln mentioned above, the firebox and entrance were likely positioned on the downhill side of this square, and have not yet been excavated. Plans are being made to complete the

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excavation of the Dennis kiln in order to determine if its shape has a European or Pennsylvania prototype. At present, the Hockett and Dennis square kilns are unique to North Carolina's pottery tradition. The total absence of stoneware sherds from the Dennis site testifies to its abandonment prior to the popularity of this ceramic type, ca. 1830s. The beginning date of this operation, about 1780, makes this kiln the oldest one yet excavated in the state of North Carolina.

The Pughs, both skilled potters, have produced replica wares reminiscent of those patterns and motifs found on sherds from this site. By their replication of these wares they have also isolated unique attributes of the designs, vessel forms, and glaze varieties used by Dennis and his son. They have gathered and tested naturally-occurring manganese nodules from the site to discover that these were likely used by the Dennis potters as colorants for their slips and glazes. The nodules, mined from local embankments, were gathered and then crushed and processed through a stone mill (or quern) before being added to slip slurry to achieve various shades of browns, depending on the amount used. A second significant finding related to soils on this site was discovered in the excavated soil samples analysis and reported on by the author and the Pughs (Carnes-McNaughton and Pugh 2000). Routine analysis of these samples by the USDA Agronomic Division laboratories provided a spectrum of traces of heavy metals contained in the soils. Spike levels of lead, along with spike levels of arsenic, were reported for each sample taken from the kiln area, while all other heavy metal traces were absent or negligible by comparison. The presence of lead residue in this case is expected given the nature of lead-glazed earthenware produced at this site. The high levels of arsenic, however, were a surprise, but two theories are offered. One is that red lead, the type obtained in bulk and used by eighteenth-century earthenware potters in North Carolina, naturally contains arsenic as a chemical bonding agent. When the lead is rendered or melted by the potter to form a liquid for glazing, the arsenic is released into the soils around the kiln. The transference is possibly enhanced during the firing process as heat is increased. The second, somewhat speculative reason for the presence of arsenic here comes from period recipes for glazing with lead. Arsenic, commonly used as a clarifying agent in the production of eighteenth-century glass, could have been used by these potters as an additive to clarify their lead glaze solutions, particularly those glazes used to cover elaborately decorated slip-trail earthenware vessels to enhance their appearance. Research on this topic continues by Hal Pugh and the

author, as the scientific explorations at the William Dennis pottery site and future analysis of the artifacts found there also continues.

Kiln Sites That Have been Completely Excavated

Four earthenware kiln sites have been completely excavated and round out the “dirty dozen” of sites described here. These sites have received the fullest archaeological investigation, though not all of the artifacts recovered from them have received complete analysis. The first two kiln sites (the Krause-Butner Kiln, 31FY7**5, and the Philip Jacob Meyer/Shepherd Mountain Kiln, 31RD28), both excavated in the 1970s, are briefly described and used for comparative dialogue (see Clauser 1979 and Outlaw 1974 for more lengthy discussions).

Tracing the technological transitions of early emigrant potters and the continuity of their craft and communities into America requires a brief review of the early immigration routes and subsequent settlement patterns of North Carolina’s multi-ethnic colonists. While the eastern, coastal settlements were comprised of English, French, Scots-Irish, African, and Swiss descendants, some of whom migrated from neighboring colonies, north from South Carolina and south out of Virginia for example, a large population came directly into the central Piedmont during the mid-1700s. This central region of the state was populated by wave after wave of emigrants who filtered south along the Great Wagon Road out of Pennsylvania and northern Virginia, via the Shenandoah Valley. Like sands in a delta they spread and dispersed into the Carolina Piedmont, settling where there were watercourses, arable farmlands, and old trading paths. Among the earliest settlers was a group of German Moravians seeking solace, religious freedom, and cheap land. Within a large, granted land tract they called Wachau (Wachovia), the Moravians formed a series of settlement towns (Bethania, Bethabara, and Salem) and immediately began production (by 1755) of various items needed to sustain this independent frontier enclave. Master craftsmen, among them potters, came with the group to this new environment, purposefully to establish an independent market. Over time, master potters like Gottfried Aust, Rudolph Christ, John Holland, and Heinrich Schaffner, among others, provided the essential ceramics to the Wachovia colony and surrounding communities.

A variety of specialized earthenware forms were made by the Moravian potters and have been described in detail by Stanley South,

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Brad Rauschenberg, and John Bivins (South 1999). Newer research, focused on the slip-decorated wares of the Moravians, can be found in Hunter and Beckerdite (2009). The combined wares (e.g., pots, pipes, and architectural elements) of these early potters set the standard for subsequent generations of apprentices, journeymen, and master potters who worked in the Moravian communities until the late 1800s. South's pioneering work at Bethabara produced thousands of sherds and wasters, plus the footprint of a potter's shop, but no kiln remains for Aust's earliest furnace.

*Krause-Butner Kiln Site (31FY7**5)*

This work set the stage for John Clauser's work in 1977–1978 on the later Krause-Butner kiln which provided the first glimpse of a furnace used by the Moravians for making pottery (Clauser 1979). This site, operated by Gottlob Krause (ca. 1789) and later by John Butner (ca. 1802), produced a variety of lead-glazed earthenware food vessels in a rectangular crossdraft kiln which Clauser has described as a modified German Cassel kiln. As seen in Figure 7, the kiln foundation, which measures approximately 12 ft by 24 ft, was composed of local fieldstone and handmade brick. Typical of this kiln design, the firebox (maybe more than one) was located at one end and the exhaust or chimney at the opposite end. Bricks were used to line the interior chamber and provided structural support during expansion and contraction from heating and cooling episodes. Excavations also revealed a fieldstone paved work yard surrounding the furnace area. In his vessel form analysis, Clauser noted that fewer slip-trailed decorated vessels and fewer tableware forms were made during this period and at this site (ca. 1789-1810) than was true for the earlier eighteenth century pottery shops of Aust and Christ (Clauser 1979).

Philip Jacob Meyer Kiln Site (31RD28)

The second site, also associated with the Moravian pottery tradition, is the Philip Jacob Meyer pottery kiln site, 31RD28, also called the Shepherd Mountain (or Mount Shepherd) site. Site 31RD28 is located on a United Methodist Church camping ground in Randolph County. Discovery of the site was made in 1968 by two young campers who found abundant lead-glazed earthenware sherds and kiln furniture pieces scattered on the surface. These artifacts were shown to two well-known clay historians and potters, Dorothy and Walter Auman in Seagrove.

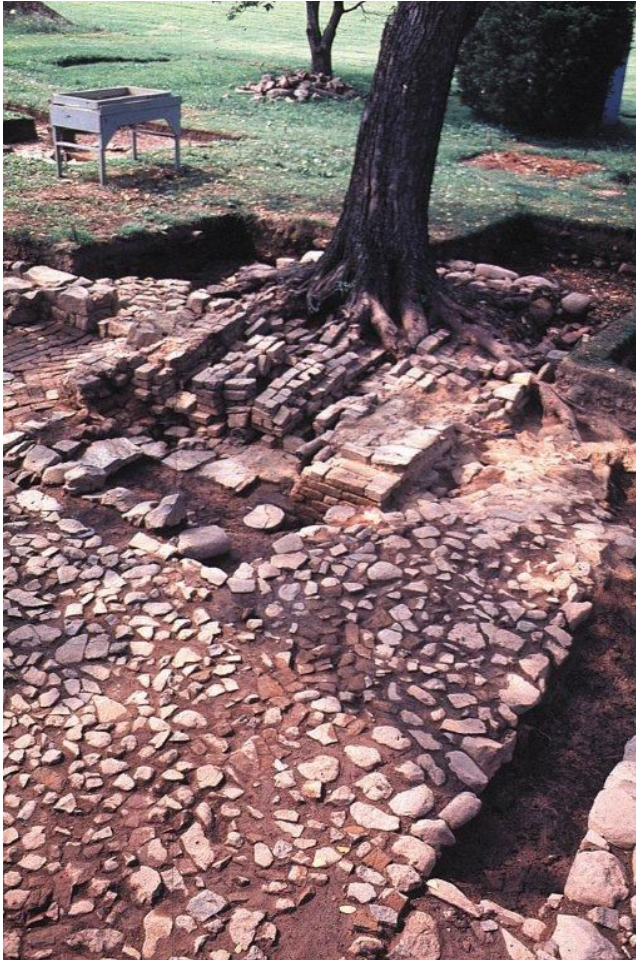


Figure 7. View of the 1977 excavation of the Krause-Butner Kiln in Bethabara. Photograph by John Clauser.

The Aumans, recognizing the importance of this undisturbed site, hired Virginia archaeologist Alain Outlaw to conduct two seasons of excavations at the site in 1974 and 1975. Outlaw's investigations revealed numerous features on the site within five large excavation blocks, including two clay pits, one large waster pit, a chimney base associated with the potter's shop, and most importantly, the circular foundation of a small kiln. As seen in Figure 8, the circular updraft kiln measured approximately nine feet in diameter, and had an intersecting

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Figure 8. View of the 1975 excavation of the Jacob Meyer Kiln in Randolph County. Photograph by Alain Outlaw.

array of five perimeter fireboxes connected by subterranean channels or flues. The foundation was composed of local field stones (described as slate, but possibly local rhyolites) mortared with water-tempered potter's clay. The interior of the kiln was comprised of unmortared channel walls constructed of handmade brick. Spaces between the channels were filled with local rocks, which may have supported the perforated kiln floor (Zug 1986:200–201). Excavations further showed that the channels measured about 9.5 inches in width and about one foot in height (four bricks stacked). Outlaw explained that the flues opening to the northeast and southwest extended all the way through and to the perimeter without obstruction. But the additional channels abutted the latter channel wall and may have served as a baffle to dissipate the heat more effectively. The walls varied in width from 1.5 ft to nearly 3.0 ft thick. The interior setting floor measured almost six feet in diameter. Outlaw described the outer walls of the kiln as tapering slightly upwards, perhaps culminating in a dome or beehive design (Outlaw 1974). The perimeter fireports, subterranean channels, circular shape, and general design indicate this was an updraft furnace. Zug (1986) estimates the height could have been about eight to ten feet and would easily have accommodated stacked wares for bisque or lead-glazed firings. Wood

would have been the primary fuel for this furnace. Evidence of an entry or doorway was apparently never discerned. In addition to the architectural remains, thousands of glazed and unglazed, decorated and plain earthenware sherds from a large variety of vessel forms (crocks, plates, jars, and teawares), along with kiln furniture, molded stove tiles, and anthropomorphic pipe heads, were found here and have received preliminary analysis (see Outlaw 2009).

During initial excavations and into the next decade the site was referred to as the Mount Shepherd site because the potter who operated here remained unknown. In 1980, McKay Whatley published the results of his research and identified the mysterious potter as Philip Jacob Meyer, Jr., whom he discovered had been expelled from the Moravian community before moving to Shepherd Mountain to set up a shop ca. 1793 (Whatley 1980). Born in 1771, Meyer's father was listed in Bethabara as a tavern keeper, which apparently led the young son to drink at an early age (according to court records), and later related to his "undoing" in the community. Meyer had been an apprentice to Moravian master potter Gottfried Aust until his expulsion from the business and community. Deed records indicate Meyer owned the land on which he set up earthenware production. Artifacts found at this site include wheel-thrown and press-molded objects, among them food storage vessels, utilitarian items such as stove tiles, and tobacco pipe heads. Having been trained in the Moravian tradition and repertoire of wares, Meyer continued to produce what he had been taught, albeit with some personal modifications. Glazed and unglazed slip-trailed decorated dishes in floral and geometric motifs testify to his artistic and pottery skills. The tobacco pipes heads, made in two-piece molds, were also of Moravian influence and exhibit the anthropomorphic faces and heads popular at that time. The press-molded stove tiles, in two unique designs (one an infantryman and the other a mounted horseman), interpreted as militaristic in theme, reflect Meyer's personal divergence from the Moravian pacifist tradition (Whatley 1980). Historical records indicate that this shop ceased operation in 1799 when he and a neighbor were sued, and later jailed, for debt. He disappears from the county records and census before 1800. In summary, this small pottery operation found in a wooded Randolph County campground holds a wealth of information about the far reaching traditions of the Moravian potters with their Old World guild system as it dissolved into the backcountry in early nineteenth century North Carolina.

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Daniel Seagle and Solomon Loy, Master Potters

The last two pottery kilns sites to be presented here represent a decade-long study of two master potters, their families, their pottery, their technologies, their kilns and their endurance, which began as a dissertation project in 1987 and culminated in 1997 with this author's doctoral work titled, *Transitions and Continuity: Earthenware and Stoneware Pottery Production in Nineteenth Century North Carolina*. Through the Department of Anthropology at the University of North Carolina, and under the guidance of Dr. Charles G. Zug, III, Dr. Stanley South, and Dr. Carole Crumley, the interdisciplinary and multi-evidential study initiated the full-scale excavations of the Daniel Seagle pottery site (31LN59), located in Lincoln County, and the Solomon Loy pottery site (31AM191) located in Alamance County. The sites of these two potters were chosen for research due to several parallel variables linking them together in pottery history. Both Daniel Seagle and Solomon Loy were contemporaneous master potters trained in the production of lead-glazed earthenware by their fathers. Both potters lived during a period in the first quarter of the nineteenth century when technology was shifting from the production of earthenware to stoneware. Both men subsequently trained their sons, nephews, other relatives, and neighbors to become potters. Both potters were second generation immigrants, but from two ethnically different European origins (Seagle was of German extraction and Loy was originally of French Huguenot ancestry). Both potters excelled in their craft. While both began as earthenware potters using lead-glazed coating, their stoneware production required them to learn alternate glazing technologies. For Seagle, it was the alkaline glaze; for Loy, it was the salt-glaze. Each potter operated his own shop and built his own kilns, but of different styles and composition. Vessels made of earthenware and stoneware produced by each of these potters exemplifies their skill and expertise, and are prized today as pieces of art, highly valued and preserved with care. Using historical research and oral histories together with archaeological evidence, the study revealed a continuity of their craft into the twentieth century, and provided valuable information to understand the settlement patterns and social networks followed by their clay clans (Carnes-McNaughton 1997).

Daniel Seagle Kiln Site (31LN59)

The Daniel Seagle site was located in 1987 by the author using local informants and earlier site descriptions by Zug from 1986. Permission

was obtained from the property owner to partially clear a thick vegetation cover of tree stumps and dense vines from the site. Once the site was cleared, structural evidence of a kiln structure appeared in the form of glazed bricks and a few large fieldstones. The site is situated on a sloping terrace just west of Howard's Creek near the hamlet called Vale, North Carolina. Using a small team of volunteers comprised of colleagues, neighbors, and a local high school student, an eight-week project was undertaken to expose and map the site. A datum point was placed near the northeast corner of a large, exposed stone, and a grid was laid out south and east of the datum. Unit size was set at 5 x 5 ft due to the shallow nature of the feature and to better control horizontal mapping of the site. The first unit, dug near the large fieldstone, revealed what was soon shown to be the northwest corner of the kiln feature, at the chimney end, with a layer of fine-grained white quartz remaining on the interior floor of the kiln. Shovels were abandoned, and hand tools, trowels, whisk brooms, and scoops were employed to excavate the fragile footprint just below ground surface. Subsequent units to the south of this one uncovered the eastern brick wall of a rectangular kiln. As excavations progressed, the rear chimney end was exposed which was made out of local fieldstones with a small "break" in the stones identified as the doorway. Two other extant kilns in the area, at potter Burlon Craig's place and at the old Enoch Reinhardt place, also exhibited chimney-end doorways to access the ware chamber, albeit they were constructed of brick instead of stone. Alkaline-glazed stoneware sherds and glazed brick fragments were predominant artifacts, along with two unglazed earthenware pipe heads found *in situ* on the quartz gravel floor. The pipe heads were a type made in a two-piece mold exhibiting rudimentary anthropomorphic features and fluted or ribbed surfaces. Earthenware and stoneware sherds were surface collected in and around the kiln footprint, where they were concentrated at the northwest corner of the feature (perhaps representing a "toss" pattern of waster disposal during unloading activities). Dense piles of brick rubble (some glazed) from the collapsed vault were uncovered *in situ* in the chamber floor as excavations continued south and downhill. Information from the property owner confirmed the general downhill trend of the debris created from his father's destruction of the collapsed kiln by pushing it off into the open ravine sometime in the early 1960s. Spatial plots of surface collected materials reflected the downhill scatter.

Once the west wall was exposed, a width was determined to be about ten feet on the interior, with a wall thickness of one foot. The side

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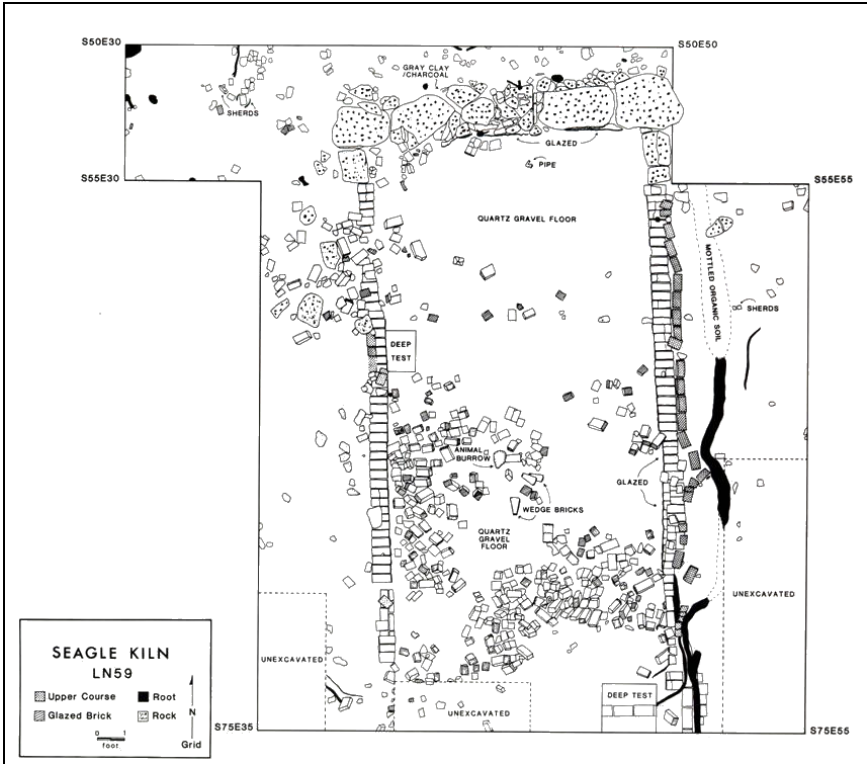


Figure 9. Excavation plan of the Daniel Seagle kiln footprint, revealing architectural details. Drawing by Carnes-McNaughton.

walls were constructed of bricks laid stretcher-to-stretcher or side by side, with the header ends facing the interior and exterior. Only two courses of brick remained of these side walls at the north or uphill end, while at least three brick courses remained towards the firebox end, downhill. Thick glaze deposits were noted on the interior surface of all bricks and chimney stones. Drawings were created of the brick rubble from the collapsed vault and what remained of the side walls. Once exposed, winter elements began their freeze-thaw cycle, further deteriorating the pieces. Builder's trenches were noted along the exterior edges of the side walls which had been filled with clay for buttressing and support. Figure 9 illustrates the final drawing of the kiln footprint following excavation of the 20 x 5 ft units. The overall exterior length measured 23 ft with an interior length of 21 ft, and an interior width of 10 ft. Area was calculated at 210 sq ft. The stone chimney measured



Figure 10. View of the Daniel Seagle kiln following excavations. Note the side walls of glazed bricks (at right), chimney end composed of fieldstones (at top), and vault bricks collapsed onto interior floor (at bottom). Photograph by Carnes-McNaughton.

about 2 ft deep by 10 ft long. Several glazed bricks were identified as arch supports for the vault, and wedge-shaped bricks, some bearing glaze residue, were used as the spine or keystone row at the vault's apex. The brick columns would have been about 30 inches in height to support the vault. The doorway was about 2 ft wide in the chimney end. The single large firebox was almost 2 ft below grade. Essentially, this groundhog kiln closely resembled the intact furnace of working potter Burlon Craig, though his was built some 150 years later (Carnes-McNaughton 1997).

