THE "PETER'S FIELD" TOBACCO BARN:

EXCAVATION REPORT FOR THOMAS JEFFERSON'S POPLAR FOREST

By Tim Trussell

TABLE OF CONTENTS

LIST OF FIGURES

HISTORICAL BACKGROUND

In 1745, William Stith patented a four thousand acre tract of land "at the Poplar Forest...passing the Ridge between the Waters of James River and Roanok". His daughter, Elizabeth Pasteur, later inherited the property, and sold it to Colonel Peter Randolph. He conveyed the land to John Wayles in 1764. Upon Wayles' death in 1773, Thomas Jefferson inherited the property, which by then had grown to encompass nearly 5000 acres. With the exception of a prolonged stay in 1781, when he and his family sought refuge at Poplar Forest following the seizure of Monticello by the British, Jefferson's visits to his Bedford holdings were sporadic in the final decades of the eighteenth century.

By the 1790s, the Bedford plantation was divided into two farms named for the waterways that ran through them: Bear Creek to the north and Tomahawk, or Poplar Forest, to the south. Agricultural fields clustered around the creeks, cleared by enslaved African Americans who cultivated tobacco in the early years, and later, wheat, corn, barley and a host of other crops for internal consumption. "Wingos," a smaller farm of 1000 acres, lay to the northwest. In 1790, this property was given to Martha Jefferson upon her marriage to Thomas Mann Randolph.

Two maps, the Callaway map of c.1801 (N266, Figure 1) and the "Watson" map, drawn on paper watermarked 1800 (N, UVA accession number 9090a), show the structure of the plantation at the turn of the nineteenth century. Among other buildings and landscape elements, historic maps show a prize barn (where tobacco was packed into hogsheads for shipment) sited in the middle of what is called the "prize barn field". A tobacco barn and a "quarry stone" source are also shown in what is called "Peter's Field" in the northeast corner of the Tomahawk tract.

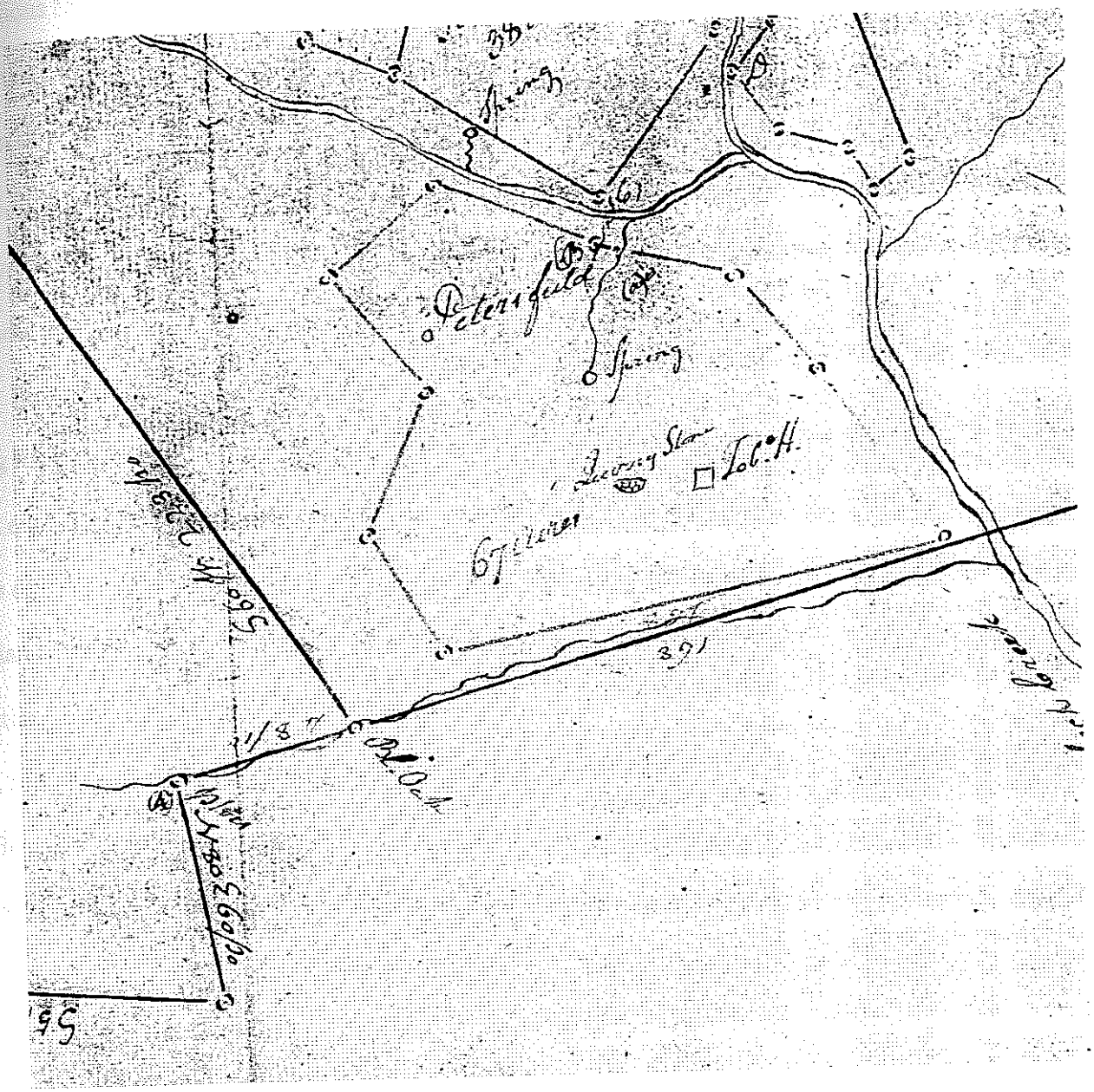


Figure 1: Circa 1801 map of Jefferson's property showing the tobacco house in "Peter's Field" (Poplar Forest Archives, N-266)

Jefferson sent his brick mason Hugh Chisolm to Poplar Forest in 1805 to begin firing bricks for his retreat house, sited at the center of the Tomahawk tract. Chisolm laid the

foundations for the octagonal dwelling in the summer of 1806. By 1809, work was essentially completed on the building, although five years later, construction activities would resume with the addition of a hundred foot long "wing of offices" attached to the east face of the house. Jefferson created Poplar Forest as a villa: a gentleman's retreat for reading, writing and contemplation set within a garden and supported by a largely self-sufficient agrarian enterprise supplemented by light industry.

From 1806 until his last visit in 1823, Jefferson visited Poplar Forest several times a year, staying for a few days or for several weeks. During this period, Jefferson's vision for Poplar Forest extended beyond the octagonal house and ornamental pleasure grounds he created there. A map drafted by Joseph Slaughter in 1813, and a corresponding memorandum sent to overseer Jeremiah Goodman in 1812, attest to some major changes which Jefferson imposed on the plantation landscape. Old boundaries were changed to create a series of more regularly shaped fields, separated from each other by the branches feeding the Tomahawk Creek. The former prize barn field was divided into the Middle and Lower Fields. "Peter's Field", where the tobacco barn was located, became part of the "Tomahawk Field". Whether any of the barns noted on earlier maps remained in use into this period is unclear; however the creek to the east of the former prize barn field retained the name "Prize branch".

By 1821 Jefferson relinquished most of his involvement in the management of Poplar Forest to his grandson, Thomas Jefferson Randolph. Two years later, another grandson, Francis Eppes, took up residence at the property with his bride Mary Elizabeth. At his death in 1826, Jefferson bequeathed the core of the property to Francis, and the outlying fields to the east to Thomas Jefferson Randolph.

William Cobbs purchased the house and central 1,074 acres from Francis Eppes for $4,925. At the time of its purchase, the house was valued at $5,000 and the property appraised at $20,000, so both were sold at a considerable loss. Cobb's daughter Emma and Edward S. Hutter were married at the property on October 7, 1840, and continued to live there with her parents. Hutter resigned from the Navy in 1844 to devote his life to full-time farming. The Hutters had eleven children, all born at Poplar Forest.

A fire destroyed the roof and interior woodwork of the house in November of 1845. Because the interior partition walls were built of brick, they survived the blaze, as did the exterior walls and the columns on the north and south portico. Following the fire, the Hutter family rebuilt the house with significant alterations.

Mrs. Cobbs died at Poplar Forest in 1877 at the age of 76, outliving her husband, her daughter, and her son-in-law. In the years after her death the second generation of Poplar Forest Hutters began using the house as a summer home. During this time farm managers and tenant farmers lived on the property year-round.

The house remained in the Hutter family for 118 years. In 1946 the James O. Watts family bought Poplar Forest and lived there on a full time basis. From 1980 to 1983 the house belonged to Dr. James Johnson of North Carolina and was unoccupied. In December of 1983 the Corporation for Thomas Jefferson's Poplar Forest, a private organization whose goal is to open the property to the public and restore it to its original appearance, bought the house and fifty acres. Today the Corporation for Jefferson's Poplar Forest owns just over 500 acres of the original plantation.