With the chimney end uphill and firebox downhill, this groundhog kiln, whose remains are seen in Figure 10, functioned as a crossdraft oven, a Southern adaptation to the rectangular crossdraft kilns of England and Germany. Excavation of the feature and testing for the shop area took 23 days with a small crew enduring bitterly cold temperatures. Almost 3,000 artifacts were recovered, including a predominance of alkaline-glazed stoneware, several hundred earthenware sherds (mostly glazed and unglazed hollowwares like jars and crocks), and the remains of the last firings of the kiln containing unglazed earthenware pipe heads. No recognizable pieces of kiln furniture were

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found, nor were any expected at this type of kiln where the wares were single-stacked on the low-vaulted chamber floor for firing. Daniel Seagle's lead-glazed earthenwares, of which only a few have survived, exhibit his skills as a potter and his ability to produce finely glazed and modestly decorated earthenware vessels. Instead of using colored slip-trailed clays to make a design, he used an engraved coggle wheel to impress geometric motifs onto his wares. Two extant jugs, each marked by Seagle in his distinctive style, suggest his line of earthenware was more restrained in its decoration than that made by Solomon Loy, whose variety of forms and decoration is quite diverse. It is possible that Daniel Seagle fired his limited production of lead-glazed earthenware in this groundhog kiln. Firings could be regulated for lower-temperature wares by controlling the fuels, the fireboxes, and the firing intervals, much as the two modified Cassel kilns in the Moravian communities would have functioned for earthenware production.

Solomon Loy Kiln Site (31AM191)

The Solomon Loy pottery site (31AM191) is the last of the earthenware kiln sites to be discussed here, yet it represents one of the most important historical resources so far discovered in the state. More definitively than any other site so far examined, it demonstrates the technological transition one potter made during the early nineteenth century from earthenware to stoneware production (Carnes-McNaughton 1997).

Excavations were conducted during the fall of 1988 and the spring of 1989 (for a total of 33 days) using a small team of two or three volunteers at a time, or by the author working alone. Mostly, hand tools were used to uncover the features which were situated just below the topsoil in most areas. The following description of work conducted at this site is drawn from the author's dissertation (Carnes-McNaughton 1997).

Nearly 17,000 artifacts were recovered from the excavation of 28 5 x 5 ft units to reveal the foundation remains of a large earthenware kiln and a stoneware kiln at the same location. Both kilns, whose plans are shown in Figure 11, measure over 17 ft in diameter and are the largest round kilns so far discovered in the state. More significantly, each kiln is a different type, each one suited for the wares to be produced. Kiln A was a downdraft model used in the firing of Loy's salt-glazed

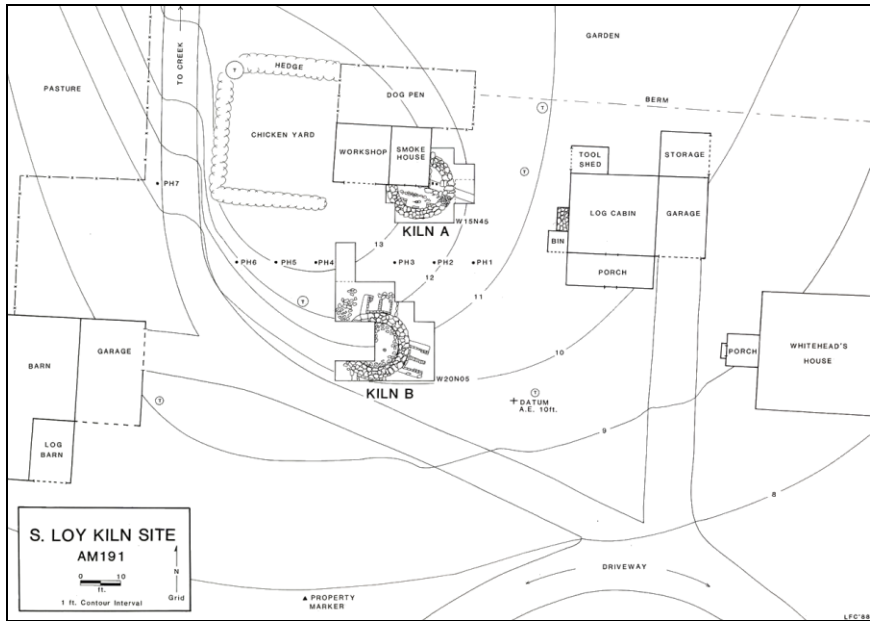


Figure 11. Plan map of the Solomon Loy Pottery Site (31AM191) showing the two kilns and other structures. Drawing by Carnes-McNaughton.

stonewares, some with elaborate cobalt and iron oxide decorations like the example seen in Figure 12. Kiln B, whose details are shown in Figure 13, was an updraft model with four unique double-chambered fireboxes positioned around its perimeter. Both kilns were composed of local fieldstone, mortared together with potter's clay, with a wall thickness of 2.5 feet on average. The interior ware floor measured 12 ft in diameter and was covered with broken kiln furniture (props and shelves) and a fine gravel mixture on top of a dense clay layer colored deep red from thermal alteration. Interior area was calculated at 227 sq ft for the base of Kiln B. A "break" in the alignment of the circular foundation wall was noted and mapped. This anomaly was interpreted as the possible doorway into the kiln. Bricks on the kiln interior were coated with a thick glaze residue, as were most pieces of kiln furniture excavated within the interior of the feature.

As excavations progressed to expose the circular foundation, four double-chambered fireboxes were uncovered and alternately designated North, East, South, and West. While all four large fireports were mapped, as shown in Figure 14, and photographed, a decision was made

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Figure 12. Example of a cobalt-decorated stoneware jar made by Solomon Loy.

only to excavate the interiors of the East and North, leaving the South and West features for future research (and because the owner had a small peach tree planted on top of the West firebox). All fireboxes were made of handmade brick mortared with clay, with the outside walls composed of double courses on the exterior for support, and further buttressed with gray clays against the outside walls of each. A single course of brick served as the divider or “hob,” splitting each firebox into two smaller chambers. The closed end of each firebox curved slightly to abut the circular stone foundation of the kiln. Excavation of the fill within the fireboxes revealed alternating layers of ash, charcoal, and gray clay. These alternating layers of ash and charcoal represented the repeated firings and cleaning episodes of Kiln B. The loading end of each firebox was slightly constricted (for better draft) by an inset of a second course of brick. Each chamber was approximately 1.8 ft wide and twice as long, averaging 3 ft from abutted end to loading end. Similar to what Rhodes describes as a “hob firebox,” the wood fuel would have been placed crosswise onto the center support, allowing the bottom pieces to burn first, then drop down and ignite fuel stored in the lower chambers. The

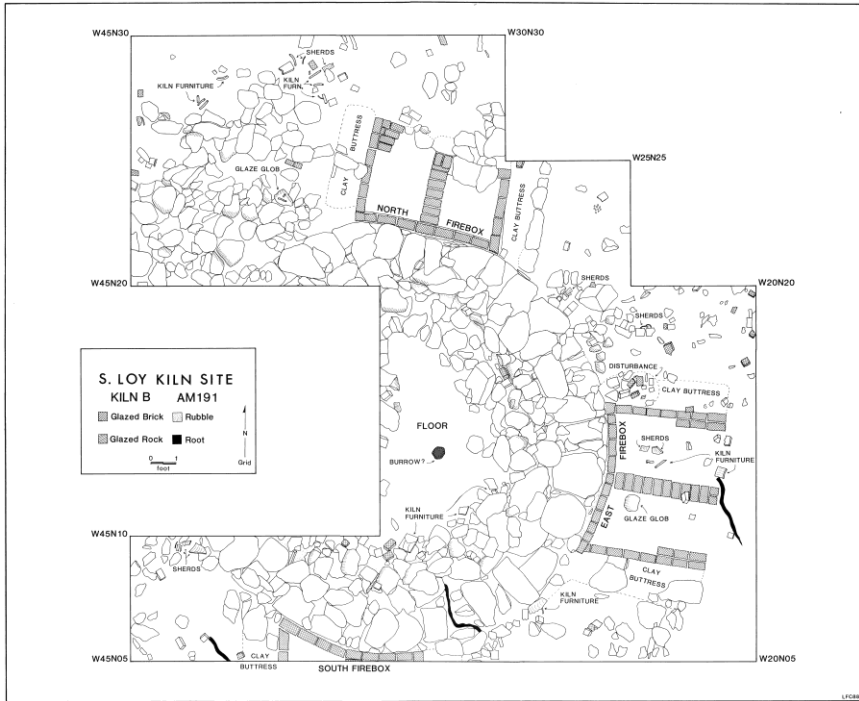


Figure 13. Excavation plan of Kiln B, the earthenware kiln at the Solomon Loy Site, showing the updraft furnace’s circular foundation and perimeter fireboxes. Drawing by Carnes-McNaughton.

advantage of such a system was that an ample stack of wood placed in each firebox could be left on the grate and the fire would fuel itself unattended until the supply was burned out. Given the enormous size of this furnace and the need to burn all the wares uniformly in the tall chamber, the design and size of these fireboxes were essential elements, as was the generation of a strong draft (Rhodes 1968). Whether the superstructure (the above ground portion) was a beehive or domed model, or whether it was a tall, bottle type kiln remains to speculation at this time. During excavations of Kiln B an abundance of unglazed earthenware sherds and kiln furniture was found on the interior floor, indicating that it may have been a stacked or double-chambered kiln with a bisque chamber on top and a glazing or “glost” chamber underneath. In this case, it would have been a very tall (with an estimated height of 34 ft or nearly twice its diameter) spectacle on the landscape. Bricks may have been used to create the top portion of the kiln to provide better

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Figure 14. Kiln B at the Solomon Loy Site after excavation. Photograph by Carnes-McNaughton.

control for expansion and contraction between firing and cooling periods. If the upper structure of Kiln B was domed to resemble a beehive, then the height would be estimated to reach about 8–10 ft. In this event, it may have been composed of fieldstone and brick (for both the liner and exhaust system).

Historically and archaeologically, there are no known prototypes in America for the Kiln B fireboxes. One intriguing possibility was reported in a salvage archaeology project in northern Virginia where it appears new construction had erased the circular kiln foundation and only the remains of a double-chambered firebox was found in the embankment adjacent to the road. The archaeologist excavating this firebox, however, misinterpreted this feature as a miniature version of a “double-chambered rectangular groundhog kiln,” despite the fact that abundant kiln furniture, used to stack wares, was also found in association with the feature. That would have made each chamber of this groundhog kiln about 2 x 3 ft in size. Vessels reconstructed from lead-glazed earthenware sherds found on site, however, revealed they were normal size. Knowing that the Loys migrated south out of Berks County,

Pennsylvania, and perhaps passed through this region of northern Virginia on their way to North Carolina's Piedmont, they may have become familiar with this design. Other contemporaneous kiln sites may provide the clues linking Solomon Loy's behemoth furnace to northern kilns in Pennsylvania and/or Virginia. Moreover, the mere size of Loy's two kilns, each over 17 ft in diameter and twice the size of the Philip Jacob Meyer round kiln, signifies the architectural sophistication of Loy's skill as a potter as well as the volume of earthenware production generated at this shop. The cumulative architectural attributes of this updraft kiln, its enormous size, construction materials, and unique double-chambered fireboxes, along with the artifacts found here, make it one of the most historically significant sites in North Carolina.

Although the general discussion here has not been about the potters' family histories, but about the archaeological explorations of their kilns, Solomon Loy's genealogy does enhance the historical significance of this site and the sophistication of his earthenware pottery. Figure 15 illustrates a partial Loy family genealogy compiled by the author in 1997, showing at least six generations of descendants and a dozen potters. The intermarriage to other pottery clans is also shown by marriages to the Boggs and Phillips families. The Loys' intermarriage with the Holt and Albright families, prominent landowners in the new county, also provided them social stability and solidarity in their decision to settle around Snow Camp in a region also occupied by English Quakers. That Solomon Loy was destined by birth to be a master potter cannot be proved, but he clearly had clay in his veins. His father, Henry Loy, was a potter who trained at least four of his six sons in the trade. His oldest son, William, while not listed as a potter, undoubtedly was involved in the enterprise in some manner. He is listed as the owner of the land on which Solomon's two kilns were located (31Am191). The family's direct connections between Berks County, Pennsylvania, and their arrival in the backcountry of North Carolina has not been fully explored but remains fodder for more research (see Hunter and Beckerdite 2010).

Solomon Loy set up an earthenware kiln and later built a stoneware kiln to broaden his skills, to experiment with clays and glazes, to express his artistic abilities, to move with the times, and ultimately to make a living. He shared these abilities with his son John, his nephew Mebane, and his grandson William Henry, along with neighboring potters from the Boggs family (Thomas H. Boggs and John Timothy), all trained at

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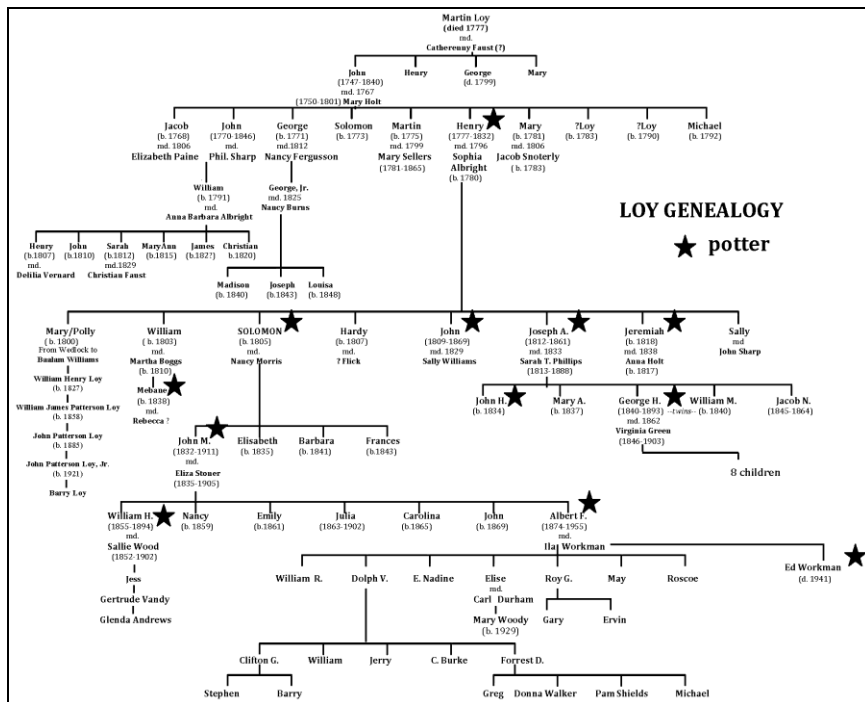


Figure 15. Loy Family Genealogy Chart showing known potters in the family. Compiled by Carnes-McNaughton.

this shop. After his father's death in the late 1860s, John inherited the shop and continued the production of stoneware well into the 1880s. His nephew Meban established his own shop and the Boggs shop and kiln were just down the road. This was a dispersed jugtown.

Solomon Loy was a prolific and versatile potter who specialized in the production of utilitarian earthenwares for a wide variety of food preparation, consumption, and storage functions, as well as tobacco pipes for personal use and horticultural containers for the gardener. He excelled in his production of elaborately slip-trailed decorated plates and hollowwares, as evidenced by the archaeological assemblage from the site, examples of which are shown in Figure 16, and as seen in intact vessels which survive in private and public collections.

The slip-trailed designs found on Solomon Loy's decorated plates, bowls, cups, and vases include geometric and floral motifs in complex



Figure 16. Sample of slip-trail decorated, lead-glazed redwares produced by Solomon Loy, along with one whole plate. Photograph by Carnes-McNaughton.

and simple patterns, accented by annular or sine-wave type lined bandings. Names of these designs can be found in source books on slip-trailed decorated wares, often called slipwares. For comparative purposes of North Carolina wares, the Moravian terms are often used. The basic clay used for slip-trailed designs was kaolin-based clay, which is normally white or cream in color. Metal oxides were added as colorants for polychrome decorations. Glazes were applied to greenware vessels in liquid form. Slip designs were applied through a nozzled slip cup or trailer, much like an icing tube. Occasionally, Loy and other potters applied an overall coating or background of colored clay (often called an engobe) on the plate or bowl interior, then decorated it with a contrasting slip-trailed design. After decoration, the wares were bisque fired once, then coated with liquid lead glaze and fired again. Several slip-trailed designs, some of which are seen in Figure 17, have been documented through archaeological work and surviving examples, and are unique to Solomon Loy's decorative repertoire. A splatter pattern appears on his small and large bowl forms, cups, tankards, and vases. The dotted star is a motif used on the cavettos of plates and bowls. This

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Figure 17. Variety of decorative motifs unique to Solomon Loy redwares.

design consists of four or five opposing rays or lines radiating out from a center point, with each ray accented by three or four dots at the terminal. Another unique pattern consists of “nested” triangles drawn with polychrome clays and placed on the marleys of large plates. Loy used combinations of motifs found earlier on St. Asaph’s dishes, such as the florets, grasses, arched lunettes, dotted circles, and van-dykes or fish scale (also called seed pod) patterns (Hunter and Beckerdite 2010). He used alternating annular banding of various colors, both straight and wavy, to accent his plates, bowls and dishes. Examples of all these patterns were recovered from site 31AM191. Even more interesting is his transfer and use of these same designs and patterns onto his later salt-glazed stonewares where he used cobalt and iron-based slips to decorate his wares, for which he became well known (Carnes-McNaughton 1997). Excavations at 31AM191 also discovered many vessel sherds of what could best be described as transition wares, resembling high-fired earthenware and low-fired stoneware, both possible evidence of experimentation. Vessel forms changed in their size and function from earthenware to stoneware as the Loys perfected their stoneware body and eventually built the downdraft kiln (Kiln A), uphill from the updraft earthenware kiln (Kiln B). The latter may have indeed collapsed from

being forced into commission for the production of higher-fired stonewares, but this remains speculative. The fact that both kilns are so identical in construction size and fabric, but not firing method, strongly suggests that they were built by the same architect/potter. It is also likely that they functioned contemporaneously for a period when the potters were experimenting with stoneware clays and temperatures. The uniqueness of Kiln B, particularly the double-chambered fireboxes, its sheer size, and design will probably remain unsurpassed in archaeological research of the Southeast potteries for some time to come.

Conclusion

The kilns just described formed the heart and hearth of the pottery-making activities at each of these sites. Analysis and interpretation of the archaeological features which remained *in situ* at the sites represent the status of what we now know about earthenware potters of the eighteenth and nineteenth centuries in North Carolina. These architectural remnants of kiln foundations, and the potential for such at some sites not yet fully explored, form the most critical component in recreating the events and processes of earthenware production as a cottage industry during this period. As with most archaeological endeavors, however, the interpretation and mental reconstruction of the above-ground components relies on research and intellectual conjecture. As stated at the beginning of this article, heat transfer through the ware chamber segregates most episodic kilns (single firings and coolings) into three categories; crossdraft, updraft, and downdraft. The crossdraft and the updraft kilns, with their lower-firing temperatures, were the best suited to earthenware production. The crossdraft kiln, with its exhaust and fire source located on opposite ends of the structure, typified by the groundhog kiln at the Daniel Seagle site, and the two modified Cassel kilns of the Krause-Butner site and the Heinrich Schaffner site, demonstrate that the potters worked them successfully. Since these kilns were known to have somewhat uneven heat distribution, the knowledgeable potters often used this trait to their advantage by placing lower-fired wares in the cool spots near the chimney end if necessary.

The other three sites which have been explored through scientific excavation — the Philip Jacob Meyer (Shepherd Mountain) site, the William Dennis site, and the Solomon Loy Kiln B site — represent updraft furnaces, though two are round and one is square. In this design, heat enters through the perimeter fireboxes located at the kiln base and is

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percolated through the chamber, then up and out through the top portal(s). Circular updraft kilns were either domed like a beehive, or tall like bottle-shaped or hovel-style furnaces. The square updraft style, unique to the Quaker communities, resembled a smaller version of an iron furnace structure. Generally, circular kilns provide uniform heat distribution with minimal “cool” spots found in corners of square or rectangular-shaped kilns.

Most historical sources indicate that round updraft kilns have their early origins dating back to the Gallo-Roman culture and the subsequent Middle Ages. Updraft bottle kilns were popular throughout the 1700s in Britain. The origin of the square updraft kiln is as yet unknown but could have been adapted from another industry — the iron furnace. Clearly, more research is needed to satisfactorily answer that question, as there is no known prototype. The downdraft kilns, the most sophisticated architecturally, are believed to be of German origin. Dating the styles of the kilns is deduced from what is known of the potter's history and cultural background. There is some temporal overlap between the kiln sites discussed here. All were used in the production of earthenware (with a possible exception of the Seagle kiln, which likely was used both for stoneware and earthenware firings). Comparative regional studies of kiln types between North Carolina's sample and those in neighboring states like Virginia, and further north in Pennsylvania, are needed to fully understand the evolution of these architectural features. Still, some basic trends can be derived from this study. Simple updraft kilns in round, square, and rectangular shapes appeared first. These were followed by rectangular crossdraft kilns such as the Southern groundhog kiln. Finally, the more complex design of the round or rectangular downdraft kiln was employed. In time, other eighteenth and nineteenth century pottery sites in the state will undoubtedly yield the remnants of other kilns, revealing more information to explain the nascent beginnings and evolution of North Carolina's unique kilns.