OWNERSHIP HISTORY OF THE TOBACCO BARN PROPERTY

Jefferson bequeathed the eastern and southern sections of the Poplar Forest plantation, including the Tomahawk Field, to Thomas Jefferson Randolph. Randolph was struggling to repay a $20,000 note that Jefferson had cosigned for Randolph's father-in-law Wilson Cary Nicholas that Nicholas had defaulted on. Randolph initially used the Poplar Forest property as collateral against a loan from William and Mary, which he used to pay the Nicholas debt. He then divided his inheritance into a number of parcels, which he sold over the ensuing ten years to pay off his loan from the college. In 1836, he sold the final 928 1/4 acres, including the field where the tobacco barn site was located, to Odin G. Clay (Figure 2). This parcel was the last Poplar Forest property sold by one of Jefferson's heirs, and after this sale none of the original plantation remained in the hands of Jefferson's descendants.

Odin G. Clay, the son of Reverend Charles Clay and Editha Clay, was born in 1800 in Bedford County. The Reverend Clay had been an acquaintance and friend of Jefferson. Odin inherited 1,700 acres of land and a lot in Lynchburg upon Charles death in 1819, and the northeastern section of the Tomahawk property he bought from Thomas Jefferson Randolph was contiguous with this property. Odin Clay became an influential figure in the area, serving as the Campbell county delegate to the Virginia House of Representatives from 1827 to 1847. He became president of the Virginia and Tennessee Railroad (which became the Norfolk and Western) in 1849, and even served a term as Lynchburg's representative to the Virginia Legislature (Hensley 1959:12-15). Upon his death in 1882, his property was divided between his three children.

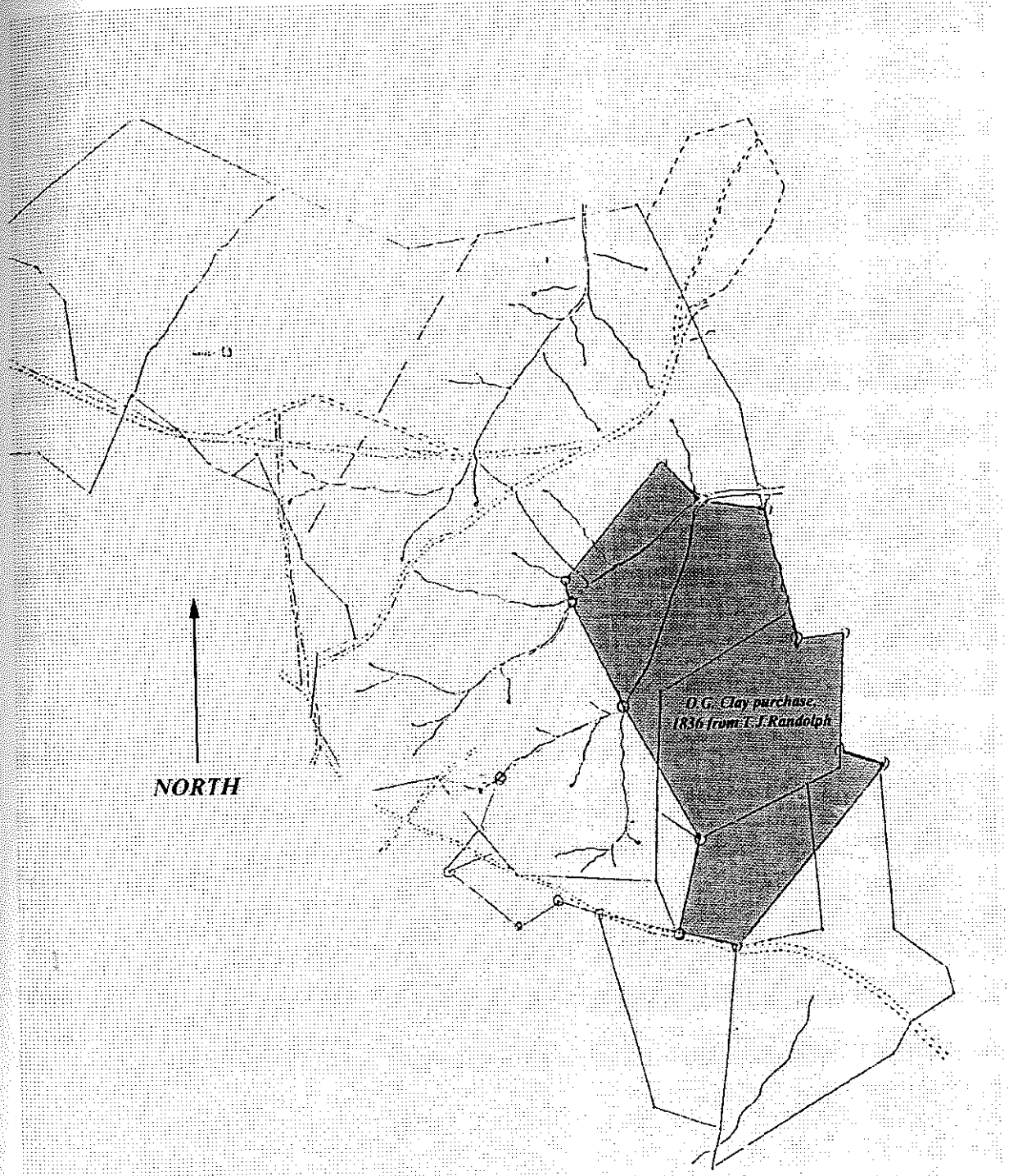


Figure 2: Map of original Poplar Forest boundary showing 1836 Clay purchase from T.J. Randolph.

Charles Clay received the portion called the "Upper Tomahawk", 297 acres bounding Timberlake and Waterlick roads to the south. Annie Clay received 305 acres in the center called "Middle Tomahawk". Catherine Clay received 335 acres called "Lower Tomahawk", and this property contained the original "Peters Field" where the tobacco barn was located.

Catherine Clay was listed in documents under different names at different times. Her first name started to appear as Kitty rather than Catherine, then later as Callie. After she marries, her name was listed alternately as Callie Clay Lewis or Kitty Clay Lewis. In 1894, she sold 261 acres of the property to R.W. Younger (D.B.60, Pg. 512). It should be noted that the subdividing of Jefferson's original lands continued and became more complex through time, and that this discussion will only trace ownership of the tobacco barn field. Ownership history of surrounding parcels can be researched from survey plats in Appendix I.

R.W. Younger sold 261acres to Frank Laxton in 1896 (D.B.63, Pg. 276). Laxton bought and sold a large amount of land in this area, but the tobacco barn property was sold in 1918 as part of a 46 acre parcel to L.D. Williams (D.B.113, Pg. 502). At least six people with the name Williams owned land in the immediate vicinity of the tobacco barn property during the 1920's and 1930's, but L.D. Williams married Henrietta Williams, daughter of Ola and Charles Williams. The Williams family owned several sections of land in this area, but a 1928 plat of this area (D.B.152, Pg. 529) detailing a separate purchase of land by Henrietta Williams merely lists "Williams" as the owner of the tobacco barn property, and documents indicate that this refers to L.D. Williams. L.D. Williams died, and the tobacco barn field came under the direct ownership of Henrietta Williams, who then married Peter Wilson. A plat of adjoining land owned by the Locke family was surveyed in 1954 (P.B 255, Pg. 430), and that the tobacco barn property was owned at that

time by "Mrs. Peter Wilson" and references the 1918 deed (D.B.113, Pg. 502) where Laxton sold to L.D. Williams. Henrietta outlived her second husband as well, because in 1953 or 1954, Henrietta Wilson (Formerly Williams) sold two tracts of land to Malcolm Sydnor, and one of them was the Tobacco Barn Field (D.B.247, Pg. 345). Although Sydnor was named as the owner of the land on a 1961 plat (D.B.325,Pg. 117) of the adjoining Passavant property, he sold the property to Leslie and Gracie Woolridge in 1958 (D.B.295, Pg. 94). The Woolridges bought up many of the previously subdivided tracts of land in the vicinity of the tobacco barn, though all were once part of the original 260 acre purchase of R.W. Younger from Kitty Clay Lewis in 1894. In December of 1979, Leslie Woolridge sold the tobacco barn property along with six other parcels of real estate in the area to Ashby-NV, a Netherlands-Antilles corporation also known in Virginia as Ashby Investments, Inc. This corporation sold the property to J.E.Jamerson & Sons, Inc. in 1996 (D.B.978, Pg. 710). Jamerson owned the property at the time of the tobacco barn excavation, and graciously allowed the Poplar Forest Archaeology Department the opportunity to conduct this project before the land was developed further.

THE TOBACCO BARN PROJECT

The majority of Jefferson's original plantation, including the eastern portion where the tobacco barn was located, has been overtaken by modern development. The landscape of this locale today consists mainly of suburban homes and subdivisions located between the city of Lynchburg and the town of Forest, Virginia. However, several open agricultural fields still remained undeveloped in this area as of 1997.

The impending development of these open portions of Jefferson's original property has

been a concern of the Corporation for Jefferson's Poplar Forest. Fortunately, a pending agreement with the City of Lynchburg would deed 28 acres in this area to Poplar Forest. This parcel of the original Jefferson plantation is contiguous with the eastern edge of current Poplar Forest land holdings, and is the location where one of Jefferson's prize barns once stood. All other open lands in this area are slated for rapid development, and the acquisition of the prize barn property will probably mark the final opportunity for preserving Jefferson lands as open spaces in this area.

As indicated earlier, the tobacco barn appears on the "Calloway" map of 1801 (Figure 1). This outbuilding is not shown on a subsequent map from 1813. Located between small branches of the Tomahawk creek and east of what today is the Laxton road cul-de-sac, the tobacco barn field is in an area that will be heavily impacted by development (see Figure 3). The construction of a planned retirement community here, including roads, waterlines, landscaping and housing, will probably cause significant disturbance or even destruction of any archaeological sites on the premises. It was therefore decided that a salvage project was necessary to obtain as much archaeological information about the tobacco barn site as was possible before construction began.

During the summer and fall of 1997, a large scale testing project was undertaken to locate archaeological sites, including the tobacco barn, in the open fields around the Tomahawk creek on the eastern portion of Jefferson's original plantation. The survey methodology consisted of shovel test pits every 50 feet in a grid pattern, with all soil screened through 1/4th inch mesh. As was expected in agricultural fields, these shovel tests yielded very few artifacts, though the prize barn and one other mid-19th century site near the Tomahawk creek were located (Bauguess,

1998). Unfortunately, this methodology only resulted in the recovery of a single wrought nail where the tobacco barn appeared on the c.1801 map. The shovel test interval was reduced in this area to every 25 feet, yet only four more nails were recovered. A metal detector sweep indicated several more subsurface metal artifacts, and a decision was made to conduct test excavations at this location in hopes of locating the circa 1801 tobacco barn.

THE HISTORIC CONTEXT OF TOBACCO CULTIVATION

The historical importance of tobacco to Virginia is difficult to overstate. From the earliest settlement at Jamestown, tobacco quickly came to dominate the colony. During the tobacco boom of the 1620s, people were literally growing tobacco in the streets, and it was feared at the time that so much was being grown that there wouldn't be enough food produced to support the colony (Siegel, 1987: 63). Its cultivation, and the yearly schedule of tasks associated with tobacco production, became the defining factor ordering the lives of Virginians, free and enslaved. Historians (Breen 1985:41, Siegel 1987:61) suggest that tobacco cultivation in Virginia was so pervasive as to serve as a powerful unifying cultural force, producing a shared set of social and economic values tying wealthy and middling landowners together during the American Revolution and the Civil War. Breen termed this phenomenon "tobacco culture," and a male landowner during the 18th century in Virginia was openly judged by his peers on the success of his tobacco crop, while his social standing in the community was often established by the price he received for his tobacco at market. In sum, tobacco not only held enormous importance to Virginians economically, but also socially and culturally.

The cultivation and production of tobacco, while differing slightly from region to region

and from plantation to plantation, was generally a homogenized and well-recognized process which lasted throughout the entire year. Starting in early January, tobacco plants were started in fertile plots of soil, or in plots heavily fertilized with manure or wood ash. Many more plants would be started here than could possibly be transplanted, but the sheer numbers were considered a necessary insurance against disasters of nature. In late April, the best seedlings would be replanted, preferably after a good rain to loosen the soil around the roots. In transferring the tobacco plants to the fields, small mounds or "hillocks" two feet in radius and three feet apart were made to receive the plants. Through the summer the tobacco needed constant care, from weeding to "topping" the plant and cutting the sucker thrown from the root of each leaf in order to promote maximum growth. During this time, it was often customary to release domesticated turkeys into the field, since they would eat worms or other insects, which could cause damage to the plants (Boyd, 1953 Vol.VII:212). The tobacco was usually ready for removal from the fields, termed "cutting", sometime in September although the exact date was determined by the overseer or plantation owner. This decision was exceptionally important, attempting to balance the desire to allow the plants as much time in the fields as possible (to reach full maturity and therefore producing higher profits from the better grade of tobacco) with the potential for disaster from an early frost. Curing was done in a tobacco barn (sometimes termed the "tobacco house") and could be accomplished in a variety of ways, depending upon the weather and climate of the region (Breen 1985:50). The object was to dry the leaf an appropriate amount while still maintaining its flexibility and general good condition for shipment.

After curing, the tobacco was sent to a prize barn, where a large weight was used to carefully pack (prize) as much tobacco as possible into one large barrel, termed a hogshead.

Since freight rates and British taxation on imported tobacco were fixed at a given amount per hogshead, the more tobacco a planter could cram into a single hogshead, the fewer taxes would eat away at his profits. Not surprisingly, this also induced planters to manufacture barrels that were always just slightly larger than the standard allowable diameter in order to increase the barrel volume. As a result, barrel sizes slowly increased over time as the law was continually altered in an attempt to catch up with the ever-increasing size of the hogsheads. An article written in *American Farmer* in 1821 stated that the standard allowable size for a hogshead "...must not exceed four and one half feet in height, nor 36 inches in diameter of the heads" (American Farmer, 1821 Vol. III:48)

Because the curing and prizing processes required patience and diligence to conduct skillfully, the final product usually was not ready for shipment until January at the earliest, and often much later than that. The production of a single tobacco crop, from field to market, usually took between 13 to 18 months, and the cycle of planting needed to start over again long before final delivery of, and payment for, the previous years crop. This schedule therefore required that nearly all supplies, necessities, and luxuries had to be purchased by the tobacco planter on credit, since a single crop took more than one year to produce.

The standard practice was to buy on credit through a British merchant house, with the expectation that the sale of the current crop through that house would settle all outstanding debts incurred during the year. Not surprisingly, a perpetual cycle of debt engulfed the majority of planters. The constantly fluctuating tobacco prices meant that the final sale price often did not meet the presupposed expectations of the planters. They, in turn, exacerbated the situation through a general fixation on acquiring the latest luxury items from England, as there was a tremendous cultural

pressure within the landed tobacco gentry to maintain an opulent outward appearance (Breen 1985:36). In the final analysis, large amounts of land, plenty of available credit, and even the use of slave labor, were not enough to allow many planters to maintain the lifestyle they aspired to. Planters often would run up considerable debts, and nearly all lived with the fear of public humiliation through being "dunned," or having one's debt called in publicly. Some attempted to diversify their farming methods, through the production of wheat or by an emphasis on livestock as financially rewarding alternatives to tobacco. In many areas, however, the soils and subtropical climate of Virginia, which rendered efforts at diversification difficult or impossible, hindered these efforts (Siegel 1987:68-74). Despite the difficulties, many stayed in the tobacco industry and often passed on their outstanding debt to the next generation of planters.

RESEARCH QUESTIONS

At the tobacco barn site, determining the original location of the building was of primary importance. This building appears only on the c.1801 survey of the property, and this map shows a crudely drawn building labeled "Tob°.Ho". The haphazard way the building is illustrated on this map opened the possibility that the location of the structure was not surveyed in exactly, but was instead simply sketched in. Archaeological survey of Jefferson's plantation has been carried out on approximately 400 acres of land owned by the Corporation for Jefferson's Poplar Forest, and on 270 acres of the Jamerson property. The majority of Jefferson's original 5,000 acres at Poplar Forest is privately owned and has been developed to the extent that archaeological survey is either not possible, or is unlikely to yield results of value. The North Hill and Quarter Site excavation projects have revealed much about the domestic lives of Jefferson's slaves, however, much of the

broader plantation away from the core area of the property, including the far-flung outbuildings and work areas associated with tobacco production, has yet to receive archaeological attention. It was therefore important to determine how precisely surveyed this c.1801 map was by locating the exact site of the tobacco barn, since the accuracy of locations of other Jefferson outbuildings shown on this map could then be evaluated accordingly for future work at these sites.