Notes

Acknowledgments. In this space, at this moment, I wish to thank those researchers and potters who have contributed to this study along the way. I wish to thank my mentor on North Carolina pottery research, Dr. Charles (Terry) Zug, the consummate ambassador to learning about our state's rich ceramic heritage. Other colleagues tempered in clay matters whom I wish to thank are Dr. Stanley South, the late Dr. Georgiana Greer, Carl Steen, Dr. John Burrison, Dr. Henry Glassie, Polly Worthy, Steve Rogers, Sam Smith, John Clauser, Dr. Alain Outlaw, Luke Beckerdite, Rob Hunter, Mike

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Hartley, and Johanna Miller. It is also important to acknowledge the many contributions of those practicing the craft of pottery-making, plying their wares and talents, who contribute to a greater body of understanding about this early and continuing clay industry. Mary and David Farrell, and Hal and Eleanor Pugh contributed their life-long findings on red clay earthenware manufacturing in the state and the history of pottery families who once practiced this craft. Their insights have augmented archaeological research into these pottery communities to examine this craft with a focus on performance and experimentation, more than ever before. Finally, I wish to acknowledge all those potters of yore who stuck to the mud and created something to further our civilization; one hero in particular would be Solomon Loy, master potter of the Piedmont.

References Cited

Bivins, John, Jr.

1972 *The Moravian Potters in North Carolina*. Published for Old Salem, Inc. by the University of North Carolina Press, Chapel Hill.

Campbell, Hugh, and Allen Campbell

1992 Unpublished field notes, maps, and site form for 31Pr59, on file at the Office of State Archaeology, Raleigh, NC.

Carnes, Linda F.

1986 Appendix A: The Potters of Alamance County. In *Alamance County Archaeological Survey Project, Alamance County, North Carolina*, by Jane McManus and Ann Long, pp. 114–147. Research Report 5, Research Laboratories of Anthropology, University of North Carolina, Chapel Hill.

Carnes-McNaughton, Linda F.

1997 *Transitions and Continuity: Earthenware and Stoneware Pottery Production in Nineteenth Century North Carolina*. Unpublished Ph.D. dissertation, Department of Anthropology, University of North Carolina, Chapel Hill.

2005 Turning to Clay: The Historic Pottery Industry in North Carolina. Paper presented at the annual meeting of the Southeastern Archaeological Conference, Columbia, SC.

2010 Solomon Loy, Master Pottery of the Piedmont, In *Ceramics in America*, edited by Rob Hunter and Luke Beckerdite, pp. 106–139, University Press of New England for the Chipstone Foundation, Hanover, NH

Carnes-McNaughton, Linda F., and Hal E. Pugh

2000 Arsenic and Old Lead: Recent Excavations at the William Dennis Pottery Site, 31Rd981. Paper presented at the annual meeting of the Society for Historical Archaeology, Quebec City, Quebec, Canada.

Clauser, John

1979 *Excavations at the Krause-Butner Pottery Kiln Site, Bethabara, North Carolina*. Unpublished Masters thesis, Department of Anthropology, University of Florida, Gainesville.

NORTH CAROLINA'S REDWARE KILNS

Compton, Stephen

2000 William Franklin James: A Late Earthenware Potter of Davie County. In *Traditions in Clay* newsletter, number 1 (winter), edited by Leon Danielson, North Carolina Pottery Collectors' Guild.

2001 The Phillips-Loy Pottery: An Eighteenth Century Earthenware Pottery in Person County, North Carolina. Unpublished but copyrighted article in possession of the author.

Comstock, H. E.

1994 *The Pottery of the Shenandoah Valley Region*. The Museum of Early Decorative Arts, Winston-Salem, NC.

Grigsby, Leslie B.

1993 *English Slip-Decorated Earthenware at Williamsburg*. The Colonial Williamsburg Foundation, Williamsburg, VA.

Hartley, Michael O.

2005 Heinrich Schaffner and the Moravian Ceramic Tradition in Nineteenth Century Pottery in Salem. *Journal of Early Southern Decorative Arts* 31(1):1-44.

2009 Salem Pottery After 1834: Henry Schaffner and Daniel Krause. In *Ceramics in America*, edited by Robert Hunter and Luke Beckerdite, University Press of New England for the Chipstone Foundation, Hanover, NH.

Hunter, Robert, and Luke Beckerdite, editors

2009 *Ceramics in America*. University Press of New England for the Chipstone Foundation, Hanover, NH.

2010 *Ceramics in America*. University Press of New England for the Chipstone Foundation, Hanover, NH.

Joseph, J. W., Theresa M. Hamby, and Catherine S. Long

2004 *Historical Archaeology in Georgia*. University of Georgia Laboratory of Archaeology Series, Report Number 39, Athens.

Loy, Barry J.

2006-2007 Personal notes and correspondence to author.

Outlaw, Alain C.

1974 Preliminary Excavations at the Mount Shepherd Pottery Site. In *Conference on Historic Sites Archaeology Papers Volume 9*, edited by Stanley South, pp. 2-12, Columbia, SC.

2009 The Mount Shepherd Pottery Site, Randolph County, North Carolina. In *Ceramics in America*, edited by Robert Hunter and Luke Beckerdite, pp. 161-189. University Press of New England for the Chipstone Foundation, Hanover, NH.

NORTH CAROLINA ARCHAEOLOGY [Vol. 60, 2011]

Pugh, Hal E.

1988 The Quaker Ceramic Tradition in the North Carolina Piedmont: Documentation and Preliminary Survey of the Dennis Family Pottery. *The Southern Friend: Journal of the North Carolina Friends Historical Society* 10(2):1–26.

n.d. Unpublished exhibition text for the kiln photograph which appeared in the Slipped, Dipped and Dotted Exhibit, May to August 2007, North Carolina Pottery Center, Seagrove.

Pugh, Hal E., and Eleanor Minnock-Pugh

2010a The Quaker Ceramic Tradition in Piedmont North Carolina. In *Ceramics in America*, edited by Robert Hunter and Luke Beckerdite, pp. 66–105. University Press of New England for the Chipstone Foundation, Hanover, NH.

2010b The Dennis Family Potters of New Salem, North Carolina. In *Ceramics in America*, edited by Robert Hunter and Luke Beckerdite, pp. 140–167. University Press of New England for the Chipstone Foundation, Hanover, NH.

Rhodes, Daniel

1968 *Kilns: Design, Construction, and Operation*. Chilton Book Company, Radnor, PA.

South, Stanley

1999 *Historical Archaeology in Wachovia: Excavating Eighteenth-Century Bethabara and Moravian Pottery*. Kluwer Academic/Plenum Press, New York.

Whatley, McKay

1980 The Mount Shepherd Pottery: Correlating Archaeology and History. *Journal of Museum of Early Southern Decorative Arts* 6(1):21–57.

Zug, Charles G., III

1986 *Turners and Burners: The Folk Potters of North Carolina*. University of North Carolina Press, Chapel Hill.

ARCHAEOFAUNAL REMAINS FROM GARDEN CREEK MOUND NO. 2 (31HW2) IN HAYWOOD COUNTY, NORTH CAROLINA

by

Thomas R. Whyte

Abstract

Salvage excavations in 1965–1967 by Bennie C. Keel at Garden Creek Mound No. 2, a Middle Woodland platform mound in Haywood County, North Carolina, generated an archaeofaunal assemblage of 1,496 specimens. Probably due to mechanical and chemical weathering, only 13% of the specimens are specifically identifiable and include remains of freshwater mussels, turtles, birds, and mammals. When considered in context with other artifact classes, the presence of exotic materials, and in light of discoveries at the nearby Biltmore Mound site, these animal remains likely represent communal feasting associated with mound construction and world renewal activities.

Salvage archaeological investigations at Garden Creek Mound No. 2 in Haywood County, North Carolina (Figure 1) were conducted by the University of North Carolina's Research Laboratories of Anthropology (UNCRLA) under the direction of Bennie C. Keel in 1965 through 1967 (Keel 1972, 1976). According to Keel, the Middle Woodland platform mound was constructed over a pre-mound Connestee phase residential midden in two stages, each supporting a structure, prior to AD 800 (Figure 2). Later intrusions and deposits from Pisgah and Qualla phase activities also were discovered. Other contexts discovered and excavated include hundreds of postmolds, several human burials, pit features, hearths, and the filled pits of previous excavators (Keel 1976). These excavations yielded substantial collections of stone, ceramic, bone, and shell artifacts as well as archaeobotanical and archaeofaunal remains. These were obtained by hand recovery, dry-screening through 1/2-inch mesh hardware cloth (non-feature contexts), and 1/16-inch wet-screening (burials, postmolds, and other features).

Recovered archaeofaunal remains (excluding artifacts reported in Keel 1976) include 1,496 vertebrate and molluscan specimens that had been washed, inventoried, and stored but never formally analyzed. The

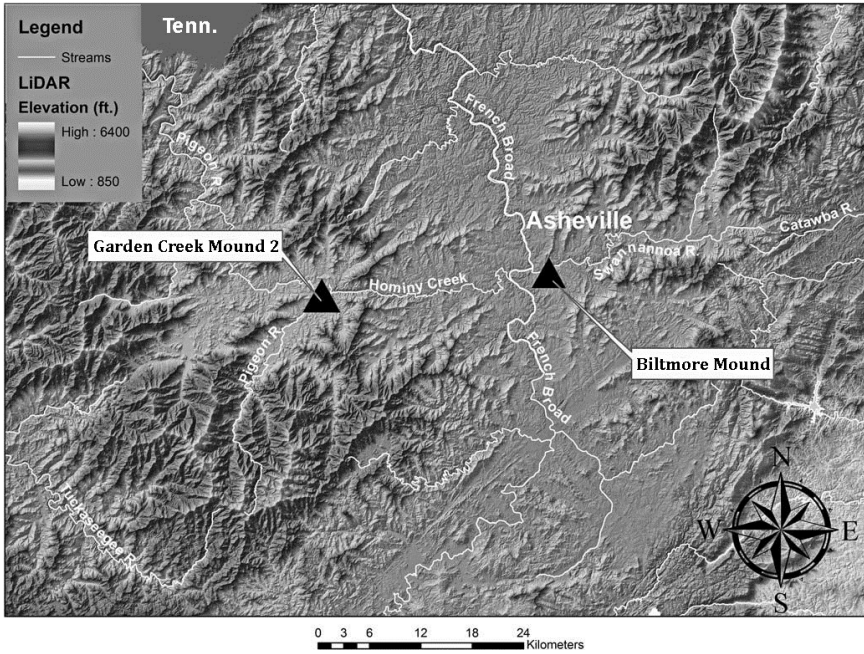


Figure 1. Location of Garden Creek Mound No. 2 (31Hw2), Haywood County, North Carolina and Biltmore Mound (31Bn174) in Buncombe County, North Carolina (adapted from Kimball et al 2010).

following is a summary and interpretation of archaeofaunal remains recovered by these excavations. The goal of this analysis is to provide the necessary data to determine the species, skeletal part, and seasonal representation of the assemblage and to identify taphonomic processes that have brought about its present condition and limit its interpretation. This approach allows conservative assessments of the processes that led to deposition (e.g., feasting *versus* domestic consumption), the nature of human diet within the context of mound use, and seasonality of deposition.

Methods

Specimens were examined by the author to identify the anatomical element (bone, tooth, etc.) and species represented, the portion (distal, proximal, etc.) and side (left *versus* right) represented by each element, and the age and sex of the individual represented. Each specimen also was examined for evidence of artificial modification (cut marks, polish,

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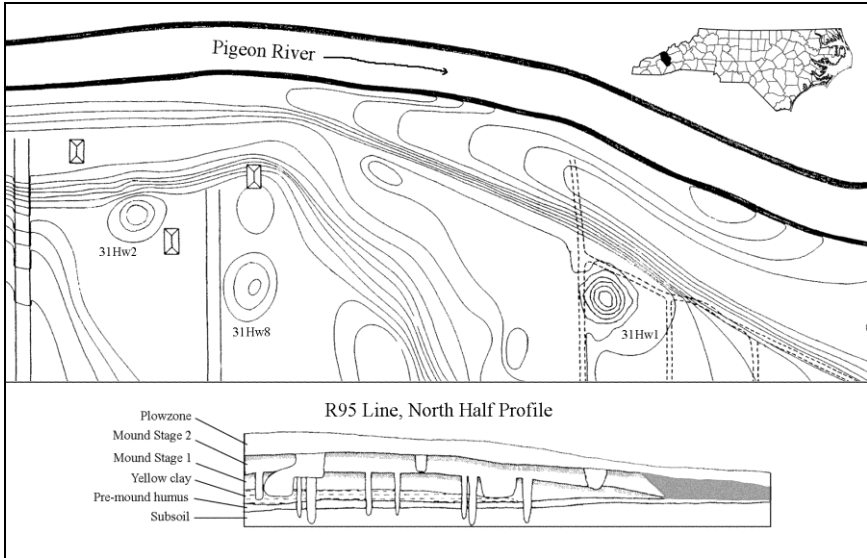


Figure 2. Setting and Cross-section of Garden Creek Mound No. 2 (31Hw2), Haywood County, North Carolina (adapted from Keel 1976).

striations, etc.), burning, perimortem or postmortem breakage, carnivore or rodent gnawing, and digestion.

Identification of specimens was made with reference to the comparative collection in the Zooarchaeological Lab at Appalachian State University. This collection is nearly comprehensive for the Holocene vertebrate fauna of the Appalachian Summit region, lacking only in extinct species and a few species of salamanders, snakes, cyprinid fishes, and migratory passerine birds. No specimens were unidentifiable due to comparative collection deficiencies. Due to the urgency of Keel's excavations and thus the use of shovels on non-feature contexts, many of the specimens were broken in recovery. Also, some unburned mammalian specimens evidently fractured into several pieces while being dried after washing or in storage. These fragments, indicated by an absence of soil staining on fracture surfaces, were combined when possible and recorded as individual specimens. As a result, specimen totals presented here are fewer than those reported in the UNCRLA specimen catalog for the site. Conjoinable fragments that had broken apart prior to excavation were recorded as individual specimens.

Table 1. Archaeofaunal Remains from Garden Creek Mound No. 2, Keel Excavations.

Scientific Name	Common Name	Specimen Count
Unionidae	Freshwater mussel	1
Kinosternidae	Musk turtle	1
<i>Terrapene carolina</i>	Eastern Box Turtle	6
Testudines	Turtle	2
<i>Meleagris gallopavo</i>	Wild Turkey	13
Aves (large)	Large bird	8
<i>Ursus americanus</i>	Black Bear	9
<i>Procyon lotor</i>	Raccoon	1
<i>Odocoileus virginianus</i>	White-tailed Deer	161
Mammalia (large)	Large mammal	476
Mammalia	Mammal	806
Vertebrata	Vertebrate	12
Total Specimens		1496

Results

The 1,496 archaeofaunal specimens recovered by Keel's excavations include remains of freshwater mussels, turtles, birds, mammals, and indeterminate vertebrates (Table 1). These were recovered from Mound Stages 1 and 2, postholes, features, and human burials. Due in part to pre-depositional bone fracturing (marrow-getting), but due primarily to poor preservation, only 13% of specimens were identified to within the family taxonomic grouping. Most were identifiable only as remains of mammals (806, 54%), large mammals (476, 32%), large birds (8, 0.5%), or vertebrates (12, 0.8%). More specifically identifiable specimens include remains of freshwater mussel (Family Unionidae), musk turtle (Fm. Kinosternidae), Eastern Box Turtle (*Terrapene carolina*), Wild Turkey (*Meleagris gallopavo*), Black Bear (*Ursus americanus*), Raccoon (*Procyon lotor*), and White-tailed Deer (*Odocoileus virginianus*) (Table 1).

The lack of remains of smaller vertebrates such as fishes, amphibians, snakes, and small birds and mammals is likely in part due to

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the use of half inch screens on most of the site's contexts. However, it was clear from the beginning of the analysis that post-depositional taphonomic processes such as carnivore gnawing and consumption, chemical weathering due to soil acidity, and microbiological decomposition had reduced the assemblage to a predominance of calcined specimens and ones representing denser mammalian anatomy. Note, for example, that 55% of specimens are either calcined (gray or white from near complete combustion) or charred (blackened or scorched). Moreover, 58 (53%) features (excluding human burials) and postmolds contained *only* burned bones. It is well known that burning inhibits microbiological decomposition of bone to the extent that only calcined bones have survived on some archaeological sites (Whyte 2001). Faunal preservation also is variable through the mound's stratigraphy. While faunal remains from subsoil, pre-mound midden, and Mound Stages 1 and 2 deposits show similar frequencies of burning (20–39%) and identifiable bone (10–25%), 83% remains from the yellow clay deposit forming the base of Mound Stage I are burned and only 7% are identifiable beyond the class level. This indicates that bone degradation was more severe in the yellow clay deposit, perhaps because of higher acidity of the matrix or because the clay and its contents represent secondary deposition relocated from elsewhere on the site.

Skeletal part representation of White-tailed deer at Garden Creek Mound No. 2 is clearly biased in favor of the denser and blockier foot bones (42% of identifiable specimens), especially astragali and calcanei, and distal ends of long bones such as the humerus (no proximal humeri were identified) (Table 2 and Figure 3). Nearly lacking from the assemblage are less-dense elements of the axial skeleton (vertebrae, sterna, and ribs). This is a clear indication of bone-density mediated preservation bias influenced by chemical and biological weathering (Lyman 1993) and possibly carnivore scavenging (Klippel et al. 1987). Three specimens show evidence of carnivore gnawing and two had been digested and regurgitated or defecated. As noted by Keel (1976:149), "Bone preservation at Hw2 could, at best, be considered as only fair."

For comparison, 37% of archaeofaunal specimens recovered from the roughly contemporaneous Biltmore Mound (31Bn174) site, only 25 km to the east, is burnt. Furthermore, the Biltmore assemblage includes numerous delicate items such as fish scales, eggshell fragments, and costal cartilage of mammals. Exceptional preservation at Biltmore Mound is likely due to calcium fortification of the soil through the

Table 2. White-tailed Deer Skeletal Part Frequency at Garden Creek Mound No. 2, Keel Excavations.

Skeletal Part	Specimen Count	Percent
Cranial	8	5
Axial	14	9
Fore-limb	41	25
Hind-limb	30	19
Foot	68	42
Total Specimens	161	100

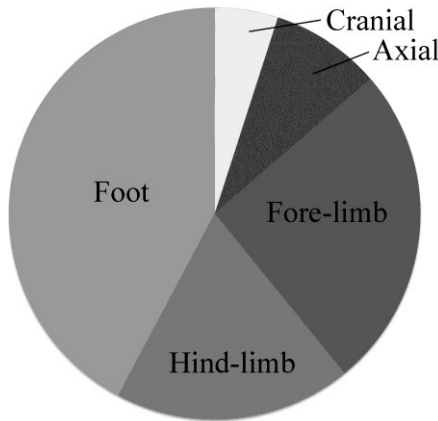


Figure 3. White-tailed Deer skeletal part representation at Garden Creek Mound No. 2.

concentrated deposition of extreme amounts of calcium-rich faunal material by the site’s occupants (Kimball et al. 2010).

Considering that preservation of animal remains at Garden Creek was mediated by bone density, burning, and the context of deposition, only very conservative inferences about the cultural behaviors and activities that led to deposition within and on the mound are afforded. The following, in taxonomic order, is an account of species and skeletal parts represented by the preserved specimens.

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Mollusks

Only a few flakes of freshwater mussel shell, recorded as one specimen broken in recovery and storage, were recovered by wet-screening of fill from Posthole 3, Unit 115R70, Subsoil. As the adjacent Pigeon River is renowned for its molluscan fauna (Parmalee 1988), it must be assumed that freshwater molluscan remains once deposited on the site have deteriorated.

Keel (1976) discusses gorgets, ear pins, and beads of marine mollusk shell recovered almost exclusively from later Pisgah phase burials. Their preservation was likely afforded by their deliberate placement in special contexts and their more recent age.

Turtles

Only nine specimens were identified as remains of turtles (Table 1). Remains of two taxa of turtles—Musk Turtle (family Kinosternidae) and Eastern Box Turtle (*Terrapene carolina*)—were recovered from various contexts. All are parts of the carapace or plastron and are calcined. One Eastern Box Turtle neural fragment shows evidence of artificial abrasion of the articular processes on the interior, likely resulting from use of the carapace as a container. Most turtle remains were recovered from posthole and feature fill that had been screened through finer (1/16-inch) mesh. This and the fact that all are calcined suggest that turtle remains are underrepresented in the data due to taphonomy and archaeological recovery bias.

Birds

The only bird remains recovered include 13 specimens identified as Wild Turkey (*Meleagris gallopavo*) and eight specimens identified only as large bird or bird (Table 1). Most bird remains were recovered from posthole and feature fill that had been screened through finer (1/16-inch) mesh. Parts of Wild Turkey identified include portions of humeri, femora, and ulnae. No artificially modified bird remains were recovered.