Recovering as much of the archaeological material associated with the building as possible was also a high priority. It was hypothesized that the building, and human activity at the site, would have produced an artifact scatter of some type. Artifacts could, for example, potentially be used to indicate the rough architecture of the barn. The September cutting process initiated the curing stage of tobacco production where such barns were primarily utilized. Thomas Jefferson describes the use of such a building at length:

> (The tobacco plant) is then cut off below the leaves and turned on its head upon the earth. Before the evening the labourers go thro' the fields, gather up all the plants which have been cut that day and hang them on scaffolds. These scaffolds are formed by strong poles running parallel with each other, 4. Feet apart and supported by forks at the height of 3 f. from the ground. Small sticks of 4 ½ f. length and 1 ½ or 2 I. Square are laid on these poles and the plants hung close to each other on these sticks in the manner that candles are hung when dipped. It remains on this scaffold a week or 10 days to attain a certain degree of curing. If in the mean time there be danger of rain it is taken from the scaffold and carried into the house till the rain be over. This is quickly done because a person will take 2. or 3. or more of the sticks at once with all the plants on them. After being imperfectly cured out of doors it is removed into the house and hung there on the same sticks, in as many tier one under another as the height of the house will admit, leaving 5. feet next the floor clear for the labourers to walk under, if the weather should be very damp while it is hanging in the house, fires are kindled under it: but here great care is necessary as it is very inflammable, and if it takes fire, the whole, with the house, consumes as quickly as straw would. When perfectly cured, it is taken down and the leaves stripped from the stems: every handful of leaves being bound round into bundles slightly at one end with another leaf. These handfuls or bundles are then laid in large heaps to give them a little

> sweat. Here they lay till it is convenient to pack them into a hogshead, which is best done when they are a little damp, but not too much. (Boyd 1953:Vol VII, 211)

Three major ways to cure tobacco resulted in three major architectural designs for tobacco barns. These methods, air curing, fire curing, and flue curing would often require different design elements to be built into the barn. For the air curing method, tobacco was basically set inside a barn to slowly dry. These barns were usually simple log structures built to allow air to pass through gaps in the wood, and were usually sited on a hill or small rise to take full advantage of any breeze. Barns built later in the 19th and early 20th century would sometimes be designed with hinged vents or shutters on the sides or near the roofline. These would allow the planter to adjust the airflow through the building, but it is unlikely that such elaborate features would have been built into the Jefferson barn. Fire curing was conducted by slowly raising the temperature inside the barn by tending small hardwood fires carefully placed within the building. This method can perhaps best be compared to a smokehouse, and barn temperatures rarely exceeded 100 degrees (Noble and Cleek 1985:95). The favored location of these buildings was in low places or tree-sheltered hollows, to protect them from winds and lessen the dangers of fire. Flue curing did not become popular on a large scale until after the Civil War. Flue curing tobacco barns operated on generally the same principles, except that permanent fireplaces and specially designed chimneys were built directly into the structure, both to lessen the dangers of fire, and to more efficiently regulate and channel the heat throughout the building. The earliest documentary mention of flue curing in Virginia was 1822 (Roberts 1938:44), and it would have been highly unlikely that this method would have been employed nearly twenty years earlier at the tobacco barn

It was hoped that artifacts such as nails, hinges, bricks, or daub could indicate which style of barn existed on the site and which type of curing was taking place. The description from Jefferson quoted previously actually describes a combination of two techniques: air curing and fire curing. It was probably a common practice to combine elements of both in the manner he describes, but potential contradictions regarding the architectural design of the barn arise from such practices. For example, if the barn was primarily used for air curing tobacco, then it should be designed with some space between the logs to promote airflow through the building. However, if fires were intended to be an integral element of the curing process, then the optimal design would be to have all the spaces between logs chinked with mud or daub, in order to most efficiently hold in the heat and smoke. It should also be noted that the location of the tobacco barn on the c.1801 map suggested a primarily air curing design, since it was located on top of a small hill. However, documentary records suggest that Jefferson was at least partially fire curing his tobacco at Poplar Forest because he lost an entire crop when a tobacco barn burned in 1824 during the curing process (MHS12, Doc. #1316).

It was also hypothesized that the people working at the tobacco barn might have left some material evidence of their presence, such as food or water storage vessels, smoking items, or work tools. However, the initial testing project yielded only a total of five nails and no other artifact types, at a testing interval of 25 feet. It was therefore considered possible that the tobacco barn was such a simply built storage structure that the artifact scatter associated with the building would be so slight that answering more complex architectural design questions design would be difficult.

Another goal was to locate subsurface evidence of the barn, as well as any structures or fences associated with it. The field where the barn once stood forms a slightly rounded saddle, probably resulting in a significant loss of topsoil due to gravitational water erosion and the fact that

it has been plowed since Jefferson's time. An aerial photograph in Poplar Forest archives indicates that the field was plowed as late as 1979. This level of subsurface disturbance would have eliminated any archaeological remnants of a log sill structure long ago. However, post in ground construction techniques would be visible as postholes in the subsoil, as would any animal pens, fences, sheds, or internal support and/or repair posts . It was also important to obtain as much information as possible about the tobacco barn site in time allowed. Two and ½ month's time on site was granted for the project by Mr. Jamerson, the property owner (See Map of Jamerson Property, Figure 2). This time constraint had to be balanced with the other aforementioned goals in order to achieve the end results desired from this project.

METHODOLOGY

The field strategy was to excavate as much of the site as possible using 10X10 foot units, broken down into 5X5 foot quadrants for tighter data control. All soil was screened through 1/4th inch wire mesh. The initial testing pattern was five 10x10 foot units placed at 20 foot intervals across the hypothesized center of the site from east to west. Another four units were placed at 20 foot intervals to test the site in a line north to south. The reason this pattern was chosen was that by covering the site with a cross shaped pattern of test units, artifact densities would appear spatially. This would allow us to focus subsequent excavations near the units that produced the most artifacts or revealed subsurface features. In each excavation unit, soil samples were taken from each 5x5 foot quadrant. These soil samples were then tested for pH level, as well as potassium, calcium, magnesium, and phosphate content.

With two weeks left until the deadline, and after a total of nineteen 10x10 foot units had

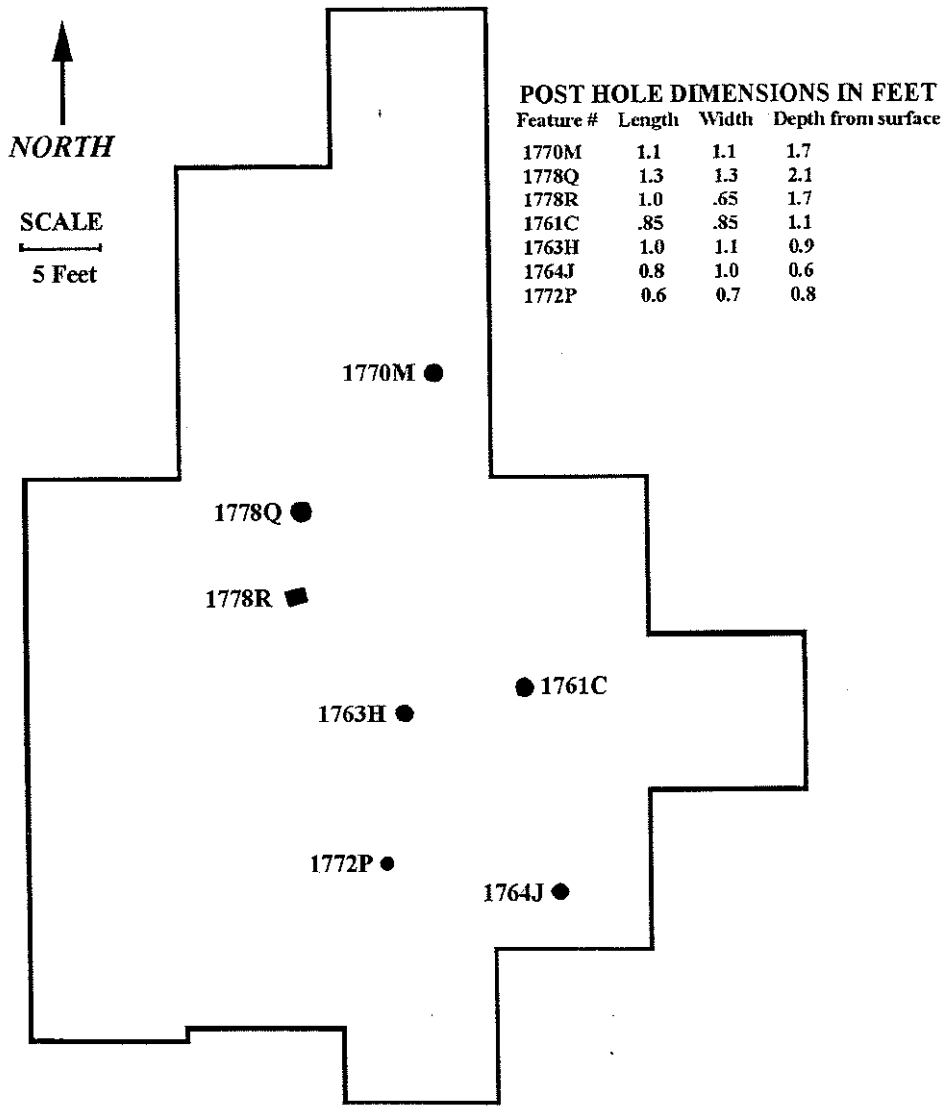
been excavated using the methods described above, we spent one week shoveling by hand to clear off areas near subsurface features. This soil was not screened, and three more 10x10 foot units were excavated in this way. In the third stage during the start of the final week, a grader was brought in to clear off the remaining plowzone soil in the excavation area in order to reveal any undiscovered features extant there. The topsoil was removed to a depth of .8 to 1 foot, and the remainder of the plowzone soil was hand shoveled down to subsoil. Approximately seven more 10x10 foot units were removed in this way. The total soil excavated and removed at the site equaled 29 10x10 foot units, or 2,900 square feet (See Figure 4).