Mammals

Mammalian remains are the most numerous (97%); however, only 12% are specifically identified (Table 1). The latter include 161

specimens of White-tailed Deer (*Odocoileus virginianus*), nine of Black Bear (*Ursus americanus*), and one of Raccoon (*Procyon lotor*). The rest were identified only as mammal or large mammal (larger than dog), include primarily long bone diaphysis fragments, and probably represent primarily White-tailed Deer.

The Black Bear (*U. americanus*) is represented only by two poorly preserved canine teeth, a humeral shaft fragment, an astragalus, a fifth metatarsal, and four phalanges. This composition of elements may have resulted, in part, from variable preservation mediated by bone density. However, the canine teeth may have played a ritual role in the context of mound ceremonialism. Perimortem fracture observed on the humeral shaft likely indicates consumption of bone marrow.

The Raccoon (*P. lotor*) is represented only by a calcined mandible fragment recovered from a sub-mound posthole. It exhibits no evidence of artificial modification other than burning.

The White-Tailed Deer (*O. virginianus*) contributed 94% of identifiable mammalian remains. Over 20% of broken specimens exhibit one or more perimortem fracture surfaces likely resulting from marrow getting. While a predominance of foot bones (astragali, calcanei, metapodia, etc.) in the assemblage may be interpreted as evidence of ritual behaviors in the context of mound use or a low utility part consumption restriction characterizing the mound users, the pattern is best argued as evidence of density-mediated preservation bias. Notwithstanding, the abundance of low-utility parts in mound contexts, like at the nearby Biltmore Mound (Kimball et al. 2010), does not indicate restricted access to or activities on the mound by individuals whose status is marked in part by higher-yield butchery units (see also Knight 2001).

Modified Bone

Only six specimens, recovered from various mound contexts, were observed to have evidence of artificial modification (Table 3). One is an Eastern Box Turtle (*T. carolina*) carapace neural with evidence of interior abrasion and polish, probably representing part of a carapace container. Another is a piece of a White-tailed Deer (*O. virginianus*) metatarsus with evidence of reshaping. Three are fragments of long bone diaphyses with evidence of reshaping, and one is a fragment of a

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Table 3. Artificially Modified Archaeofaunal Remains from Garden Creek Mound No. 2, Keel Excavations.

Scientific Name	Element	Portion	Alteration
<i>Terrapene carolina</i>	Carapace	Neural	Abraded
<i>Odocoileus virginianus</i>	Metatarsus	Shaft	Reshaped
Large Mammal	Long bone	Shaft	Reshaped
Large Mammal	Long bone	Shaft	Reshaped
Large Mammal	Long bone	Shaft	Reshaped
Mammal	Bone	Fragment	Reshaped

reshaped bone identifiable only as mammalian. All of these are calcined and exhibit dry-bone breakage.

A modified deer mandible recovered from the pre-mound midden and marine shell artifacts recovered from some human burials (reported in Keel 1976) were not included in the present analysis.

Most of the modified bone specimens from the nearby Biltmore Mound also were broken and burned, suggesting the possibility of ritual “killing” of artifacts (Kimball et al. 2010). While this behavior may also explain the conditions of specimens at Garden Creek Mound No. 2, it is also possible that only more durable calcined specimens remain preserved to the extent that artificial modifications remain observable on their surfaces; the surfaces of many unburned specimens were notably weathered.

Possibly due to poor preservation and damage imparted by hastened recovery methods, no specimens were observed to have cut marks resulting from butchery or other forms of carcass processing.

Considerations of Context

Of the excavated Woodland period features, only Middle Woodland Connestee and Pigeon phase features contained animal remains. The fact that no Early Woodland Swannanoa phase features contained animal remains suggests that they did not remain preserved on the site from Early Woodland times and, by extent, that later features and mound deposits containing a mix of Early and Middle Woodland period artifacts

such as pottery do not include a mix of earlier and later faunal remains. It can be safely assumed, then, that all faunal remains contained in Middle Woodland features are of Middle Woodland age. Human burials, however, are intrusive to the mound from the Mississippian Pisgah phase and may contain a mix of Middle Woodland and Mississippian faunal and other material. Only 47 specimens, all mammalian, were recovered from the Pisgah phase burials and of these, only four (all *Odocoileus virginianus*) were identifiable beyond the class level.

No meaningful variation in species composition is seen among mound and submound deposits. This homogeneity may be a result of a taphonomic reduction of the assemblage to include primarily the denser elements of large mammals. Although deer part representation varies slightly among contextual groupings, this variation may be influenced by sample size and have little to do with changes in human activities or behaviors through time. The “pre-mound humus” identified by Keel (1976), likely representing a pre-mound habitation midden (Wright 2010), provided nearly 20% of the archaeofaunal specimens. However, most of these are unidentifiable mammalian bone except for a few identified as White-tailed Deer and Black Bear. This homogeneity and bias for larger mammals in a pre-mound residential context is clearly a product of density-mediated post-depositional degradation (Lyman 1993).

Conclusions

While the preservation of archaeofaunal specimens at Garden Creek is underwhelming, enough remains to permit cautious interpretations, especially with the benefit of the neighboring Biltmore Mound site serving as proxy. Biltmore Mound (31Bn174) is located 25 km to the east, just upstream of the confluence of Swannanoa and French Broad rivers in Asheville (Figure 1). It and Garden Creek Mound No. 2 are similar in size, shape, and composition, their ceramic and lithic artifact assemblages are similar, and they may be exactly contemporaneous (Kimball et al. 2010). Each is a Connestee phase oval platform mound characterized by a carefully planned and ideologically prescribed sequence of color, texture, and source-differentiated layers over a residential surface. Both mounds supported public architecture, some of which was evidently ritually “decommissioned” by filling postholes with light yellow-brown sand (Keel 1976; Kimball et al. 2010).

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Important differences between the two, other than geography, are the degree of contextual and material preservation and the way in which each was excavated. Biltmore Mound excavations, motivated by academic research rather than emergency salvage, were undertaken with more care and with the aid of finer recovery techniques. For some reason, preservation of faunal remains on and within Biltmore Mound is exceptional, while that of Garden Creek Mound No. 2 is, as Keel (1976:149) noted, “only fair.” If the two once contained similar faunal remains, as they do other artifact classes, then an abundance and array of remains of mollusks, fishes, amphibians, reptiles, small birds, and small mammals has disappeared from Garden Creek Mound No. 2.

While neither the abundance nor the array can be predicted from what remains, Garden Creek Mound No. 2 may have had functions identical to those of Biltmore which, based on evidence to date, are interpreted to be related to world renewal ceremonies of local egalitarian or trans-egalitarian residents participating in the larger southeastern Hopewell cosmogony (Kimball et al. 2010). Among others, these activities likely included warm-season communal feasting with participants from distant places in Hopewell space, including the eastern Midwest.

Notes

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Collections. Archaeofaunal specimens from Garden Creek Mound No. 2 are maintained by the Research Laboratories of Archaeology, The University of North Carolina at Chapel Hill.

References Cited

- Keel, Bennie C.
1972 *Woodland Phases of the Appalachian Summit Area*. Unpublished Ph.D. dissertation, Washington State University, Pullman.
- 1976 *Cherokee Archaeology: A Study of the Appalachian Summit*. University of Tennessee Press, Knoxville.

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- Kimball, Larry R., Thomas R. Whyte, and Gary C. Crites
2010 The Biltmore Mound and Hopewellian Mound Use in the Southern Appalachians. *Southeastern Archaeology* 29:44–58.
- Knight, Vernon J.
2001 Feasting and the Emergence of Platform Mound Ceremonialism in Eastern North America. In *Feasts: Archaeological and Ethnographic Perspectives on Food, Politics, and Power*, edited by Michael Dietler and Brian Hayden, pp. 311–333. Smithsonian Institution Press, Washington, DC.
- Klippel, Walter E., Lynn M. Snyder, and Paul W. Parmalee
1987 Taphonomy and Archaeologically Recovered Mammal Bone from Southeast Missouri. *Journal of Ethnobiology* 7:155–169.
- Lyman, R. Lee
1993 Density-mediated Attrition of Bone Assemblages: New Insights. In *From Bones to Behavior: Ethnoarchaeological and Experimental Contributions to the Interpretation of Faunal Remains*. Southern Illinois University, Center for Archaeological Investigations, Occasional Paper vol. 21:324–341.
- Parmalee, Paul W.
1988 A Comparative Study of Late Prehistoric and Modern Molluscan Faunas of the Little Pigeon River System, Tennessee. *American Malacological Bulletin* 6:165–178.
- Whyte, Thomas R.
2001 Distinguishing Remains of Human Cremations from Burned Animal Bones. *Journal of Field Archaeology* 28:437–448.
- Wright, Alice
2010 Under the Mound: The Early Life History of the Garden Creek Mound No. 2 Site. Paper presented at the 67th Annual Meeting of the Southeastern Archaeological Conference, Lexington, Kentucky.

**BURIED, EXHUMED, AND COMMEMORATIVELY
REINTERRED: THE REDISCOVERY OF LOST
CONFEDERATE SOLDIERS AT BENTONVILLE
BATTLEFIELD STATE HISTORIC SITE**

by

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Abstract

The last major battle of the American Civil War occurred in Johnston County, near the community of Bentonville, in March 1865. Now a North Carolina State Historic Site, historical documentation suggests that a number of wounded Confederate soldiers died and were buried hastily following the battle. These individuals were disinterred in 1895 and reburied in a commemoration ceremony. Over the past century, this specific location of reburial was “lost” and forgotten. A ground penetrating radar survey was conducted in 2006 to relocate these individuals, the results of which were archaeologically assessed in 2008 and 2010. This study details the archival and archaeological investigations undertaken that led to the relocation and modern commemorative marking of the final resting place of these 20 Confederate soldiers.

The battle of Bentonville represents the last major Confederate offensive of the American Civil War. Between March 19 and 21, 1865, remnants of General Joseph E. Johnston’s southern forces engaged the Union Army commanded by William Tecumseh Sherman near a small rural crossroads known as Bentonville, southwest of Goldsboro in Johnson County (Figure 1). Today the hallowed grounds of this conflict comprise the core of a North Carolina State Historic Site and are interpreted for the public. Visitors may take a driving trail of troop movements, as well as visit a restored period residence and a small family cemetery of the Harper family, on whose farm properties the majority of this battle occurred.

At any public historic site on the local, state, or national level, the degree of interpretation based on information gleaned from archaeological investigation varies widely. This may be a result of the mission and focus of the site, the available traditional historical

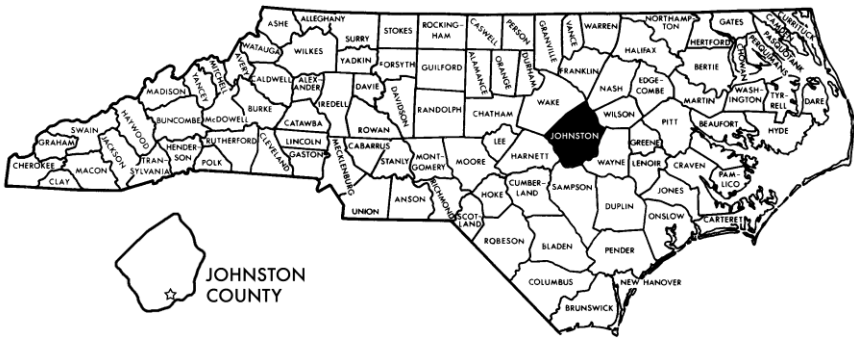


Figure 1. Location of Johnston County and Bentonville Battlefield State Historic Site in North Carolina.

documentation (e.g., written accounts, drawings, photographs, etc.), or the extent of archaeological excavations conducted at the site. Unless the site is specifically designed to be an archaeological park and contains original, visible period features (e.g., the colonial-period house foundations and Civil War earthworks at Brunswick Town/Fort Anderson State Historic Site) or the excavations were for the accurate restoration of structures or landscape (e.g., Tryon Palace and Somerset Place state historic sites), traditionally archaeology has played a minor role where only the most significant discoveries have been interpreted for the public.

Such has historically been the case at Bentonville Battlefield State Historic Site (31Jt69**), where small-scale archaeological investigations conducted intermittently over the past 40 years have focused primarily upon activities related to building repair and restoration (Babits 1976; Beaman 2000a; Harper 1997; Wilson 1984), landscaping (Carnes-McNaughton 1992, 1996a; Harper 1991; Wilson 1983a, 1983b), and general site maintenance (Beaman 2000b; Carnes-McNaughton 1996b; Harper 1990). Each of these projects was limited in scope and yielded few artifacts, the vast majority of which were related to post-Civil War activities, recent improvements, or modern visitation. Despite the decades of investigations at Bentonville, archaeology had continued to maintain a silent and non-visible presence at the site because it offered no new interpretive information about Civil War-era soldiers' encampments, troop movements, the battle, or its aftermath.

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However, in 2008 archaeology was able to unravel one of the mysteries about an historical event at the site through the rediscovered location of 20 deceased Confederate soldiers. These soldiers had reportedly died in the Harper House, a local residence that was used as a Federal Army field hospital. Rumored to have been originally buried in the days following the battle by the Harper Family, these individuals were exhumed and reburied in a commemorative ceremony in 1895. Yet apparently no permanent markers were placed that identified this reinterred location. Through the use of ground penetrating radar, the unusual style of this reburial — small, oval, or rectangular holes dug to hold approximately 2-ft square wooden boxes that held the collected human remains — was detected and verified through limited archaeological investigation. This study summarizes the historical and archaeological aspects of the project reported in Robinson and Schneider (2007) and Robinson et al. (2008), as well as subsequent investigations that led to the establishment of a “Confederate Cemetery” for the site and installation of permanent commemorative markers for these reinterred soldiers.

Historical Context: The Battle, The Burials, and a Commemorative Monument

Following months of a “total war,” the “scorched earth” campaign through Georgia and South Carolina in 1864 and early 1865 found Sherman’s troops in pursuit of Johnston’s army. In their attempt to catch and defeat Johnston, a second primary goal was to cripple the already weakened supply lines of General Robert E. Lee’s Confederate Army of Northern Virginia. Following the defeat of Confederate Forts Fisher and Anderson along the Cape Fear River, as well as the capture and occupation of important Confederate supply centers at Wilmington and Fayetteville, mid-March found Sherman’s army moving northeastward towards Goldsboro. It was there where the two most important remaining rail lines in the state crossed and railroad maintenance shops were located. One of these lines, the Wilmington-Weldon Railroad, was one of the last major suppliers of Lee’s troops (Barrett 1963:244). Sherman was intent on capturing the Goldsboro railroad shops before he moved on the city of Raleigh. A final attempt by Johnston and his army to protect these supply lines and to halt Union forces at Bentonville resulted in a bloody battle with 4,133 reported casualties: 1,527 by the Union forces and 2,606 by the Confederates (Barrett 1963:343). This loss forced Johnston’s army to retreat toward Smithfield, then eventually

to Raleigh and beyond. Within a few weeks, following the surrender of Lee at Appomattox Courthouse, Johnston surrendered the Confederate southern forces to Sherman near Durham at Bennett Place (also now a State Historic Site) on April 26, 1865.

During the battle, the residence of John and Amy Harper, located near the edge of the main battlefield, was commandeered by the Union Army's XIV Corps and used as a field hospital. Historical accounts and photographs document the quick, unsanitary, and assembly-line style medical treatment provided to soldiers injured during this conflict. Scores of hands, feet, and limbs were amputated and discarded through the window of the parlor, which was used as the main operating room. By the end of the battle, both Union and Confederate wounded were housed in and around the house.

When the Union army departed on March 22 (the day after the battle), the worst of the Confederate wounded were left behind. Twenty-three of these soldiers subsequently died. Troop records indicate that three of these soldiers were close enough to home to be collected by their families. Eventually a total of 20 were buried in the vicinity of the Harper house, reportedly near the family cemetery located about 300 yards east of the family home. Whether the dead were buried in a mass grave or individual graves remains unclear, though local tradition held that individual graves scattered about the battlefield were later dug up and moved into a mass grave around 1895 (Crow 2006:54). As part of this effort, under the North Carolina Monumental Association's rallying cry of a "land without monuments is a land without history," a public campaign to erect a monument at Bentonville in memory of these Confederate dead began in 1893 under the sponsorship of the Goldsboro Rifles, a local militia unit of the North Carolina State Guard (Crow 2006:39, 48–51). The money-raising campaign for the monument was a long one, and it was two years before the monument could be purchased and erected.

The Confederate graves were apparently unmarked, though records of the memorial campaign give clues as to where at least some of the dead were buried. The first account is by M. Haywood Bizzell, one of the men who advocated for the establishment of the memorial at Bentonville. He described the battlefield in 1894 as "a sacred spot of earth, where sleep in unmarked graves the silent dust of twenty of the brave men who sacrificed their lives on the altar of Southern Rights"

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(Crow 2006:39). Additional information from Bizzell's letter suggests that during the time that John and Amy Harper, owners of the Harper property, "lovingly maintained the graves, only a single rail fence and the absence of weeds set apart the hallowed ground [from the surrounding area]" (Crow 2006:39). In this quote, Bizzell seems to indicate that the soldier's graves were clustered in a special area surrounded by a fence, although he could have been referring to soldiers' graves located inside or near the Harper family cemetery.

Another account of the memorial effort from 1895 suggests the Confederate bodies were scattered about the battlefield in individual graves: "Through the first months of 1895, the Rifles continued the work of raising their Confederate memorial at Bentonville. On February 26, 1895, the Rifles dispatched a special committee to Bentonville to begin the process of collecting the remains of the Confederate dead from their scattered burial spots around the battlefield and reintering them at the location set aside for the monument" (Crow 2006:54; from information in the Goldsboro *Daily Argus*, December 16, 1894). It may be that the scattered graves were in addition to those buried in the vicinity of the Harper family cemetery, although this cannot be certain, and exactly where the graves were originally located around the battlefield remains unclear.

On March 20, 1895, the 30th anniversary of the battle, the monument at Bentonville was dedicated. Though heavy rain kept many people from attending, the dedication ceremony attracted several hundred people (Crow 2006:56–57). General Wade Hampton of South Carolina was the guest speaker at the dedication. This monument remains on the battlefield today (Figure 2), but except for marked graves located inside the fenced Harper family cemetery (located about 45 yards north of the monument, as shown in Figure 3) and several marked twentieth-century graves located a few yards west of the Confederate monument, there is no visible above-ground evidence of the reinterred soldiers' graves associated with or near the monument.

Fortunately, there is an 1898 photograph in the North Carolina Archives that shows the monument area shortly after the time of its dedication. The photograph shows that the ground extending north (toward the Harper family cemetery) from the monument was landscaped, with grave markers, possibly wooden, placed in at least two rows (Figure 4). The western row (left in the photograph) was longer,



Figure 2. The monument commemorating the Confederate dead at Bentonville Battlefield State Historic Site (facing north). It was erected by the Goldsboro Rifles, a local militia group, around 1895. The monument is almost centered between the two rows of trees, and the Harper family cemetery is located at the other end of the row.



Figure 3. The Harper Family Cemetery. View faces southwest.

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Figure 4. An 1898 photograph of the monument to the Confederate dead at Bentonville. This view is to the north. The Harper family cemetery fence is located behind the monument, with other fencing present left (west) of the cemetery. Visible to the left and right of the monument are raised or covered beds with what appear to be individual grave markers.

containing more than 20 markers and the eastern row (right) is fairly short with only four markers. The markers presumably represent the number of disinterred individuals who were reburied near the monument, which would total about 24 graves or more. It is possible, however, that the markers do not mark individual graves but are instead symbolic of the number of individuals buried there, with the actual physical remains

buried in one or more collective graves. Whether the reinterred remains were placed in individual graves or a mass grave, or several collective graves, is an issue that made the radar search for the graves all the more interesting. While this photograph was not available when the ground penetrating radar survey was undertaken in October 2006, it did provide a great deal of information that helped with the interpretation of the radar data.

Although the 1895 monument has stood firmly through the years, the graves associated with it were neglected during the first half of the twentieth century. By the 1940s, when the area began to be extensively plowed and cultivated, the location of the reinterred Confederate graves was largely forgotten. When the State acquired the property in 1957, in addition to four burials of family members that owned the land during the first half of the twentieth century about 12 yards west of the monument, there were only a few vague recollections among local residents that additional graves had been located in this area. Two rows of longleaf pine trees (*Pinus palustris*) were planted north of the battlefield monument after this acquisition, and over the past 50 years they have grown substantially. Perhaps these trees represented an attempt to mark the line of graves shown in the 1898 photograph, or alternately to define an approach to the gate of the Harper family cemetery located about 45 yards north of the monument. Additionally, the 1898 photograph shows the family cemetery enclosed by what appears to be a wood picket fence, but it was sometime later replaced with an iron fence that is still in existence today.

The Search: Ground Penetrating Radar Surveys

Perhaps inspired by the impending Civil War sesquicentennial and Crow's *North Carolina Historical Review* article on the historic commemoration efforts at Bentonville, in 2006 the staff of the Bentonville Battlefield State Historic Site initiated a formal effort to search for the missing Confederate graves. Given the previous failed attempts over the years to find these commemoratively reburied soldiers with probes, in consultation with the North Carolina Office of State Archaeology, the staff of Bentonville and the Bentonville Battlefield Historical Association, Inc., the support group for the state historic site, decided that examination of the area where graves were suspected by ground-penetrating radar (GPR) would be the best method for the search. The site's support group, The Bentonville Battlefield Historical

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Association, and a local reenactment group, Company D-27th Regiment, North Carolina Troops, provided funds for a joint project between Wake Forest University Archaeology Laboratories, the North Carolina Office of State Archaeology, and Tar River Archaeological Research to conduct a GPR survey of areas in the vicinity of the Harper family cemetery to see if any unmarked graves of the “lost” Confederate soldiers could be found.

In general, ground-penetrating radar provides an excellent, non-intrusive method to locate and identify subsurface signatures of cultural activity that have no visible above-ground remains. GRP involves the observation of the reflected component of transmitted electromagnetic waves. The radar signals are sent into the ground and an antenna captures the reflected signals. Differential reflections occur at the interfaces of materials of differing electrical conductivity or permittivity. The depth of penetration for radar waves is frequency dependent, and the attenuation of the radar wave in the ground is rather quick compared to, for example, that of seismic waves — a few meters compared to kilometers. The GPR output is a series of radar wavelet traces or scans produced on a chart recorder or computer screen as an antenna is pulled across the ground surface. The use of ground-penetrating radar (GPR) on archaeological sites has grown in popularity in recent years due to the advent of new mapping techniques that allow an accurate portrayal of subsurface data, thereby enhancing interpretations (Conyers and Goodman 1997:11).

The GPR data at Bentonville were collected by a Geophysical Survey Systems (GSSI) Model SIR 3000 GPR unit composed of a digital computer console, cable, and a 400 MHz antenna attached to a survey wheel. The time window for the data collection was set at 50 nanoseconds. This allowed the operators to image near-surface detail and view subsurface details to 6 or 7 ft below surface. The radar signal attenuates below this depth. The data were post-processed using the GPR-Slice program (www.gpr-survey.com) that allows the presentation and viewing of data in two and three dimensions. Both two- and three-dimensional analyses were used for data interpretation as part of this project.

The GPR data were collected from two different areas near the Harper family cemetery (Figure 5). Archaeologists Kenneth W. Robinson of Wake Forest University and Kent Schneider, Ph.D., of

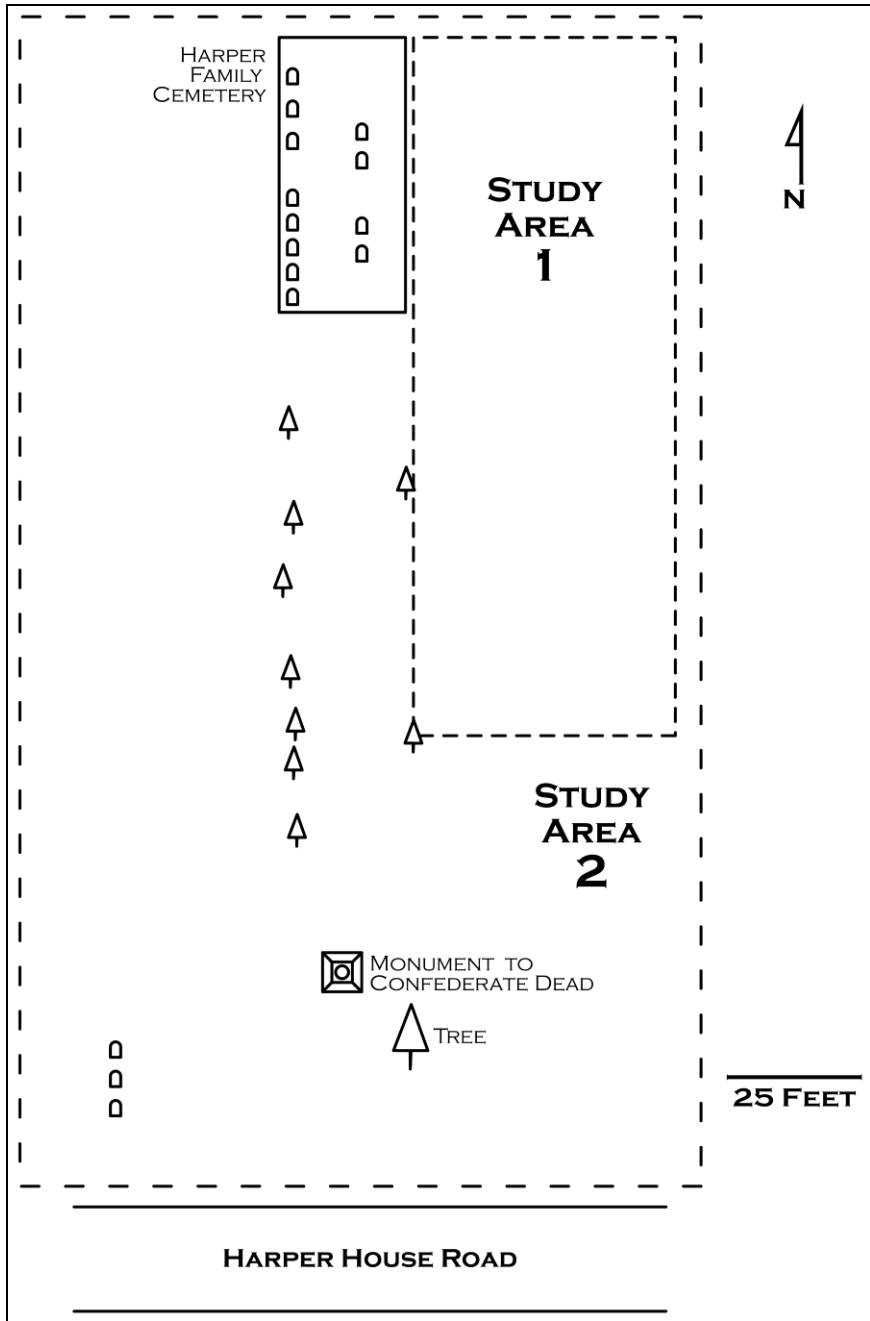


Figure 5. Plan view of the commemoration monument and Harper family cemetery showing study areas 1 and 2.

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Figure 6. Collection of data in Study Area 1 using ground penetrating radar. Steve Thomas, host of The History Channel's *Save Our History* program, is pulling the radar sled while Ken Robinson reads the real time data output on his laptop. Also shown are Michael Murrow and Tom Beaman. View is to the southwest, with the commemoration monument visible in the background.

Underground Imaging Solutions, Inc., with Michael Murrow and William Terrell, professional staff from Wake Forest University Archeology Laboratories, performed the initial data collection in Study Area 1 on October 16, 2006. Archaeologists John Mintz and Tom Beaman, as well as the staff from Bentonville Battlefield State Historic Site and Historic Sites Section Chief Rob Boyette, provided field assistance. Robinson and Schneider also processed and analyzed the results from this phase. Part of this data collection and analysis was filmed by The History Channel's *Save Our History* program, specifically for the episode "Sherman's Total War Tactics." Host Steve Thomas even pulled the GPR sled for several transects across this study area (Figure 6). Interestingly, many video clips from this data collection were also shown as a modern method of grave location in the recent *Written in Bone* exhibit at the Smithsonian Museum of Natural History. Robinson collected data from Study Area 2 on October 27 and 29, 2006, again

assisted by Mintz, Beaman, members of the site staff, friends, and local volunteers.

Radar Study Area 1

At the onset of the ground-penetrating radar study, the existence of the 1898 Monument photograph discussed above was not known to the staff of the historic site or the archaeologists. Therefore, Site Manager Donny Taylor suggested an area on the east side of the Harper family cemetery as the best place to begin the radar search. The ground in this area was slightly elevated and seemed to be best suited for burials. Based on Taylor's suggestion, Robinson, Schneider, Mintz, and Beaman established a 15 m by 40 m tract as Study Area 1.

Conditions for data collection were excellent. The ground surface was covered with short grass. The radar grid was set with its long axis in a north-south direction, parallel to the east side of the Harper Cemetery fence. This direction was selected so that radar transects would likely extend across the width of any graves that might be present. Graves inside the Harper cemetery were generally oriented lengthwise in an east-west direction, with headstones generally facing east, and it was expected that any grave outside the cemetery fence would likely also be oriented in this fashion.

Unfortunately, the initial GPR survey did not yield any strong evidence of graves. A few small subsurface anomalies of moderate strength were detected, but these did not appear to be graves. These anomalies were not oriented east-west as expected of most period burials, and the depth and continuity of the subsurface anomalies was not what would be expected of grave features. Of course, the possibility that the stronger anomalies might be graves was not ruled out entirely until they could be tested through archaeological investigation.

Despite a lack of convincing evidence that graves might be present, the initial radar results did show that the soil in the area was very suitable for the collection of GPR data. Tree roots buried in the ground showed up clearly on one edge of the radar maps, and features such as the postholes and molds of the iron fence alongside the family cemetery were clearly visible in the upper slices of radar data. Based on the results from Study Area 1, as well as general suitability of the area for GPR, it was decided that a larger area on other sides of the Harper family

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cemetery needed to be surveyed to determine if any clearly unmarked graves might be present.

Radar Study Area 2

Given the inconclusive radar evidence in Study Area 1, Robinson, Mintz, and Beaman returned to Bentonville several weeks later for a follow-up GPR study. A 40 m by 75 m tract, nearly six times as large as Study Area 1, was established as Study Area 2. As seen in Figure 5, this area surrounded the Harper family cemetery, extended southward through the two parallel rows of large pine trees, and past the 1895 monument to within a few meters of the ditch alongside Harper House Road. A resurvey of Study Area 1 was also included within Study Area 2, as it was decided that it would provide consistent radar data across the larger area rather than to try and combine data sets from the two separate surveys.

The GPR survey of Study Area 2 produced intriguing results. Subsurface anomalies were detected in the center of the study area between the monument and the family cemetery. The mapped radar data did not show a series of individual grave pits, as might be expected, but instead showed two elongated and irregular patches of subsurface anomalies. Despite the irregularity of these anomalies, these were interpreted to be the most likely places for graves, either in the form of a singular mass burial or multiple, close individual interments. Based on the presence of these anomalies, archaeological investigations later undertaken in 2008, and as will be detailed below, the sought reinterred burials were found in these areas. In addition to identifying the places where graves were most likely to be located, the GPR survey was very useful in clearly illustrating which areas around the Harper Family Cemetery and 1895 monument did not contain graves.

It should be noted that the mapped radar data in Study Area 2 was complicated by the reflections of roots from the trees in the same area. In retrospect, some of the radar anomalies identified near the surface represent reflections from a combination of tree roots, plowed soil, and the presence of shallow graves just below the plow zone. The radar was not capable of discriminating between the graves and the roots and root disturbances near the surface, although in hindsight, lower density reflections that show up between the root reflections probably represent the graves that were identified in the field.

**The Rediscovery: Field Investigations
of Radar Anomalies**

The GPR survey of Study Area 2 yielded enough positive evidence to warrant subsequent archaeological investigations. The mapped radar data illustrated two anomalies in this area as elongated and irregular patches based on, as noted above, reflections within the soil matrix that differed in electrical conductivity or permittivity. While it was suspected these anomalies represented the presence of the reinterred Confederate soldiers associated with the 1895 monument, as with data from almost all remote sensing devices, the two locations within Study Area 2 needed to be conclusively identified through archaeological investigations.

Methods and Results of the Field Investigation

A plan on how to best investigate these anomalies was designed through additional consultation between the Office of State Archaeology, Wake Forest University Archeology Laboratories, and staff of Bentonville Battlefield State Historic Site. The archaeological investigation was to be conducted in three steps. First, a backhoe would be used to strip the topsoil and plowed (disturbed) soil in trenches, the locations of which would provide the best chance to define the detected anomalies within the study area. Next, the remaining plowed soil, as well as the interface of additional subsurface layers or subsoil, would be cleared through the use of schnitting (i.e., using flat shovels to skim the surface flat) and trowels to expose and define any features. Finally, the floors of these trenches would be documented through mapping and photography.

Joint field investigations took place on January 24 and 25, 2008, co-directed by Mintz and Robinson, with field assistance provided by Beaman, the staff of the historic site, local volunteers, and Johnny Carter, the backhoe operator from the North Carolina Transportation Museum in Salisbury. Six trenches of varying lengths were excavated using a backhoe in combination with shovel skimming. The locations of the trenches were selected using the ground-penetrating radar data maps as a reference. Five were placed west of the rows of pine trees, and one was placed on the eastern side. After experimenting with various backhoe techniques, it was found that the most efficient excavation method was to break up a few inches of plowed soil at the end of the trench with the backhoe bucket, and then use the front-end loader to pull back the soil,

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Figure 7. Shovel skimming after most of the plow zone has been removed with the backhoe. View faces east.

level by level, to the opposite end of the trench. Each scrape with the front end loader removed about one inch of soil. The technique permitted the 20 inches of plowzone to be carefully removed. Next, flat shovels and hoes were used to schnitt away the remaining plowed soil (Figure 7). The use of trowels and other hand tools to complete the excavation insured that soil beneath the plow zone would remain undisturbed and the tops of any graves pits would be located without disturbing the contents of the grave.

A total of eight graves were identified in the six excavated trenches (Table 1). The grave pits all showed up as dark stains (Munsell colors 10YR 4/3–4/4 and 10YR 5/3–5/6) in the lighter subsoil. Human skeletal remains and nails were visible at the tops of the graves in a couple of the pits. It was obvious that plowing had truncated the grave shafts and in some instances the human remains contained within the grave. No attempt was made to excavate the contents of any grave pit that was identified. When burial pits were located and identified, the grave was left intact. Human remains that were identified at the base of the plow

Table 1. Grave Pit Features Identified During Field Verification of the GPR Survey Results.

Feature Number	Location	Described Appearance	Size	Contents Observed on Top of Feature
1	Trench 1	Small, oval shaped	1.6 ft by 2.1 ft	None
2	Trench 1	Small, oval shaped	2.4 ft by 2.0 ft	None
3	Trench 2	Small, roughly rectangular shaped	2.6 ft by 2.8 ft	Several nails
4	Trench 2	Small, oval shaped	1.1 ft by 2.1 ft	Nail, cranium fragments
5	Trench 3	Small, oval shaped	1.8 ft by 3.2 ft	None
6	Trench 3	Small, rectangular shaped	2.5 ft by 2.8 ft	None
8	Trench 6	Small, elongated oval shaped	3.5 ft by 3.2 ft	Nail fragment
9	Trench 6	Small, oval shaped	3.1 ft by 2.6 ft	Nail, fragments of misc. human bone

zone were left undisturbed and were subsequently reburied. Finally, the grave pits were photographed and plan maps were drawn to show the location relative to the excavated trench.

In addition to plow scars in the subsoil, two additional sub-plow-zone features were also identified. Each of these was carefully exposed at the base of the plow zone, and documented with photographs and drawings. These non-burial features also appeared as dark stains in the lighter subsoil, but were much more irregular shape than the graves.

A second field investigation led by Mintz was conducted on June 12, 2010. Using the same field methodology, four additional trenches were excavated on the eastern side of the rows of pine trees. While several grave pits had been identified in the area during the original trenching, these trenches were designed to document the extent of the commemorative reburials. The northernmost grave pit was identified, yielding a total of four on the eastern side, compared to the 16 documented on the western side of the pine tree rows. As with the earlier identified grave pits, these were not excavated and were reburied following photography and measured drawings.

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Observations and Interpretations

As shown in Figure 8, the small, oval graves identified by GPR and verified through archaeological investigation are clearly lined up in two north–south rows between the 1895 Battlefield Monument and the Harper family cemetery. The graves are spaced about 2.5–3.5 ft apart, and were shallow pits that extended no more than 2.5 ft below the ground surface. The verified locations of these graves in the ground clearly correspond to the two lines of wooden markers shown in the 1898 photograph of the battlefield monument (Figure 4).

Given the small size of the reinterments, it is probable that only the best preserved pieces of skeletal remains were removed from the original grave for reburial when they were disinterred in 1895. Nails were identified within the grave pits associated with the skeletal remains. These may have been used to construct small wooden boxes used to hold the transported remains, although definitive evidence for such boxes, such as fragments of wood, was not found.

Presently, the two rows of graves lie parallel to the two extant rows of pine trees between the monument and family cemetery. The trees are estimated to be about 80 years old. However, the east and west tree lines are not positioned the same distance from the lines of graves. The western line of graves is about 2.0–2.5 ft west of the western tree line, and the eastern graves are directly in line with the eastern line of trees. It appears that the tree lines were intended to provide a visual connection between the 1895 monument and the family cemetery, but the specific locations of these graves may have been lost by the time the trees were planted. This would have been before 1940, as the tree lines are shown in the 1940 aerial photograph. It does not appear that the trees were planted to show precisely where the graves were located.

It is not surprising that the locations of the graves were lost in the early twentieth century. As shown on early aerial photographs, repeated plowings of the agricultural fields adjacent to the cemetery extended onto the lines of graves. The archaeological investigation clearly showed that all of the area between the monument and family cemetery was plowed at one time, as there is a well-developed plow zone throughout this area. The twentieth-century plowing cut through many of the shallow, reinterred graves to a depth of about one foot below surface, truncating the graves as well as scattering and destroying any remnant of the

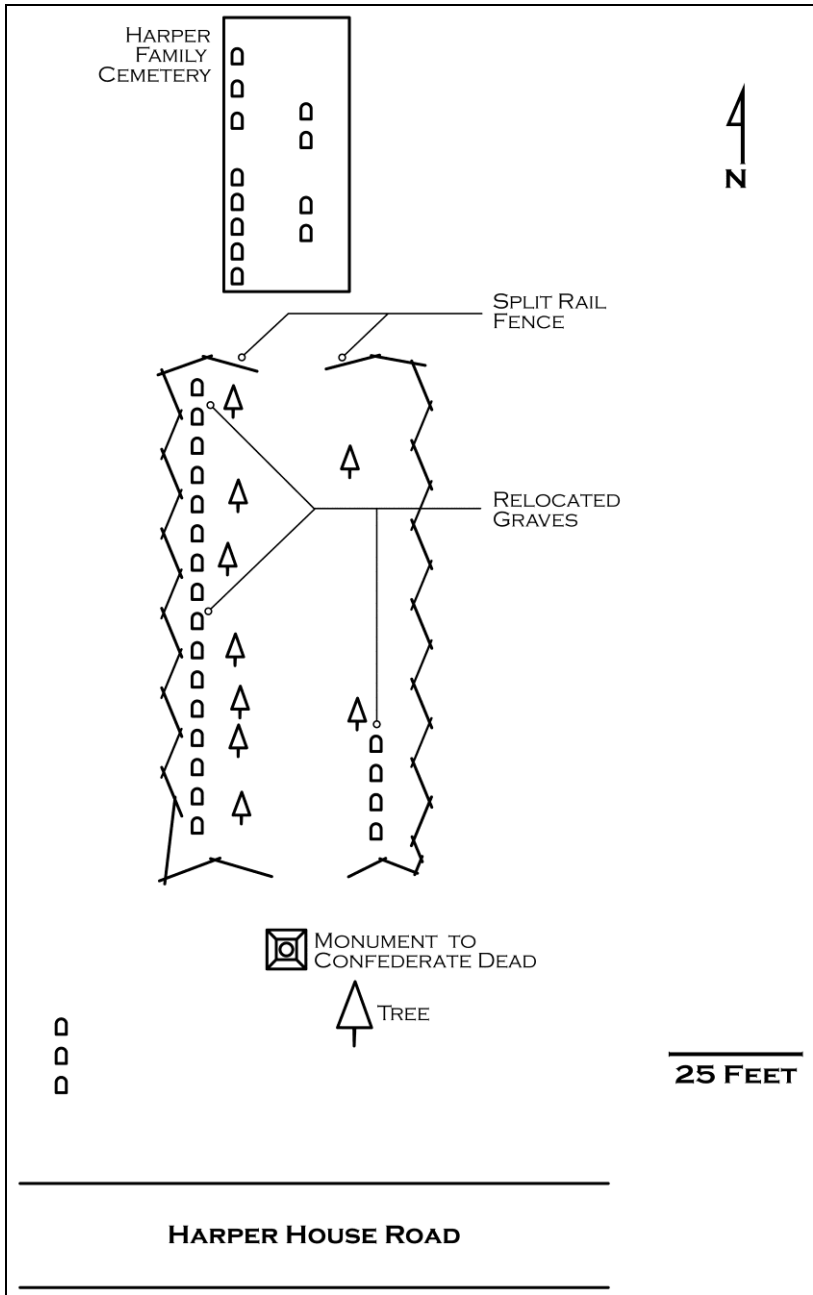


Figure 8. Plan view of the monument and Harper family cemetery showing the locations of the relocated graves.