The field where the site was located was cleared farmland, and the site had been plowed for nearly 200 years (an aerial photograph from 1979 was our most recent evidence of ground disturbing activity at the site). The stratigraphy consisted of .8 ' to 1.1 ' of plowzone (disturbed soil), overlaying a hard red clay subsoil. The plowzone soil was a dark reddish brown (2.5YR 3/4 to 2.5YR 4/4 Munsell color) clay loam, with numerous inclusions of yellow colored "greenstone", a native schist which forms most of the bedrock in this area. Charcoal flecking was also present and varied from pit to pit, but many nearly intact burned roots of obviously recent origin were also found in this same soil, meaning that the charcoal flecking could not be positively linked to historic human activity at the site.

RESULTS OF EXCAVATION

Six post hole features were revealed by this excavation, along with two other features found to be tree root disturbances. As can be seen in Figure 4, the post holes are in close

FIGURE 4:
Map of excavation area showing features



POST HOLE DIMENSIONS IN FEET

Feature #	Length	Width	Depth from surface
1770M	1.1	1.1	1.7
1778Q	1.3	1.3	2.1
1778R	1.0	.65	1.7
1761C	.85	.85	1.1
1763H	1.0	1.1	0.9
1764J	0.8	1.0	0.6
1772P	0.6	0.7	0.8

proximity to each other, but obvious outlines of the structure are not readily discernable. No dateable artifacts were found within any of these features. However, the artifact scatter recovered clearly suggests that no later structure ever stood on this site. In addition, the proximity of these features to the highest areas of artifact density seems to indicate that these features were associated with the tobacco barn. No coherent spatial pattern emerged from the location of these post holes, so no true dimensions for the barn could be derived. The lack of a clear wall or square corner pattern suggests that the structure initially rested on the ground. It is possible that one or several of the walls were later strengthened or repaired through the placement of posts in the ground, which would account for the irregularity of the post holes. One post hole, ER-1778R, was squared off on all four sides, and it may have been connected to a square frame. It is also possible that several of the post hole features represent an exterior shed or animal pens connected to the barn (see section on soil chemical analysis).

The cultural material recovered at the Tobacco Barn site was not as informative as had been hoped. As was expected, several artifacts were recovered which dated after the Jefferson era tobacco barn. These included clear bottle glass, a dog license from the 1950s, and the cast iron tip of a drag plow. Fragments of green bottle glass were also recovered, but no diagnostic pieces were found to allow these items to be accurately dated by manufacturing technology, it is unknown whether they were deposited during the existence of the tobacco barn.

Several artifacts were found that clearly indicated the tobacco barn site being used during Jefferson's ownership of Poplar Forest. Two small fragments of creamware were recovered.

FIGURE 5: A 19TH CENTURY SMOKEHOUSE, CIRCA 1935. CONSTRUCTION OF THIS BUILDING IS PROBABLY SIMILAR TO THAT USED FOR THE TOBACCO BARN, SUCH AS ROUGH-HEWN LOGS AND ABOVE GROUND SILLS. (Vlach, 1993)

Both pieces appear to have come from flatware vessel forms, and have a manufacturing date range of 1762 to 1820. Though their presence suggests food consumption at the site, the number recovered was too small to draw definitive conclusions.

A copper alloy button with a wheel engraved decoration was recovered in unit 1761 (Illustrated in Figure 5). These buttons, made of an alloy of copper, zinc, and arsenic called tombac, were fairly inexpensive and utilitarian. The buttons were so cheaply made that the copper alloy was extremely brittle; so much so that the decoration had to be engraved while the button was turned on a wheel because the alloy would stress or break if the decoration were stamped. This type of button was only manufactured from 1760 to1800 (Hughes and Lester 1981:203).

All other artifacts recovered at the tobacco barn site were hand wrought nails. The distribution of artifacts across the site, as shown in Figure 7, provided the best evidence of the physical location of the tobacco barn. Of the 234 nails recovered at the site, 108 were straight, 119 were pulled, and 7 were clinched. The large numbers of pulled nails appears to indicate that the barn was salvaged upon abandonment, and the distribution of pulled and straight nails is shown in Figure 8. Although showing some minor variations, these concentrations do not clearly delineate one work area for salvage and another for the standing location of the barn.

SOIL CHEMICAL ANALYSIS

Archaeologists have traditionally used the distribution of artifacts across a site as one of the basic foundations of site analysis. By plotting the relative concentration of artifacts recovered

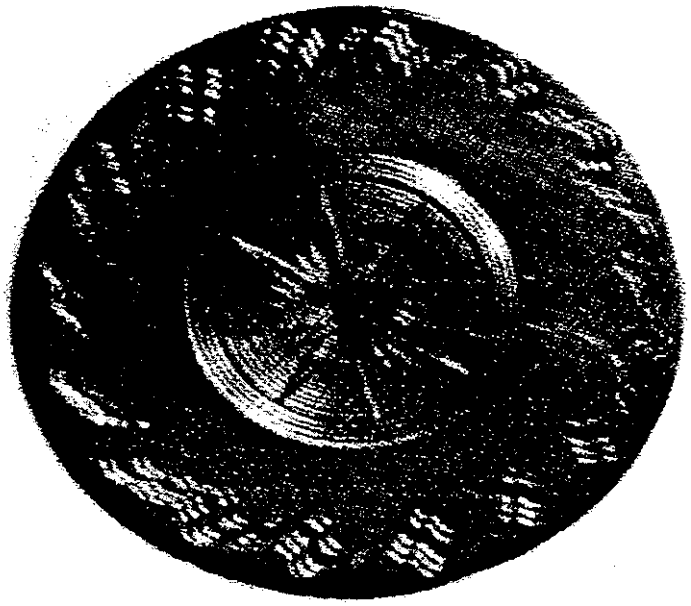


Figure 6: Example of tombac alloy button found at tobacco barn. Engraved design is a star superimposed on concentric circles, within a border of wavy lines (Hughes and Lester, 1991).

by controlled excavation, it is possible to determine spatial relationships that reveal information about the site itself. Plotting the distribution of all artifacts often indicates the exact location of a site, while a more focused analysis of the distribution of task-specific artifacts can indicate areas where particular activities took place within that overall site. In the same way, the spatial distribution of changes in soil chemistry often allows similar conclusions to be drawn regarding specific information about an archaeological site. Certain human activities can alter the soil chemistry of an archaeological site, a fact that has been used by historic and prehistoric archaeologists to supplement artifact analysis and identify activities and use areas within

FIGURE 7: ARTIFACT DENSITY MAP

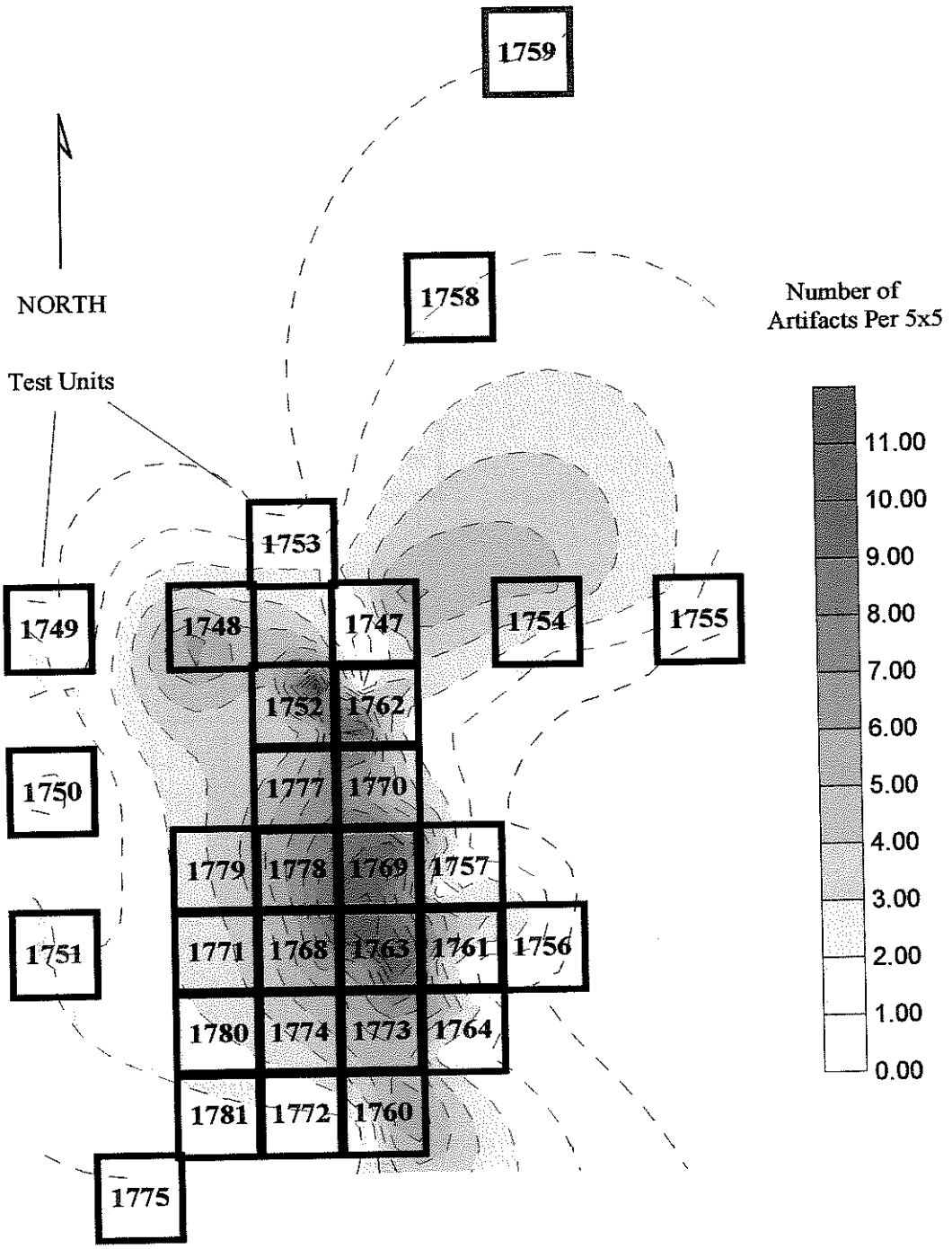
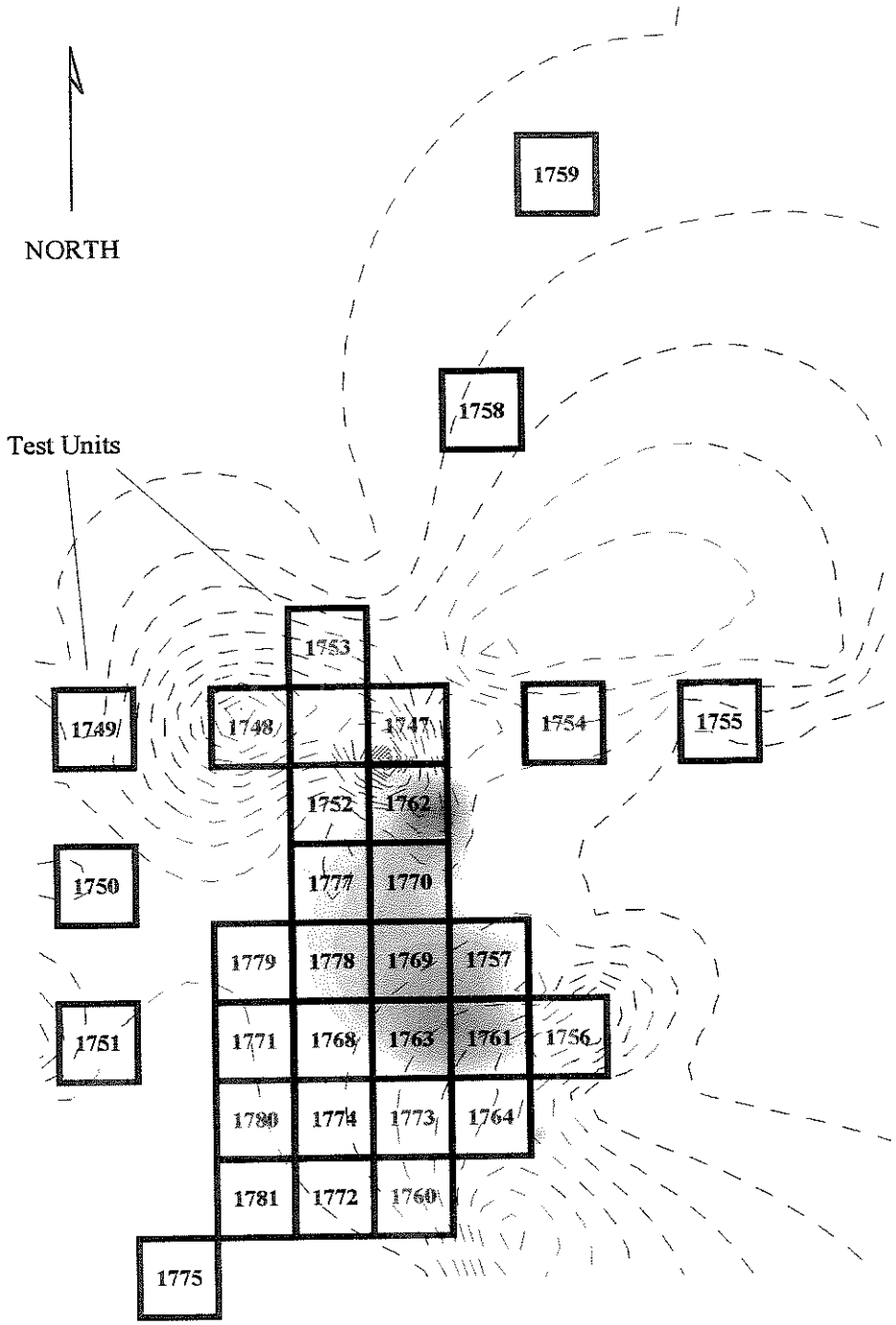


FIGURE 8: PULLED vs STRAIGHT NAIL DISTRIBUTION
Pulled shown as blue, Straight shown as hatched line



archaeological sites. In fact, even plowed contexts have been shown to retain a significant chemical spatial signature.

> (in plowzone)...the analysis of patterns in the distributions of these chemicals should reflect depositional processes similar to those indicated by artifact distributions, but might well provide additional data that otherwise may not be available. (Pogue 1988:2)

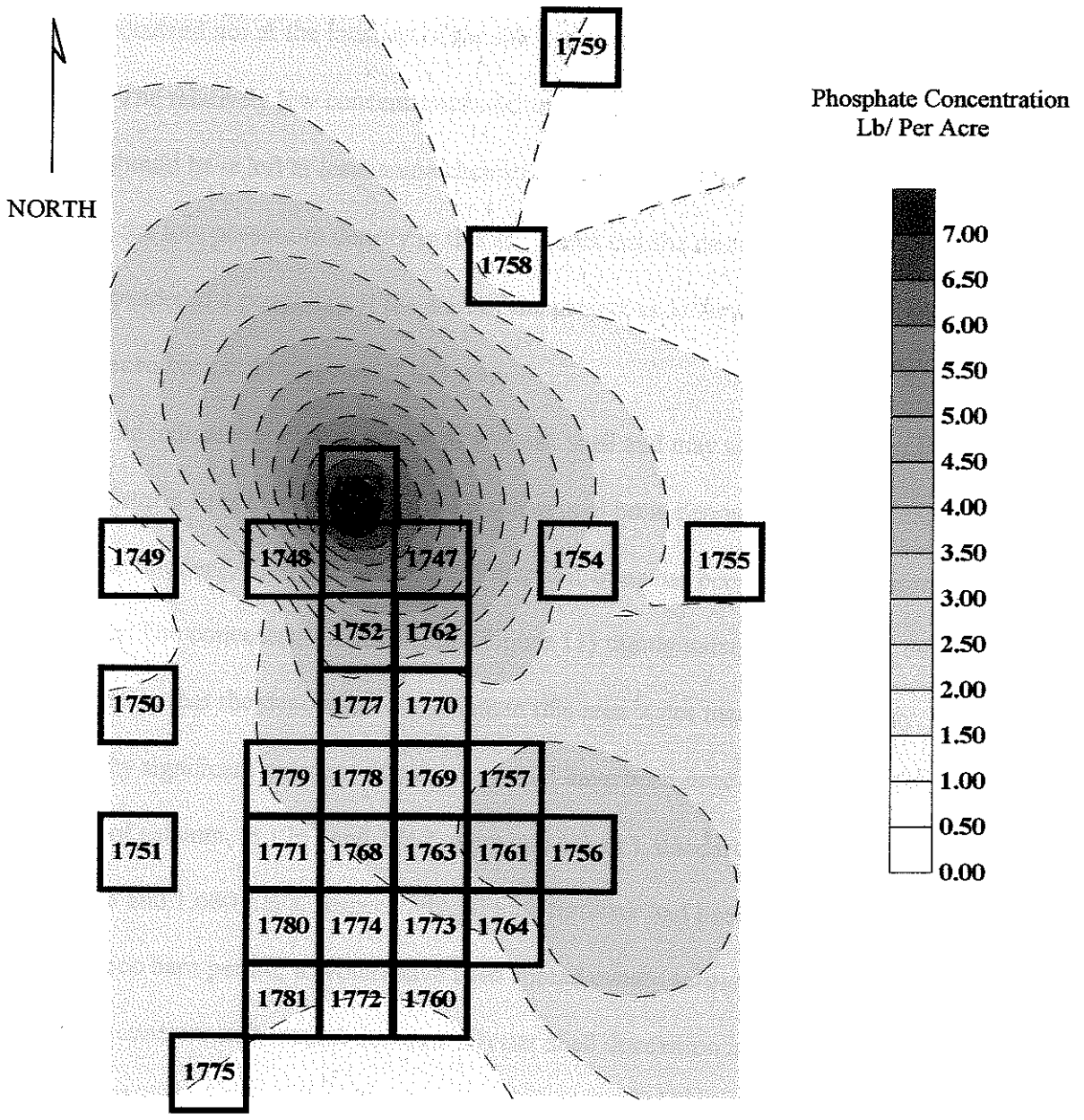
The following soil chemical distribution data should therefore be compared to Figure 7, the artifact concentration map, which is the best indicator of site location at the tobacco barn. The soil sampling strategy was dictated by the simple stratigraphy of the site. Because the stratigraphy consisted only of disturbed plowzone, then subsoil, and occasionally feature fill within the subsoil, the following methodology was utilized. A soil sample was taken from the plowzone layer of each 5X5 excavated, and was obtained from the planview center of each 5X5. The sample was taken from the bottom half of the plowzone vertical soil column to decrease the effects of surface contamination, though plowing over a long period of time would probably effectively randomize such contamination. This methodology allowed plotting of the spatial distribution of chemical change across the site. An additional sample was taken from the fill of each feature, for comparison to the overall site soil chemistry. The soil samples were sent to the Virginia Tech Soil Testing Laboratory in Blacksburg, VA , where they were tested for pH, phosphate, potassium, calcium, and magnesium.