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wooden markers, parts of the burials, and the tops of many of the boxes that contained the human remains.

Summary and Cemetery Dedication

Archaeological investigations at Bentonville Battlefield State Historic Site have resulted in confirmation that the human remains of 20 Confederate soldiers were reinterred in two rows between the 1895 Battlefield Monument to Confederate Dead and the Harper Family cemetery after being removed from their original burial places. According to historic records, the burials were relocated and commemoratively reburied in February and March, 1895, just prior to the 40th anniversary of the Battle of Bentonville. Archaeological evidence shows that the reinterments were placed in small, shallow pits, each measuring approximately 2.0 ft by 3.5 ft, not in individual standard-sized graves, several collective graves, or a mass burial pit.

Given the unexpectedly small size of the pits, as well their locations near and within the roots of the large modern pine trees, traditional methods of grave identification, such as shovel tests or the use of a probe rod, would have likely not been able to locate the pits or to identify the regular interval of burials in two rows. The systematic search with ground-penetrating radar, combined with mechanical trenching, proved the most effective technique in terms of time and cost in relation to the large area surveyed. In the short space of several days, archaeologists were able to electronically identify cultural anomalies from the natural ones, and to verify the archaeological pattern of the grave pits through limited field testing. Additionally, ground-penetrating radar provided a non-intrusive method of investigation that respected the remains of the deceased without inflicting further damage or disturbance to them.

As an act to help commemorate the Sesquicentennial beginning of the American Civil War, in conjunction with the North Carolina Department of Cultural Resources, Bentonville Battlefield State Historic Site dedicated the area containing the 20 graves as a Confederate Cemetery. While specific identification of the individuals contained in each of the reinterred burials was not undertaken, Assistant Site Manager Derrick Brown and North Carolina Archives and History Research Historian Joshua Howard were able to compile potential identities from period military records for 16 of the individuals (Table 2). Given the absence of conclusive identities, 20 grave markers for unknown

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Table 2. Potential Identities of Confederate Soldiers Who Died in the Harper House and Were Buried, Exhumed, and Commemoratively Reinterred at Bentonville Battlefield State Historic Site.

Soldier's Name	Unit Served at Time of Battle (March 1865)
James F. Chambers	Company A, NC 3 rd Light Artillery
Thomas J. Dearing	Company H, 27 th Georgia Infantry
J.H. Edwards	Company B, 26 th Tennessee Infantry
Lewis B. Flack	Company G, 50 th North Carolina Infantry
James W. Glover	Company C, 51 st Georgia Infantry
George W. Larimer	Company I, 42 nd Alabama Infantry
James A. Latham	Company B, 40 th Alabama Infantry
Maloy A. McPhaul	Company A, 1 st North Carolina Battalion Heavy Artillery
Harley Nance	Battery E, 2nd North Carolina Light Artillery
William E. Reid	Company G, 13 th Battalion North Carolina Light Artillery
Samuel H. Smithson	Company D, 32 nd Tennessee Infantry
Jacob Sowers	Company D, 13 th Battalion North Carolina Light Artillery
John R. Stringfield	Company G, 6 th Georgia Infantry
Gilbert C. Taylor	Company A, 1 st North Carolina Battalion Heavy Artillery
Abram D. Wadkins	Company A, 54 th Virginia Infantry
R.H. Webb	Company D, 45 th Tennessee Infantry

Confederate soldiers were purchased and donated to the project by the Harper House Chapter of the United Daughters of the Confederacy (Figure 9). With the assistance of John Mintz, on June 8, 2011, these markers were installed over the locations of the 20 identified grave pits (Figure 10). Additionally, a split rail fence was constructed to delineate the boundaries of the cemetery, and an interpretive panel for visitors was prepared for the area. The dedication of the new Confederate Cemetery at Bentonville Battleground State Historic Site was held on Saturday, June 11, 2011.

As seen in Figure 11, the 116-year-old monument to the Confederate Dead at Bentonville continues to stand as a silent sentinel over the 20 unidentified soldiers who perished as a result of the Battle of Bentonville. While the newly installed grave markers lend a respectful commemorative voice to these individuals, the inscription on the monument provides an equally fitting reminder:

*“Nor shall your glory be forgot while fame her record keeps
or honour points the hallowed spot where valor proudly sleeps.”*

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Figure 9. One of the Unknown Confederate Soldier commemorative grave markers purchased by the Harper House Chapter of the United Daughters of the Confederacy. View faces west towards the Bentonville Visitor Center.



Figure 10. Unknown Confederate Soldier grave markers were installed over the measured locations of the 20 identified burial pits on June 8, 2011.



Figure 11. The 1895 monument commemorating the Confederate dead with the 20 installed Unknown Confederate Soldier grave stone markers at Bentonville Battlefield State Historic Site. View faces north.

LOST CONFEDERATE SOLDIERS AT BENTONVILLE

Notes

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Disclaimer. Even with the tremendous support and assistance of the individuals acknowledged above, the authors assume full responsibility for any factual errors and the interpretations presented in this article.

References Cited

- Babits, Lawrence E.
1976 Exploratory Archaeology at Bentonville Battlefield State Historic Site, Johnston County, North Carolina. Archaeology Section, Division of Archives and History, Department of Cultural Resources, North Carolina. Copy on file, North Carolina Office of State Archaeology, Raleigh.
- Barrett, John G.
1963 *The Civil War in North Carolina*. The University of North Carolina Press, Chapel Hill.
- Beaman, Thomas E., Jr.
2000a Installation of New Electrical Panel Box for the Harper House at Bentonville Battlefield State Historic Site (31Jt69**). Fieldwork summary on file, Historic Sites Section Archaeology Files, North Carolina Office of State Archaeology Research Center, Raleigh.

2000b Installation of New Hydrants and Waterlines at Bentonville Battlefield State Historic Site (31Jt69**). Fieldwork summary on file, Historic Sites Section Archaeology Files, North Carolina Office of State Archaeology Research Center, Raleigh.
- Carnes-McNaughton, Linda F.
1992 Clearance for New Monument at Bentonville Battlefield State Historic Site (31Jt69**). Fieldwork summary on file, Historic Sites Section Archaeology Files, North Carolina Office of State Archaeology Research Center, Raleigh.

1996a Clearance for Stump Removal at Bentonville Battlefield State Historic Site (31Jt69**). Fieldwork summary on file, Historic Sites Section Archaeology Files, North Carolina Office of State Archaeology Research Center, Raleigh.

1996b Clearance for New Security Systems at Bentonville Battlefield State Historic Site (31Jt69**). Fieldwork summary on file, Historic Sites Section Archaeology Files, North Carolina Office of State Archaeology Research Center, Raleigh.
- Conyers, Lawrence B., and Dean Goodman
1997 *Ground Penetrating Radar: An Introduction for Archaeologists*. AltaMira Press, Lanham, Maryland.
- Crow, Amy
2006 "In Memory of the Confederate Dead:" Masculinity and Politics of Memorial Work in Goldsboro, North Carolina, 1894–1895. *The North Carolina Historical Review* LXXXIII(1): 31–60.
- Harper, Terry M.
1990 Clearance for an Equipment Shed at Bentonville Battlefield State Historic Site (31Jt69**). Fieldwork summary on file, Historic Sites Section

LOST CONFEDERATE SOLDIERS AT BENTONVILLE

Archaeology Files, North Carolina Office of State Archaeology Research Center, Raleigh.

1991 Clearance for Tree Planting at Bentonville Battlefield State Historic Site (31Jt69**). Fieldwork summary on file, Historic Sites Section Archaeology Files, North Carolina Office of State Archaeology Research Center, Raleigh.

1997 Harper House Structural Repair at Bentonville Battlefield State Historic Site (31Jt69**). Fieldwork summary on file, Historic Sites Section Archaeology Files, North Carolina Office of State Archaeology Research Center, Raleigh.

Robinson, Kenneth W., John J. Mintz, and Thomas E. Beaman, Jr.

2008 Archaeological Search for Confederate Soldiers' Graves, Bentonville Battlefield State Historic Site, Johnston County, North Carolina. Report prepared for the Friends of Bentonville Battlefield and the Bentonville Battlefield State Historic Site by Wake Forest University, Winston-Salem, North Carolina, North Carolina Office of State Archaeology, Raleigh, and Tar River Archaeological Research, Wilson, North Carolina.

Robinson, Kenneth W., and Kent A. Schneider

2007 Ground Penetrating Radar Study to Locate Confederate Soldiers' Graves, Historic Bentonville Battlefield, Johnston County, North Carolina. Report prepared for the Friends of Bentonville Battlefield and the Bentonville Battlefield State Historic Site by Wake Forest University, Winston-Salem, North Carolina, and Underground Imaging Solutions, Winder, Georgia.

Wilson, Jack H.

1983a An Evaluation of the Impact of a Landscape Improvement Project upon the Archaeological Resources of Bentonville Battlefield, Johnston County, North Carolina. Historic Sites Section, North Carolina Division of Archives and History. Copy on file, North Carolina Office of State Archaeology, Raleigh.

1983b Test for Flagpole Installation at Bentonville Battlefield. Fieldwork summary on file, Historic Sites Section Archaeology Files, North Carolina Office of State Archaeology Research Center, Raleigh.

1984 Installation of Privies at Bentonville Battlefield. Fieldwork summary on file, Historic Sites Section Archaeology Files, North Carolina Office of State Archaeology Research Center, Raleigh.

**“TO DESCRIBE THE HORRORS OF THIS HURRICANE IS
BEYOND THE ART OF MY PEN”: ARCHAEOLOGICAL
EVIDENCE OF THE SEPTEMBER 1769 HURRICANE
THAT BLEW NORTH CAROLINIANS OFF
THEIR TAR HEELS**

by

**Thomas E. Beaman, Jr.
and
Jim McKee**

Abstract

As a result of a particularly fierce hurricane on September 7–8, 1769, damage to the Colonial ports of New Bern and Brunswick eloquently described in various historical accounts can be compared with material evidence from over 50 years of archaeological excavations in those towns. This study discusses specific damages noted in archaeological investigations to a number of buildings that are likely a result of this storm. The potential for identifying additional terrestrial and underwater archaeological evidence of this hurricane is also discussed.

“They brew themselves out of the heat of the tropics, spinning blindly across the open sea. Often they evolve into massive storms with violent winds and torrential rains. They may live for days or for weeks, and most die off harmlessly as they wander over cooler waters... But occasionally, these storms become deadly intruders as they strike our coastlines with random fury. Hurricanes... are the greatest storms on earth...” (Barnes 2001:1)

“To describe the Horrors of this Hurricane is beyond the Art of my Pen, therefore must leave it to you, to form an Imagination of so terrible a Night.”
(*The Pennsylvania Gazette*, October 19, 1769)

With its prominent Atlantic coastline of inlets and barrier islands that borders warm Gulf Stream waters, North Carolina has historically endured and continues to experience its share of hurricanes. Such storms, which include winds of 74 miles per hour or greater, torrential rains, and storm surges, have certainly affected the lives and influenced the actions of past prehistoric and historic period populations in the Coastal Plain. During the mid-1950s, the landfall of six sizable hurricanes in a seven year period along the Carolina coast — four of

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them within a 12-month span from October 1954 to September 1955 — led the eastern portion of the state to become known colloquially as “hurricane alley” (Barnes 2001:4). Every North Carolinian, past or present, has at least one story of how a hurricane has impacted their life, from dramatic events such as being forced to evacuate an area or experiencing extensive property damage, to perhaps something as generally inconvenient as a temporary loss of utilities or grocery stores being sold out of bottled water, batteries, milk, and bread.

Through their dynamic combination of powerful wind and water action, archaeologists recognize hurricanes as potentially one of the most rapid and effective forms of transformational processes on archaeological sites. Yet despite the potential paths of havoc such storms can wreak, it is very difficult, if not next to impossible, on terrestrial sites to link archaeologically documented data to any single, specific tropical tempest. This is potentially a result of a number of factors. Perhaps the brevity of the event only moved or deposited an ephemeral quantity of soil, or that much of the natural trees, plants, and crops so often affected leave no definable traces for archaeologists. When buildings are damaged, most are repaired or torn down, but with little historical record of a particular hurricane as the primary causal factor. Such is the case of many hurricanes noted in the history of North Carolina; documentary records of many storms exist, but can any specific evidence of them be identified or defined archaeologically?

Beginning as early as 1524, many hurricanes that have made landfall in North Carolina are noted in various historical records. However, none of these storms prior to the establishment of the first comprehensive hurricane-forecasting service in 1898 by the United States Weather Bureau (cf. Barnes 2001:28) may have matched the fury or damage caused by the hurricane of September 7 and 8, 1769. As reported in historical records, New Bern and Brunswick Town, two colonial port towns in southeastern North Carolina, sustained extensive damage. As both of these urban centers have also been the subject of repeated archaeological inquiry for over half a century, this brief study provides a unique opportunity to examine contemporary accounts of one particular eighteenth-century hurricane and the reported damage it caused with contextual evidence recovered through archaeological investigation.

Historical Accounts of the Tropical Tempest

Period accounts of the September 1769 hurricane are paramount in establishing a baseline of what is historically known of this event. First, since hurricanes have only been given names since the early 1950s, prior to this time these storms are generally referred to by the year they occurred (Barnes 2001:32). With no specifically given name, such as Fran, Floyd, or most recently, Irene, only references to this storm by the date it occurred were used in reconstructing this climatic catastrophe.

One of the most valuable sources by sheer volume was period newspapers. With regular publication dates, *The Pennsylvania Gazette*, *The South Carolina Gazette*, and *The South Carolina and American General Gazette* were particularly diligent on reporting descriptions of the hurricane's damage in North Carolina, some accounts of which are duplicated in subsequent issues of other papers. However, many of these accounts are from verbal reports told second hand and, as such, must be considered with extraordinary caution as slightly exaggerated tales, versus purely factual recounting.

Four personal correspondences provided more candid views of the hurricane, as they not only report of the storm but describe in some detail the ruin and aftermath it caused. The first two letters are found in the papers of Royal Governor William Tryon (Powell 1981, II:362–365; Saunders 1890:71–75). Thomas Clifford Howe, a member of the Colonial Assembly from Craven County sent to Tryon his personal observations, dated September 10, 1769, on the condition of New Bern after the hurricane. The second of these two correspondences concerns Brunswick Town and the surrounding countryside. This account is by Tryon himself in a September 15, 1769 letter to Lord Hillsborough, also known as Wills Hill, Earl of Hillsborough and First Lord of Trade for the American colonies from 1768–1772. This second letter contains Tryon's personal observations of the storm from "Castle Tryon" (historically and presently referred to as "Russellborough"), his home located immediately north of Brunswick Town. Letters by colonial merchant and rice planter Henry Laurens, of Charleston, South Carolina, specifically those sent to Henry Bright (Chesnutt 1979:140) and John Rutherford (Chesnutt 1979:158–159), also provide good regional perspective and detail of the September 1769 hurricane on Charleston and the southern Carolina coast.

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Before evaluating the archaeological evidence of this hurricane, what is known of the storm itself? Tryon described it at the storm's height as "a perfect hurricane" (Powell 1981, II:364; Saunders 1890:71). Interestingly, he attributed this hurricane to "the effect of a blazing planet or star that was seen both from Newbern [sic] and here rising in the east for several nights between the 26th & 31st of August," and noted, "its stream was very long & stretched upwards towards the southwest" (Powell 1981, II:364–365; Saunders 1890:71).

Ship reports of 150 mile-per-hour winds on September 5 northeast of Nassau, Bahamas, are the earliest records in which it appears (Ludlum 1963:48). It appears to have travelled far enough beyond Charleston, South Carolina, that it didn't damage the rice crops, and allowed the town to provide refuge and repairs for ships in the Atlantic that were damaged by the storm (Ludlum 1963:48). Speculation among hurricane historians differs as to specifically where this hurricane made landfall in North Carolina, but the location has been consistently estimated between Southport and Cape Lookout (Barnes 2001:36; Ludlum 1963:48). Tryon's (Powell 1981, II:364–365; Saunders 1890:71) observations from Brunswick Town state that it began with a "tremendous gale of wind" to the northeast at about 10 AM in the morning of Thursday, September 7. "It blew and rained hard till the close of evening when both wind and rain increased." Just before midnight, Tryon notes the winds shifted to the northwest, and the storm raged through the night and into Friday morning of September 8, 1769. With these observations, he summarized its fury to Hillsborough as, "In short, my Lord, the inhabitants never knew so violent a storm." Historian Kent Brinkley (1999:20) reported that the storm passed over or just east of Williamsburg, Virginia, around 10:30 AM on September 8 and its northern edge reached a point near Boston at 10:15 PM. Based on these reports, this hurricane's speed has been calculated over ground at approximately 40 miles per hour (Brinkley 199:20). Given these descriptive period accounts from North Carolina and Virginia, the estimated path of the September 1769 hurricane through North Carolina is pictured in Figure 1.

Determining the intensity of this storm is a more difficult matter. Since the mid-1970s, the intensity of modern hurricanes has been measured on the Saffir-Simpson scale, which considers wind speed and storm surges, as well as patterns of damages to buildings and the environment, on a scale of one to five (Barnes 2001:20–23). The only historical evidence that would help estimate the 1769 hurricane by this

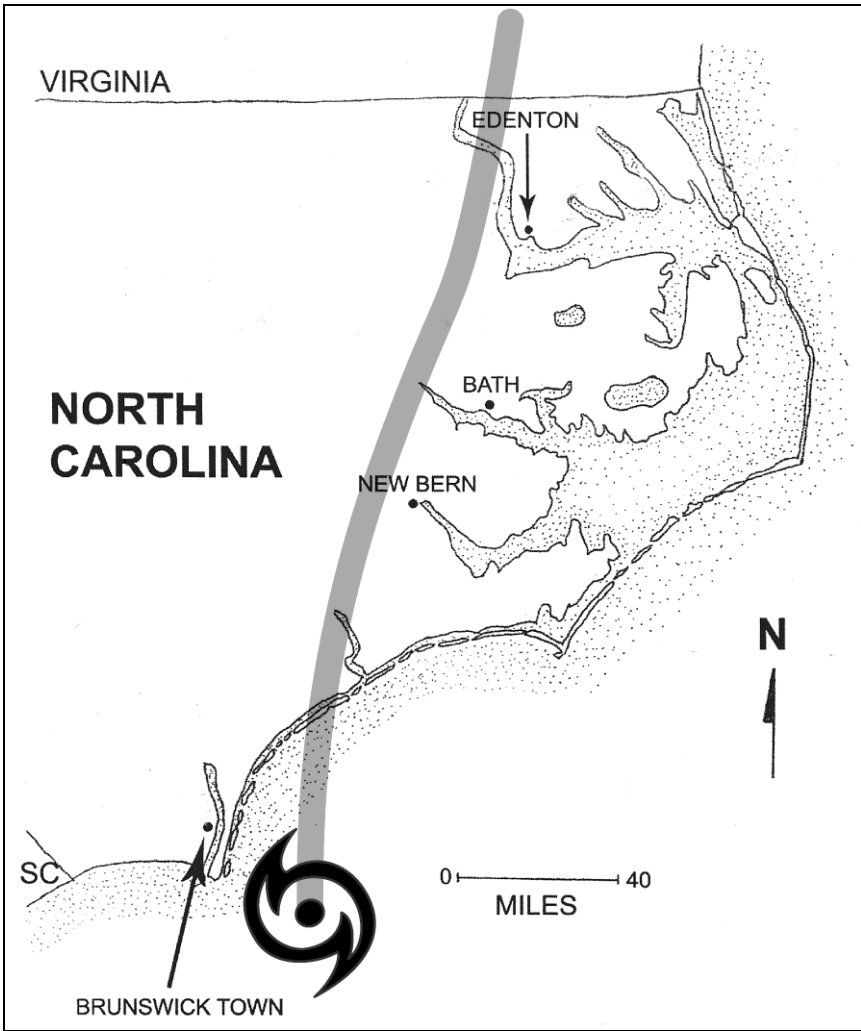


Figure 1. Based on historical documents from North Carolina, South Carolina, and Virginia, this reconstruction illustrates the September 1769 hurricane's approximate path through coastal North Carolina.

scale is the reported storm surge. As reported in the October 19, 1769 issue of *The Pennsylvania Gazette*, the tide at New Bern around 2:00 AM on the morning of September 8 was, "10 or 12 Feet above its usual Height." Alexander Stewart (1769), one of the last ministers at the Anglican Church in Bath, similarly remarked the storm surge produced, "the highest tide that has been known since this country has been

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inhabited. The tide rose in a few hours at my house 12 feet higher than I ever before knew it....” Given that both reports are from along inland rivers instead of the ocean front, by the Saffir-Simpson scale this likely places the intensity of the September 7–8, 1769 hurricane at the top of category 4 or the bottom of category 5. Though all factors that determine intensity by modern standards cannot be reasonably calculated, dramatic accounts of the hurricane and its effects from the Caribbean to New England led one hurricane historian to consider it among the severest of the eighteenth century (Ludlum 1963:48).