The concentration of phosphate (P) at the site indicates a coherent spatial pattern (Figure 9). Phosphate is considered the best chemical indicator of human occupation of a site, because it is found in human and animal tissue and waste, as well as in other organic substances. The presence of

phosphate at historic sites has been shown to have a very high degree of correlation with human living spaces and trash middens (Pogue1988; Keeler 1978). The high levels of phosphate in animal waste would also create a strong signature, especially in soils of outbuildings used to house animals, or in soils from animal pens. As Figure 9 shows, the concentration of phosphates at the site were broadly similar to the overall artifact density, indicating a rough correlation between the two. The highest concentration of phosphates occurred to the north in units 1753 and 1747. These units contained sixteen wrought nails and are at the periphery of the main artifact concentration, approximately 30 feet north of the highest concentration of artifacts in unit 1763. It is possible that the center of phosphate density, located close to, but slightly offset north of, the center of the site artifact density, may indicate an activity area outside of the central barn structure. There are several potential explanations for such an area.

Documentary sources, including the account of tobacco production from Jefferson himself, indicate that fowl, especially turkey, were kept near the tobacco fields (Boyd 1959:212). Certain worms and insects feed upon the tobacco leaf, and turkeys would intentionally be set loose into the fields to eat these worms, serving as an effective natural insecticide. The phosphate concentration, overlapping but 30 feet north of the presumed barn center, may indicate a pen or enclosure for these birds, or a pen for other common farm or work animals. Another possibility is that the concentration represents the remains of a manure or compost heap. Because tobacco exhausted the soil so quickly, it was common to store manure to spread on older, established fields to attempt to keep them in production longer. Unfortunately, no archaeological evidence was found to prove either of these possibilities, though it should be noted that locations such as turkey pens or compost heaps would not be likely to yield much of an archaeological signature other than a chemical one.

FIGURE 9: PHOSPHATE CONCENTRATION



Potassium is found in wood ash. As shown in Figure 10, the potassium concentrations occurred to the north and the south of the center of the site as indicated by the artifact density map. It is possible that concentrations of this chemical might be linked to hardwood fires Jefferson describes using for speeding the curing of tobacco. At other historic sites, the highest concentrations of potassium have occurred not at the location of the fire itself, but in places where the ashes were routinely dumped. The relatively low concentrations occurring at the center of the barn, where the burning hardwood should have left at least some chemical trace, is nonetheless puzzling. It seems clear, however, that the low potassium density in this area rules out the destruction of the tobacco barn through fire, considered a possibility at the start of the project as Jefferson was known to have lost at least one tobacco barn at Poplar Forest this way.

Calcium can be indicative of the presence of mollusk shell and may also be linked to lime fertilization, but at historic sites is most directly the result animal bone deposition. A high degree of correlation to trash middens, food preparation, and disposal areas has been shown at historic sites (Pogue 1988:9). The concentration of calcium (Figure 11) tightly mirrors the artifact density map, strongly suggesting that the deposition of calcium in this area is not merely an anomaly. It is unclear, however, why significant amounts of calcium would have been deposited at this site, and the highest readings of calcium, in 1761 and 1762, were more than 1 standard deviation above the mean (1162) at 1,608 and 1,680 LB/a, respectively. If lime fertilizer had been used on the field during the post-tobacco barn period, it would have been spread evenly across the site, whereas the calcium is plainly concentrated around the barn. Oyster shell deposition is obviously unlikely, leaving bone as the only remaining explanation for the calcium. If the orientation of the building

FIGURE 10: POTASSIUM CONCENTRATION

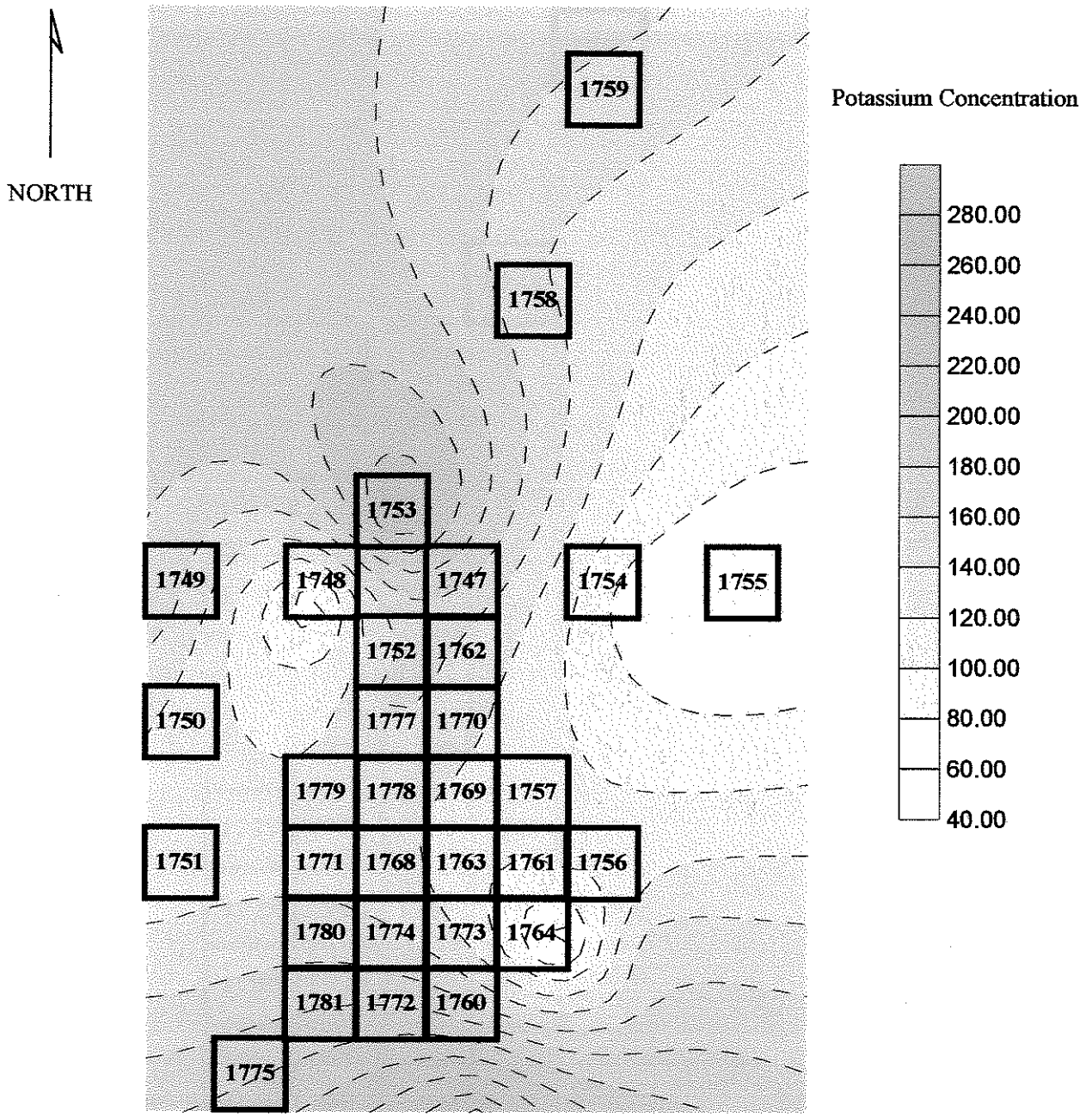
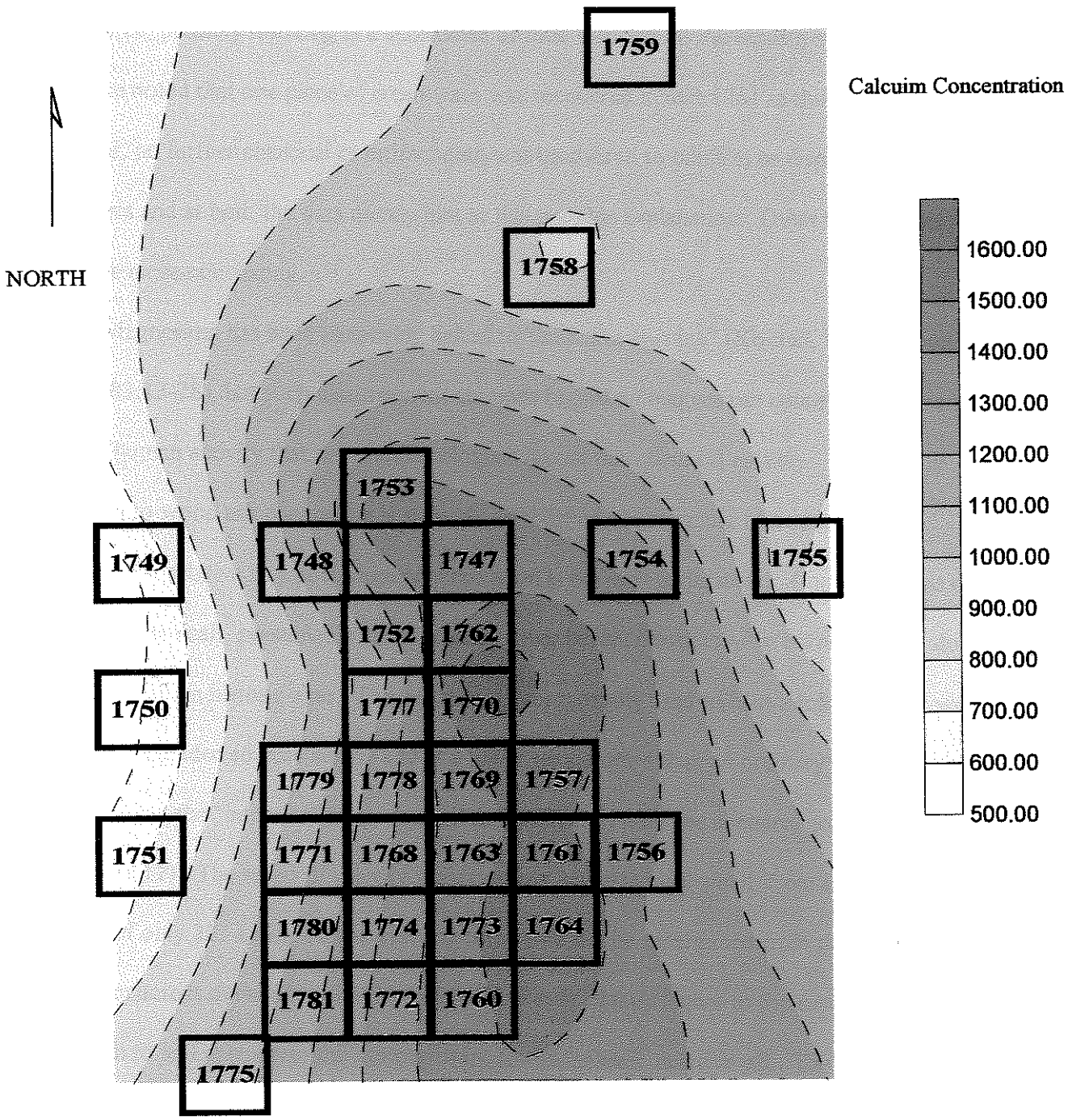