An Archaeology of the Hurricane’s Effects

The descriptions of damages contained in historical records will be evaluated against what is known of each building or location from the archaeological explorations within New Bern and Brunswick Town. Though its northern path from the Caribbean took this storm through Brunswick Town before New Bern, New Bern contains much more archaeological evidence of this climactic event, and will be considered first.

New Bern

New Bern was first settled in 1707–1708 by French Huguenots, as well as Swiss and German colonists. It is located at the confluence of the Neuse and Trent Rivers. As a trans-Atlantic port, its central location between the Albemarle and Cape Fear regions, as well as the presence of an extensive road system that developed quickly, resulted in a rapid size and population growth as a regional center of trade by the second half of the eighteenth century. By May 1769, the plan map of this town by Swiss cartographer Claude Joseph Sauthier illustrates 149 structures, the most of any contemporary urban center documented in North Carolina at that time (Beaman et al. 1998:17–18). Today, New Bern is a small, regional urban center with an active historic and preservation community. As such, New Bern has been, and continues to be, a very fertile area for urban archaeology. The reconstruction of Tryon Palace as a public historic site and more than a dozen environmental compliance investigations over the past 30 years have revealed much of its eighteenth-century core.

In the October 19, 1769 edition of *The Pennsylvania Gazette*, an uncredited letter from New Bern details that the hurricane of September

7–8 destroyed 60 houses and damaged many others, along with eight large wharves “tore to Pieces” [sic]. Thomas Clifford Howe’s description of the town after the 1769 hurricane states that New Bern was “a spectacle, her streets full of the tops of houses, timber, shingles, dry goods, barrels and hogsheads, empty most of them, rubbish in so much that you can hardly pass along; a few days ago so flourishing and thriving—it shows the instability of all sublunary things.” Much of Howe’s narrative focused upon inventory lost by merchants and the misfortune of different citizens. Examples include, “Mr. Cove’s store with the store house on the wharf next to this [was] thrown down and carried away with all the goods they contained,” and “the unfortunate Mr. Seagreaves who with a large family of small children had not now a second shirt to his back.” While important to establish the volume of loss caused by this hurricane, the majority of such is not readily definable by modern archaeology.

The most unique aspect of the September 1769 hurricane unearthed by archaeologists in New Bern speaks to this general description of the streets provided by Howe. First identified in 1981 by archaeologist Michael Hartley, along the Trent River waterfront across, from town lots 16 and 17, was a buried stratum of “washed white sand.” Microscopic analysis of sand grains from this layer by coastal geologists reveal it to be a “thoroughly washed” sand of sub-rounded granules, not river bottom sand but more likely from the destruction of sand dunes (Hartley and Hammond 1981:16). However, the association of this stratum with the hurricane was not based solely on its soil composition. In test unit 3, the “washed white sand” layer had partially covered one of two contemporary structures of similar construction with marl and ballast stone footings that were found still supporting two courses of articulated bricks (Figure 2). Both structures were illustrated on Sauthier’s 1769 town map, a likely indicator these structures were standing and in use in May, only four months before the September hurricane (Hartley and Hammond 1981:17). Additionally, both of these structures contained artifacts that dated no later than the 1762–1765 appearance of Royal Pattern creamware ceramics (Hartley and Hammond 1981:16; Noël Hume 1970:125).

Presently, this white sand layer has only been identified in subsequent archaeological projects conducted within a four block area, specifically in three easternmost blocks along the Trent River waterfront and two southernmost blocks on the Neuse River waterfront (Figure 3).

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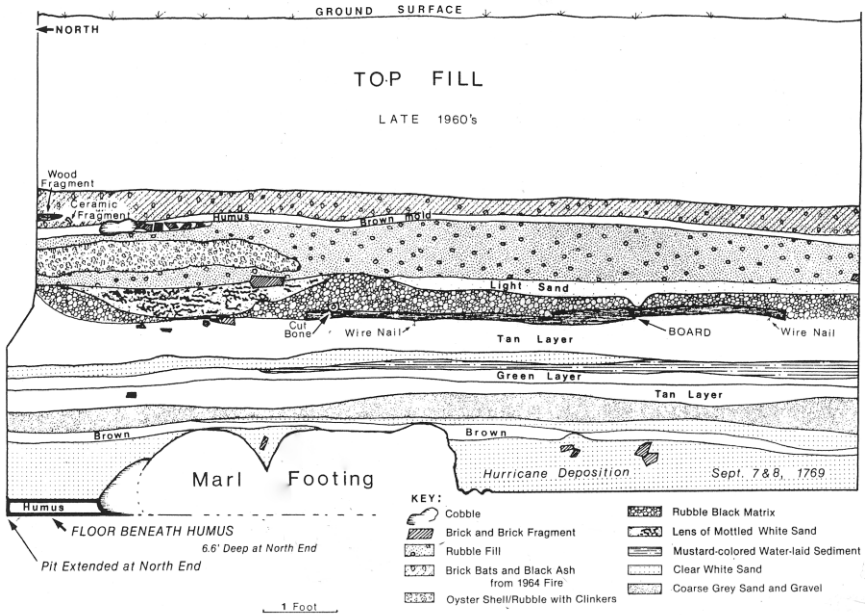


Figure 2. Profile of test unit 3, with marl footing for a colonial-era structure and the white sandy layer labeled “Hurricane Deposition” visible. From archaeological investigations along the Trent River waterfront in New Bern opposite town lots 16 and 17.

It is defined along the Neuse River primarily by its presence in the excavations of Dr. Halsen’s colonial tannery and its identification along Trent River spanning from lots 9 and 10 to lots 20 and 21. This Trent River waterfront boundary is also confirmed by its conspicuous absence in restoration investigations on lot 89 at The Fenner House (31CV412) along Hancock Street (Bradley and Lautzenheiser 2007; Joseph 1999). The white sandy stratum was also not identified in Stanley South’s (1964) investigations on lots 64 and 65 at the Christ Episcopal Church and Cemetery (no site number assigned), located along Pollock Street, which provides a defined northern boundary for this feature within the core of the colonial town.

As illustrated in Table 1, where it is found the white sand varies in depth from 0.2 to 0.75 feet, but this stratum and layers beneath it uniformly contain decorative ceramics, table and bottle glass, and other artifacts from no later than the 1760s. In the three excavations within this area where this stratum has been identified, no artifact post-dating



Figure 3. The archaeologically determined boundaries of the white sandy stratum produced by the September 1769 hurricane’s storm surge, as superimposed on an excerpt from the May 1769 map of New Bern by Claude Joseph Sauthier.

1770 has been recovered from it. The artifact evidence places this white sand layer within the time frame of the 1769 hurricane. No other singular event documented in historical records could have produced this uniformly homogenous deposit of white sand across so many town lots. Unlike Brunswick Town, the vast majority of which was seated on a bluff 30–40 ft above a river, New Bern is situated just above sea level. As such, this layer is most likely associated with riverfront flooding from this hurricane’s extensive storm surge.

There are three specific locations described in Howe’s account that archaeologists have identified and explored. First, Howe notes that no damage was done to “The Edifice,” Tryon’s monstrous, opulent, pre-Revolutionary Palladian-villa style home now referred to as “Tryon’s Palace” that was under construction at the time of the hurricane. The 1950s excavation and reconstruction of two city blocks for Tryon’s Palace by Morley Jeffers Williams strengthens Howe’s account, because no evidence of any damage or flooding was identified that could be dated

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Table 1. Archaeological Projects and Sites in the Core of New Bern That Are Located Within the Four Block Area of the White Sandy “Hurricane” Stratum.

Town Lot(s) ¹	Site Number	Principal Extant Structure or Archaeological Feature	Identified Hurricane Stratum	Estimated Thickness of Hurricane Strata	Primary Citation
2, 3, 4	31CV148	Thomas Halsen tannery; turpentine distillery; Infill	Trench A, Stratum 19 & 20	0.3 – 0.7	Garrow and Joseph 1985
			Trench F, Strata 16-18	0.7	
9, 10	31CV310	Samuel Cornell house foundation and associated 18 th -century midden	Period II: Zone 6	0.2 – 0.3	Brady et al. 2001
20, 21	31CV183	18 th -century ballast stone foundation and associated trash pit	Feature 102, Zone 5, Level 2	0.5 – 0.7	Lautzenheiser et al. 1994
Trent River Waterfront (Opposite 16-17)	None Assigned	ballast and marl footings for two 18 th -century structures, foundation of Devereux Building	Test Unit 3	0.75	Hartley and Hammond 1981

¹ Though clearly noted in historic land transactions, the numbered lots are first shown on the ca. 1817 Price-Fitch map of New Bern. The town lots noted here are numbered lots from that map that have been investigated by archaeologists, and they may not represent the historically defined entire property of a structure or its landscape.

to this hurricane (Beaman 2000). In fact, the only potential candidate initially thought to be associated with this tropical tempest was a light sandy soil at the rear of the Dixon-Stephenson House, which stands on the northern edge of the original Palace property, but this was later determined to be the remnant of a late nineteenth-century walkway (Clauser 1988, 1995; Samford 2001). To date, no definitive stratigraphic evidence of the sandy storm surge has been identified in any archaeological investigation of the historic Palace grounds.

The second location was the tannery of Doctor Halsen. Howe described the loss of this industry, as “Doctor Hasten’s [sic] tan house, stores and yard entirely ruined and destroyed and the chimneys of his dwelling house fallen off on the roof but luckily did no damage.” Located on historic town lots 2, 3, and 4 along the Neuse River waterfront, data recovery investigations were conducted by Garrow and Associates prior to construction activities associated with the modern redevelopment of these lots. Evidence that the hurricane destroyed the tannery was uncovered in two of six mechanically dug trenches. Trench A yielded the remnants of a well-preserved pine liming vat (designated Feature 20) that still contained fragments of leather covered by the white sand hurricane layer, labeled as strata 19 and 20. Part of stratum 20 may be out of context in part of the trench due to later disturbance (Garrow and Joseph 1985:44). Trench F contained an almost complete wooden barrel tanning vat (designated Feature 14) that still contained tree bark and leather fragments, again covered by the hurricane stratum, labeled strata 16–18 (Garrow and Joseph 1985:72). The artifacts and sealed deposits of these features by hurricane layers bear out historical records that no effort was made to salvage the tannery following its destruction by the storm in September 1769.

The final location involves the properties owned by Loyalist merchant Samuel Cornell. Henry Laurens observed that “Messrs. Cornell’s and Smith’s Houses in Newbern, are totally demolished and all that Streets wherein they stood” (Chesnutt 1979:159). A letter from New Bern that appeared in the October 19, 1769, edition of *The Pennsylvania Gazette* is more specific in its description of the damage to Cornell’s property as “very considerable,” detailing that, “his Brig., Wharff [sic], Warehouses, Dwelling house, cellar, and their Contents were washed away.” It also mentions that “His dry Good Store, which stood on high Ground, much damaged, and many Goods washed away.” Howe also commented on Cornell’s losses, noting that “Mr. Cornell’s cellar under

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his dwelling house was undermined and the wall destroyed, the piazza all thrown down and carried away” (Powell 1981, II:362; Saunders 1890:73). Though Cornell was a well-known merchant, it is not clear whether these mentions are borne from the extensive damage and losses occurred or because of his close friendship and association with Governor William Tryon, as no other individual or family was as consistently mentioned in accounts of the hurricane in New Bern.

Archaeological investigations were conducted in May and June of 2000 as part of modern redevelopment on historic town lots 9 and 10. These lots were owned by Cornell from 1754–1777 and contained the remains of his home and the cellar of which doubled as his store. In these investigations, evidence of contexts before and after the 1769 hurricane was identified, but no specific white sandy stratum was found. Soil Zone 6, a heavily mottled brown sandy loam with a scoured appearance that measured 0.2–0.3 ft in thickness, contained artifacts that pre-date 1769 and was interpreted as the ground surface at the time of the hurricane. Based on later artifacts, soil zones 4 and 5 were dated to the period of renovation and repair after the hurricane (Brady et al. 2001:60–61). Additionally, Feature 105 was identified along the exterior of the northern ballast stone wall of the house foundation. This feature contained a large quantity of domestic debris, including fragments of window glass, nails, a lock and a strap hinge, bottle and table glass, delftware tiles, and an assortment of late third quarter eighteenth-century ceramics. It was interpreted as a trench associated with the repair of the hurricane-damaged wall, and the artifacts within from clean-up efforts on these lots date after 1769 (Brady 2001:64–73). This is likely from the continued use of the structure and lots after the hurricane, even extending into the middle nineteenth century.

Brunswick Town

Located approximately 100 mi south of New Bern, Brunswick Town was founded in 1726 on a high western bluff 13 miles from the mouth of the Cape Fear River. Brunswick’s *raison d’être* was the export of naval stores, specifically tar, pitch, and turpentine. In 1769, at the time of the hurricane, it was also the home of the Royal Governor. A map of the town, also by Sauthier, drafted that same year illustrates approximately 51 central structures, many if not all with dependency buildings (Beaman et al. 1998:17–18). What is presently known of this port town through archaeology is based on excavations conducted by

Stanley South as part of its development into a State Historic Site, which it remains today. Between 1958 and 1968, South excavated 23 of 60 documented colonial period structures and conducted limited testing of many more. These investigations were detailed in field notes, brief technical reports, and artifact catalogs, and recently have been synthesized in *Archaeology at Colonial Brunswick* (South 2010). Since South's excavations, the only research-based fieldwork to occur at the site has been associated with the forthcoming Sesquicentennial of Fort Anderson, a series of defensive earthworks constructed over part of the town during the Civil War, and include the investigation of barracks structures behind Battery A and a gun emplacement on Battery B (Beaman and Melomo 2011).

As with New Bern, Tryon's description of the damages to Brunswick Town and the surrounding area caused by this hurricane are observations that would be difficult if near impossible for archaeologists to identify. One such example relates to downed trees, as Tryon (Powell 1981, II: 364–365; Saunders 1890:71) noted “The fury of its influence was so violent as to throw down thousands, and I believe from report hundreds of thousands of the most vigorous trees in the county, tearing some up by the roots, others snapping short in the middle.” Crop damages were also cited as extensive, with “All the Indian corn and rice leveled to the ground and the fences blown down,” and “every herbage in the garden had their leaves cut off.” Additionally, Tryon wrote “add to this upwards of twenty saw mill dams carried away with many of the timber works of the mills,” and “scarce a ship in the river that was not drove from her anchor and many received damage.” However, the most tangible observation of concern is that “Many houses [were] blown down with the Court House of Brunswick County.” Archaeological evidence indicates that a total of six structures were potentially destroyed by this tropical tempest (Table 2).

Identified as ruin N7, the Court House at Brunswick Town (which served the entire county) was excavated by South in 1964 (Figures 4 and 5). Labeled as such on the 1769 map of Brunswick (Figure 6), this structure had a masonry foundation constructed of ballast stone and oyster shell mortar and, like all of the residences at colonial Brunswick, was constructed of wood. The foundation measured 25 ft square with a fireplace on the western side, and had a partition wall in the southern end of the building, most likely to separate court officials from the public courtroom area (South 2010:44). The artifact pattern of the N7 ruin also

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Table 2. The Six Structures Excavated by Stanley South at Brunswick Town That Archaeological Evidence Presently Suggests Were Abandoned About the Time of the September 1769 Hurricane.

Name of Archaeological Feature	South's Designation ¹	Town Lot(s) ²	Lot Component ³	Year Excavated	Primary Citation(s)
The Jones-Price Ruin	N1	120	1	1959	South 1959a
Courthouse	N7	78	1	1964	Field Notes; South 2010
Richard Quince House	N14	40	1	1968	Field Notes; South 2010
“Gaol” (Jail)	N22	n/a	**8 ⁴	1959	South 1959b
The Newman- Taylor House	N41	77	2	1961	South 1961
The McCorkall- Fergus House	S18	71	3	1959	South 1959c

¹ A unique alpha-numeric designator was assigned to each ruin by Stanley South (1962) based on whether it was located north (N) or south (S) of the St. Philip's Church ruin. Many period and modern documents use these numbers referentially, and they are included here for clarity of specific archaeological feature noted.

² Though clearly noted in historic land transactions, the town lots noted here are based on the reconstructed lot plan of Brunswick Town by Lawrence Lee overlaid with Stanley South's (1960) base map of the relocated archaeological remains.

³ Each archaeological feature defined in every lot was assigned a unique component number for that lot. For example, ruins of a main dwelling house may have been designated component 1, and a detached kitchen ruin on the same lot as component 2. As such, the component number presented here does not represent the entire archaeological remains of any specified lot.

⁴ The “Gaol” was given a specific town component number, as it could not be definitively ascertained in which town lot(s) the actual structure was located.

supports the notion of it being a courthouse. If one discounts the overburden of soil placed on the foundation during the construction of Fort Anderson in the 1860s, the 1,076 artifacts recovered in colonial context functionally arranged in Carolina Artifact Pattern format (Table 3) fall within the expected ranges of Cara Wise's (1978) “Public Structure Artifact Pattern.” Ceramics, as well as table and bottle glass,



Figure 4. Beginning the excavations on the Courthouse ruin at Brunswick Town in 1964. View faces west.



Figure 5. The foundation remains of Courthouse after excavation. The outer walls measured 25 ft square, with a stone wall partition that South (2010:44) interpreted as a division between the public courtroom and the court officials. View faces west.

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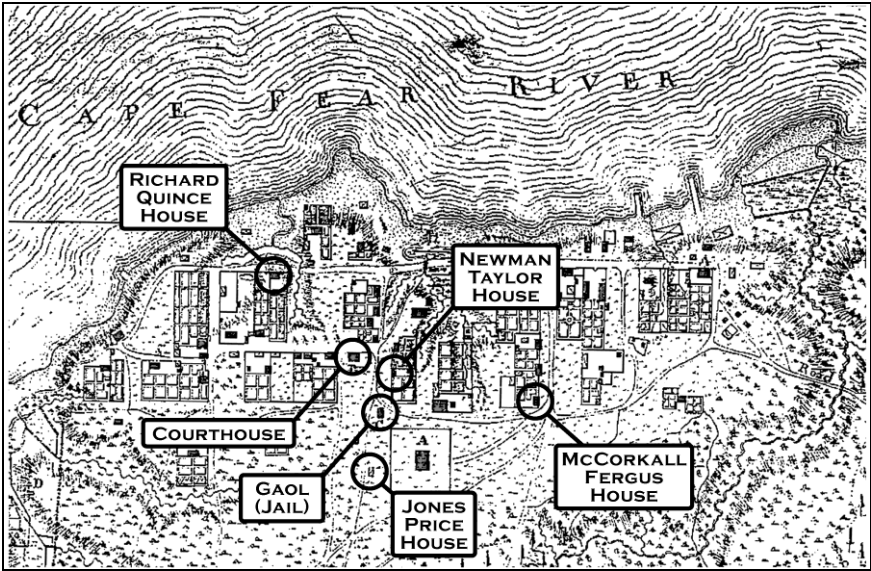


Figure 6. As suggested by archaeological evidence and illustrated on the April 1769 map of Brunswick Town by Claude Joseph Sauthier, the Courthouse, Gaol (Jail), and four residences are suspected to have been irreparably damaged and abandoned following the hurricane of September 1769.

place the destruction of this building within the time frame of the 1769 hurricane. The latest ceramic was also Royal Pattern creamware, and no other artifact dates to 1770 or after. Little architectural hardware, including fasteners (nails and spikes), one door hinge fragment, and one pintle, were recovered; this suggests that some of the architectural material may have blown away or been salvaged for repair of other structures following the hurricane.

Defining the “many houses” that were blown down at Brunswick Town is a more difficult task. Of the other 22 excavated colonial ruins, archaeological evidence found in period field notes and their respective artifact collections indicate that four primary residences (the Newman-Taylor House, the Richard Quince House, the Jones-Price Ruin, and the McCorkall-Fergus House), as well as the town’s gaol (jail), ceased to be used prior to the final abandonment of the town by October 1777 (Beaman et al. 1998:18–19). Each of these five structures noted in Figure 6 was measured against the artifacts as recovered in the Court House ruin, and none contained any ceramics later than Royal Pattern

Table 3. Artifact Assemblage from the Colonial Courthouse (N7) at Brunswick Town in Carolina Artifact Pattern Format, Minus the Stratum Associated with the Mid-19th Century Construction of Fort Anderson.

Artifact Category	Count	%	Artifact Category	Count	%
I. Kitchen Group	515	47.9	VII. Personal Group	2	0.2
1. Ceramics	349	32.4	27. Coins	0	0.0
2. Wine Bottle	101	9.4	28. Keys	0	0.0
3. Case Bottle	37	3.4	29. Personal Items	2	0.2
4. Tumbler	14	1.3			
5. Pharmaceutical Bottle	3	0.3	VIII. Tobacco Pipe Group	7	0.7
6. Glassware	3	0.3	30. Tobacco Pipes	7	0.7
7. Tableware	2	0.2			
8. Kitchenware	6	0.6	IX. Activities Group	12	1.1
II. Bone Group	44	n/a	31. Construction Tools	1	0.1
9. Bone Fragments	44	n/a	32. Farm Tools	1	0.1
			33. Toys	0	0.0
III. Architectural Group	513	47.7	34. Fishing Gear	0	0.0
10. Window Glass	370	34.4	35. Stub-Stemmed Pipes	1	0.1
11. Nails	138	12.8	36. Colonoware	2	0.2
12. Spikes	3	0.3	37. Storage Items	6	0.6
13. Construction Hardware	2	0.2	38. Ethnobotanical	0	0.0
14. Door Lock Parts	0	0.0	39. Stable and Barn	0	0.0
IV. Furniture Group	1	0.1	40. Misc. Hardware	0	0.0
15. Furniture Hardware	1	0.1	41. Other	0	0.0
			42. Military Objects	1	0.1
V. Arms Group	15	1.4	Total (minus Bone Group):	1,076	100.0
16. Musket Balls, Shot	15	1.4			
17. Gunflints, Gunspalls	0	0.0			
18. Gun Parts	0	0.0			
VI. Clothing Group	11	1.0			
19. Buckles	3	0.3			
20. Thimbles	0	0.0			
21. Buttons	8	0.7			
22. Scissors	0	0.0			
23. Straight Pins	0	0.0			
24. Hook & Eye Fasteners	0	0.0			
25. Bale Seals	0	0.0			
26. Glass Beads	0	0.0			

creamware or any artifacts that date after 1770. This places their abandonment within the time frame of the 1769 hurricane. The abandonment of these five structures also provides an interesting contrast to the nine remaining primary structures whose use continued, each of which was eventually burned to the ground by 1781 by British troops and local Tory activity (Beaman et al 1998:18–20). Whether these four

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residences and the gaol ceased occupation or use as a result of being “blown down” in the 1769 hurricane is unfortunately more speculative than not. That being said, it is tantalizing to consider that no other event described in historical records provides an alternative cause for the destruction of any house at Brunswick Town in the third quarter of the eighteenth century before the American Revolutionary War.

Aftermath

The citizens of New Bern and Brunswick Town would feel the aftermath of the September 1769 hurricane for some time. In a letter to the Colonial Assembly dated October 23, 1769, Tryon remarked “the calamities arising from the extreme Violence of the late Storm, which has been too destructive to have failed to excite, in every human breast, a sensible Compassion and Sympathy for the unfortunate sufferers” (Powell 1981, II:386). When the Earl of Hillsborough shared Tryon and Howe’s descriptions of the storm with King George III of England, Hillsborough wrote to Tryon, “I have nothing in command from His Majesty on the subject of these dispatches but to express to you that His Majesty is greatly concerned for the distress brought upon such a number of his subjects but the devastation of the tempest” (Powell 1981, II:419).

Historical documents indicate that the most pressing concern in Tryon’s observations was not the losses of individuals in New Bern, but “the destruction of its banks, formed by nature on the side of the two rivers, and formerly thought a sufficient bulwark, the trading part of the town lies open and exposed to the ravages of every high wind and tide” (Powell 1981, II:386). Believing the expense of reconstructing the protective banks beyond New Bern, especially “under its present and ruinous condition,” Tryon asked the Assembly to fund the restoration of the protective bulwarks. The Colonial Assembly’s response on October 30 was to decline this request for fear of showing partiality or favoritism to one part of the colony over others (Powell 1981, II:392). This lack of action apparently displeased Tryon, as he wrote Hillsborough that “an over heated zeal excluded every principle of generosity from the patriots’ bosom” (Powell 1981, II:447). The Colonial Assembly eventually granted cash reimbursements to three citizens of New Bern — James Davis (three pounds), Jane Wilton (nineteen pounds), and Dorcas Bathurst (two pounds, 10 shillings) — each of whom had lost proclamation money during the hurricane (Powell 1981, II:405, 559). Interestingly, as a result of his losses in the hurricane, James Davis was

not able to completely restore his print shop and resume publication until 1771 (Reavis 2000:23–24).

The specific aftermath of the hurricane is almost as difficult to distinguish through archaeology as a hurricane itself. Only at the Samuel Cornell House were features and artifacts identified as related to clean-up efforts after the 1769 storm (Brady 2001:64–73). The best evidence for how New Bern weathered the storm and its aftermath was through its continued existence and occupation. Archaeological evidence demonstrates that all of the lots in Table 1, as well as others that suffered damage in the storm, continued to be occupied and used. Additionally, as the primary regional trans-Atlantic port, once the port facilities were repaired the town continued to expand in size and population. Even when a contemporary eighteenth-century structure on a lot was destroyed in the storm, such as Halsen’s tannery, eventually the lot was cleared and different structures were erected. The reuse of these lots and construction of new buildings often served to bury the past for archaeologists to recover. But New Bern’s growth was to be short lived, for beginning in the early nineteenth century, the town’s essential function as a port diminished. Commercial goods experienced more efficient transit by rail and road to larger inland centers such as Raleigh, which rapidly grew to prominence in the political and social realms. New Bern reached early maturity and largely ceased expansion by the early nineteenth century.

While no historical documents have been located that discuss or detail the aftermath of the 1769 hurricane at Brunswick Town, archaeological evidence indicates that the Courthouse and above-mentioned residences damaged or destroyed during this tropical tempest were not repaired or reconstructed. In fact, it could be argued that the damage caused by this storm represented a visible step towards the decline and abandonment of the Colonial port town. Tryon moved his residence from Brunswick to New Bern the following year, and the town was fully abandoned and destroyed during the American Revolutionary War. The center of politics and society in the region had already shifted to Wilmington and, unlike New Bern, the former citizens of Brunswick Town apparently had little or no inclination to restore the town or its port facilities. The town largely disappeared in the public consciousness until rediscovered and explored by archaeologist Stanley South as a State Historic Site in the late 1950s. As aptly observed by nineteenth-century

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biographer Alfred Moore Waddell (1890:223), “In truth, the whole existence of the old town was marked by storms, natural and political.”

Conclusions

This brief study has summarized the available archaeological data that has been associated and identified with the hurricane of September 7–8, 1769. Documentary records of this tropical tempest found in period newspapers and correspondences have allowed a sound historical perspective of the storm and its effect on the coastal port towns of New Bern and Brunswick. Thanks to diligent and careful excavations at these two sites over the past 50 years, some of the actual damage and aftermath described in period accounts has been archaeologically documented. Such evidence includes the remains of structures and associated artifacts, subsurface features, and a unique layer of white sand deposited over four city blocks by storm surge at New Bern.

The evidence presented in this study also hopefully demonstrates that there is promise to identify additional terrestrial traces of this hurricane within these and other town sites in future investigations. Two additional documents discuss the impact of this hurricane at Bath and Edenton. Alexander Stewart (1769) at Bath reported to the Secretary of the North Carolina Colonial Assembly in a letter that “the tide rose in a few hours at my house 12 feet higher than I ever before knew it, and the wind blew so violent that nothing could stand before it.” In addition to a personal injury sustained, Stewart also noted that every “vessel, boat or craft were drove up into the woods,” and that his private losses in houses and stores at Bath were approximately 600 pounds. The September 28, 1769 edition of *The Pennsylvania Gazette* reports on conditions at Edenton, in which “all of the Wharffs [sic] in that Town are demolished, many small Craft drove ashore, and several Houses thrown down.” Though these documents provide a base of historical information, to date no archaeological evidence has been reported in excavations at Bath, Edenton, or any other colonial town in coastal North Carolina that may be related directly to the September 1769 hurricane. However, the key to such identification will likely be in the understanding of specific archaeological signatures, such as those at New Bern and Brunswick Town described in this study.

Another potentially fruitful archaeological resource related to this hurricane involves the ships that were either in port or at sea that were

downed as a result of the storm. Research through period newspapers and other accounts of this and other hurricanes by historian Wilson Angley (1991, 1996) yielded reports of 15 ships in or near the Port Brunswick (Brunswick Town and Wilmington) and Port Beaufort (Beaufort and New Bern) colonial customs districts that were sunk, run aground, or overturned on September 7–8, 1769. As seen in Table 4, Angley thoroughly documented evidence of vessel types and purposes, location of loss, and cargo lost and salvaged, though no names were able to be related to any specific vessel. Each historically identified wreck was also given a specific identification number by the North Carolina Underwater Archaeology Branch. Unfortunately, to date none of the 15 ships identified by Angley in historical records have been located or verified by underwater archaeologists. As such, the search for these vessels remains a fertile topic for future underwater research by experienced scholars or graduate students working in the waters of these historic customs districts.

As anthropologists, we cannot observe the perception or understanding of hurricanes possessed by our prehistoric or historic predecessors, or know whether they considered them to be simply natural phenomenon, caused by celestial activity, or even perhaps the expressed displeasure of an angry deity. However, as archaeologists this study demonstrates that it is not impossible to document the damage of past hurricanes or other natural calamities through the material evidence that can be recovered through excavation. By sharing information on the effect hurricanes have on the formation of archaeological contexts, perhaps the understanding of their transformational processes on archaeological sites will evolve into recognition of common patterns to evaluate in future investigations.

Notes

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Table 4. As Reported in Period Newspapers, Ships Reported To Have Been Lost During the September 1769 Hurricane. To Date, None of These Ships Have Been Identified Archaeologically or Explored.

NCUAB ID No.	Date Lost	Described Location Lost	Type of Vessel	Vessel Purpose	Home Port	Cargo	Cargo Salvaged?	Described Reason Lost	Source	Notable Notes
67	9/7/1769	Beaufort Inlet, South of Old Topsail Inlet	Brig	Unknown	Norfolk	Rum	Partial	Gale	<i>Pennsylvania Gazette</i>	
1533	9/7/1769	Ocracoke Island, Ashore at Inlet	Sloop	Unknown	New York	Unknown	Unknown	Ashore in hurricane	<i>Pennsylvania Gazette</i>	Captain Hunt
1534	9/7/1769	Ocracoke Island, Ashore at Inlet	Sloop	Unknown	New England	Unknown	Unknown	Ashore in hurricane	<i>Pennsylvania Gazette</i>	
1538	9/7/1769	Ocracoke Inlet, Ashore at Inlet	Sloop	Unknown	New England	Unknown	Unknown	Ashore in hurricane	<i>Pennsylvania Gazette</i>	
3853	9/7/1769	Neuse River, Near New Bern	Unknown	Unknown	Unknown	Unknown	Unknown	Foundered at anchor	<i>South Carolina Gazette</i>	
4690	9/7/1769	Ocracoke Island, Southward of Old Topsail Inlet	Brig	Cargo carrier	Norfolk	Rum	Partial	Driven ashore in hurricane	<i>Pennsylvania Gazette</i>	
4691	9/7/1769	Ocracoke Island, at Ocracoke	Brig	Unknown	New Bern	Unknown	Total Loss	Washed away during hurricane	<i>Pennsylvania Gazette</i>	Owned by Samuel Cornelle People saved
4831	9/7/1769	Rich Inlet, South of Old Topsail Inlet	Brig	Cargo carrier	Norfolk	50 Hogshead of Rum	Unknown	Lost during severe gale	<i>Pennsylvania Gazette</i>	
3629	9/8/1769	Cape Fear River, in Cape Fear River	Unknown	Unknown	Unknown	Unknown	Unknown	Hurricane	<i>South Carolina Gazette</i>	
3852	9/8/1769	Neuse River, at New Bern	Unknown	Unknown	Unknown	Unknown	Unknown	Foundered at anchor	<i>South Carolina Gazette</i>	
3854	9/8/1769	Neuse River, Near New Bern	Unknown	Unknown	Unknown	Unknown	Unknown	Foundered in storm	<i>South Carolina Gazette</i>	
3855	9/8/1769	Neuse River, Near New Bern	Unknown	Unknown	Unknown	Unknown	Unknown	Foundered at anchor	<i>South Carolina Gazette</i>	
3856	9/8/1769	Neuse River, Near New Bern	Unknown	Unknown	Unknown	Unknown	Unknown	Foundered in storm	<i>South Carolina Gazette</i>	
3857	9/8/1769	Neuse River, Near New Bern	Unknown	Unknown	Unknown	Unknown	Unknown	Foundered at anchor	<i>South Carolina Gazette</i>	
3858	9/8/1769	Neuse River, Near New Bern	Unknown	Unknown	Unknown	Unknown	Unknown	Foundered in storm	<i>South Carolina Gazette</i>	

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Figures. Figures 1, 3, and 6 were created for this publication by Bryan Wiggins. Excerpts from the Sauthier maps used in Figures 3 and 6 are from the North Carolina State Archives. Figure 2 is reproduced from Figure 4 in Hartley and Hammond (1981). Figures 4 and 5 are from the Brunswick Town/Fort Anderson photography collection, Historic Sites Archaeology Files, Office of State Archaeology Research Center, Raleigh. All images are reproduced here with appropriate permissions.

Disclaimer. Even with the tremendous support and assistance of the individuals acknowledged above, the authors assume full responsibility for any factual errors and the interpretations presented in this article.

References Cited

Angley, Wilson

1991 North Carolina Shipwreck References from Newspapers of the Late Eighteenth, Nineteenth, and Twentieth Century. Manuscript on file, North Carolina Underwater Archaeology Branch, Kure Beach, NC.

1996 North Carolina Shipwreck References from *The Pennsylvania Gazette*, 1728–1812. Manuscript on file, North Carolina Underwater Archaeology Branch, Kure Beach, NC.

Barnes, Jay

2001 *North Carolina's Hurricane History*. Third Edition. University of North Carolina Press, Chapel Hill.

Beaman, Thomas E.

2000 Fables of the Reconstruction: Morley Jeffers Williams and the Excavation of Tryon Palace, 1952–1962. *North Carolina Archaeology* 49:1–22.

Beaman, Thomas E., Jr., and Vincent H. Melomo

2011 Exploratory Excavations at Brunswick Town/Fort Anderson State Historic Site: Barracks West of Battery A (31BW376**12). Prepared for Brunswick Town/Fort Anderson State Historic Site, Winnabow, North Carolina, by Peace College Department of Anthropology, Raleigh, NC.

ARCHAEOLOGICAL EVIDENCE OF A HURRICANE

- Beaman, Thomas E., Jr., Linda F. Carnes-McNaughton, John J. Mintz, and Kenneth W. Robinson
1998 Archaeological History and Historical Archaeology: Revisiting the Excavations at Brunswick Town, 1958–1968. *North Carolina Archaeology* 47:1–33.
- Bradley, Dawn M., and Loretta Lautzenheiser
2007 Archaeological Investigations of Portions of Site 31CV412 (The Fenner House), New Bern, North Carolina. Report prepared for The Fenner Family Fund, New Bern, North Carolina, by Coastal Carolina Research, Inc., Tarboro, NC.
- Brady, Ellen M., Patricia Samford, Susan E. Bamann, and Loretta Lautzenheiser
2001 Archaeological Data Recovery, Site 31CV310, The Samuel Cornell House Site, Craven County, North Carolina. Report Prepared for Craven County by Coastal Carolina Research, Inc., Tarboro, NC.
- Brinkley, M. Kent
1999 The Hurricane History of Colonial Virginia to 1775. *The Electronic Journal of Disaster Science* 1. Sponsored by the Emergency Management and Disaster Science Program, School of Continuing Studies, University of Richmond. <https://facultystaff.richmond.edu/~wgreen/ejem0102.htm>. Accessed September 11, 2011.
- Chesnutt, David R.
1979 *The Papers of Henry Laurens, Volume VII: August 1, 1769 – October 9, 1771*. University of South Carolina Press, Columbia.
- Clauser, John W.
1988 Excavations at the Dixon-Stevenson House, New Bern, Craven County, North Carolina. North Carolina Office of State Archaeology, State Historic Preservation Office, Raleigh.

1995 Monitoring the removal of underground oil storage tanks at Tryon Palace, New Bern, Craven County. North Carolina Office of State Archaeology, State Historic Preservation Office, Raleigh.
- Garrow, Patrick H., and J.W. Joseph
1985 Historical and Archaeological Investigations of the New Bern Motor Inn Site, New Bern, North Carolina. Report prepared for Mardeck, Ltd., Rockville, Maryland, by Garrow and Associates, Inc., Atlanta Georgia.
- Hartley, Michael, and Michael Hammond
1981 Archaeological Testing for the Proposed New Bern Main Branch of Branch Banking and Trust Company, New Bern, Craven County, North Carolina. Report prepared for John N. Peterson, A.I.A., by Archaeological Research Consultants, Inc., Chapel Hill.
- Joseph, John Mark
1999 The Fenner-Oliver House Revisited: 1998–1999 Archaeological Investigations, New Bern, North Carolina. Report prepared for The Fenner

NORTH CAROLINA ARCHAEOLOGY [Vol. 60, 2011]

Family Fund, New Bern, North Carolina, by John Mark Joseph (Independent Contractor), Greenville, NC.

Lautzenheiser, Loretta, Patricia Samford, Annie Holm, and Jane Eastman

1994 Archaeological Data Recovery, Site 31CV183, United Carolina Bank, New Bern. Two volumes. Report Prepared for United Carolina Bank by Coastal Carolina Research, Inc., Tarboro, NC.

Ludlum, David M.

1963 *Early American Hurricanes, 1492–1870*. The History of American Weather Series. American Meteorological Society, Boston.

Noël Hume, Ivor

1970 *A Guide to Artifacts of Colonial America*. Alfred A. Knopf, New York.

Powell, William S. (editor)

1981 *The Correspondence of William Tryon and Other Selected Papers*. Two volumes. Division of Archives and History, North Carolina Department of Cultural Resources, Raleigh.

Reavis, Scott Aaron

2000 *James Davis: North Carolina's First Printer*. Unpublished Master's Thesis, Department of Library Science, University of North Carolina, Chapel Hill.

Samford, Patricia M.

2001 Dixon-Stevenson House (31CV3), archaeological monitoring of fire suppression line, Tryon Palace Historic Sites and Gardens, Craven County, North Carolina.

Saunders, William L.

1890 *The Colonial Records of North Carolina, Volume VIII: 1769–1771*. Printed by Josephus Daniels, Raleigh. Reprinted 1993 by Broadfoot Publishing Company, Wilmington.

South, Stanley A.

1959a Excavation Report - The Jones-Price Ruin, Brunswick Town. Report on file, Historic Sites Archaeological Files, Office of State Archaeology Research Center, Raleigh.

1959b Excavation Report - The area of the "Gaol", Brunswick Town. Report on file, Historic Sites Archaeological Files, Office of State Archaeology Research Center, Raleigh.

1959c Excavation Report - The McCorkall-Fergus House, Brunswick Town. Report on file, Historic Sites Archaeological Files, Office of State Archaeology Research Center, Raleigh.

1960 Archaeological Base Map of the Site of Brunswick Town, Brunswick County, North Carolina, Correlated with C.J. Sauthier's Map of April 1769 and the Reconstructed Lot Plan of Maurice Moore-1726, with a List of the Property

ARCHAEOLOGICAL EVIDENCE OF A HURRICANE

Owners and Fort Anderson, 1862–1865. Map on file, Historic Sites Archaeological Files, Office of State Archaeology Research Center, Raleigh.

1961 Excavation Report - The Newman-Taylor House, Brunswick Town. Report on file, Historic Sites Archaeological Files, Office of State Archaeology Research Center, Raleigh.

1962 Locating the Excavation Units at Brunswick Town State Historic Site. Report on file, Historic Sites Archaeological Files, Office of State Archaeology Research Center, Raleigh.

1964 Report on the Examination of the Graveyard at Christ Episcopal Church. Report on file, State Historic Preservation Office, North Carolina Office of State Archaeology, Raleigh.

2010 *Archaeology at Colonial Brunswick*. Office of Archives and History, North Carolina Department of Cultural Resources, Raleigh.

Stewart, Alexander

1769 Letter to the Secretary of the Colonial Assembly at New Bern, December the 6. In the Elizabeth Moore Collection, Joyner Library, East Carolina University, Greenville.

Waddell, Alfred Moore

1890 *A Colonial Officer and His Times, 1754–1773: A Biographical Sketch of General Hugh Waddell of North Carolina*. Edwards and Broughton, Raleigh.

Wise, Cara L.

1978 *Excavations at Delaware's State House: A Study in Cultural Patterning*. Unpublished Master's thesis, Department of Anthropology, Catholic University of America, Washington, DC.

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