FIGURE 11: CALCIUM CONCENTRATION

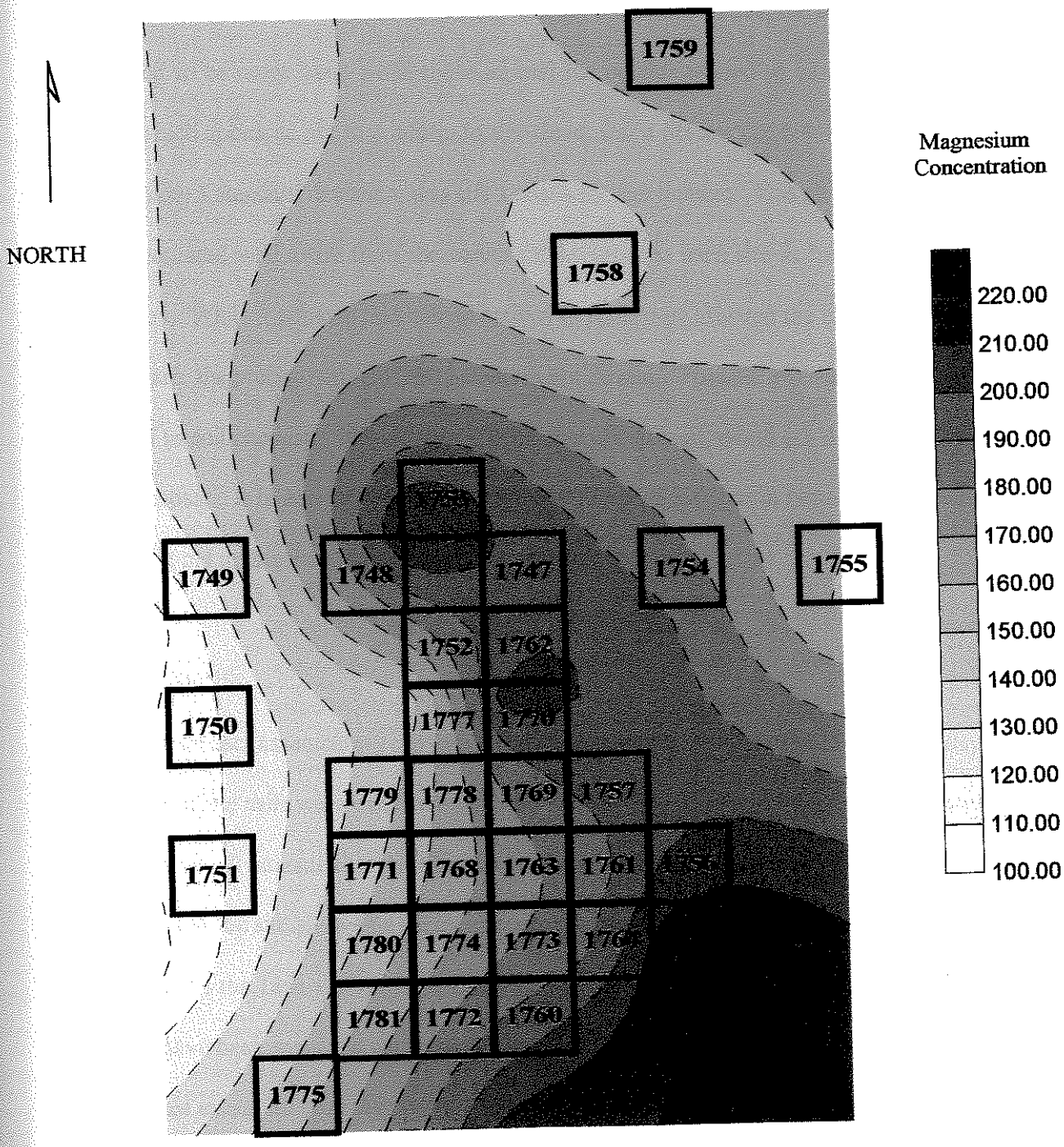


mirrored the slightly northwest to southeast cant suggested by the artifact scatter, then the only shady area during the hot Piedmont summer afternoons around the tobacco barn would have been the eastern side of the barn. Because the highest concentrations of calcium are offset slightly to the east of the highest artifact densities, it is possible these readings represent a shady eating and resting area, possibly resulting in a small level of food disposal on the eastern side of the barn. It should be noted that one piece of creamware was recovered in unit 1761 in this location. However, no further chemical or artifact data was recovered to confirm or disprove this hypothesis and at best, the data merely hint at this possible explanation. Other conclusions may yet prove more convincing.

Magnesium has been tentatively linked to "intensive burning" (Konrad, Bronnichson, and Clay, 1983:13-28), but such disagreement abounds regarding magnesium concentrations as the result of human activity that some archaeologists ignore this chemical entirely. Though the potassium to wood ash connection is strongly established, the meaning of a magnesium concentration relative to a potassium concentration is not well understood. Concentrations of these two chemicals, presumably linked to each other because both involve burning, often do not match up at all on historic sites. The hardwood fires typically used to heat a tobacco barn were specifically intended to burn slowly and at a lower temperature than an ordinary fire, and may not have produced the "intensive" heat required to significantly alter the chemical composition of the soil (Figure 12). The range of values for magnesium was relatively small, from a low of 106 LB/a to a high of only 223 LB/a. At the tobacco barn, little can be ascertained from the distribution of magnesium across the site beyond the fact that it trends slightly higher to the east of the barn.

In addition to soil chemistry, soil samples were tested for their relative pH. The mean soil pH

FIGURE 12: MAGNESIUM CONCENTRATION

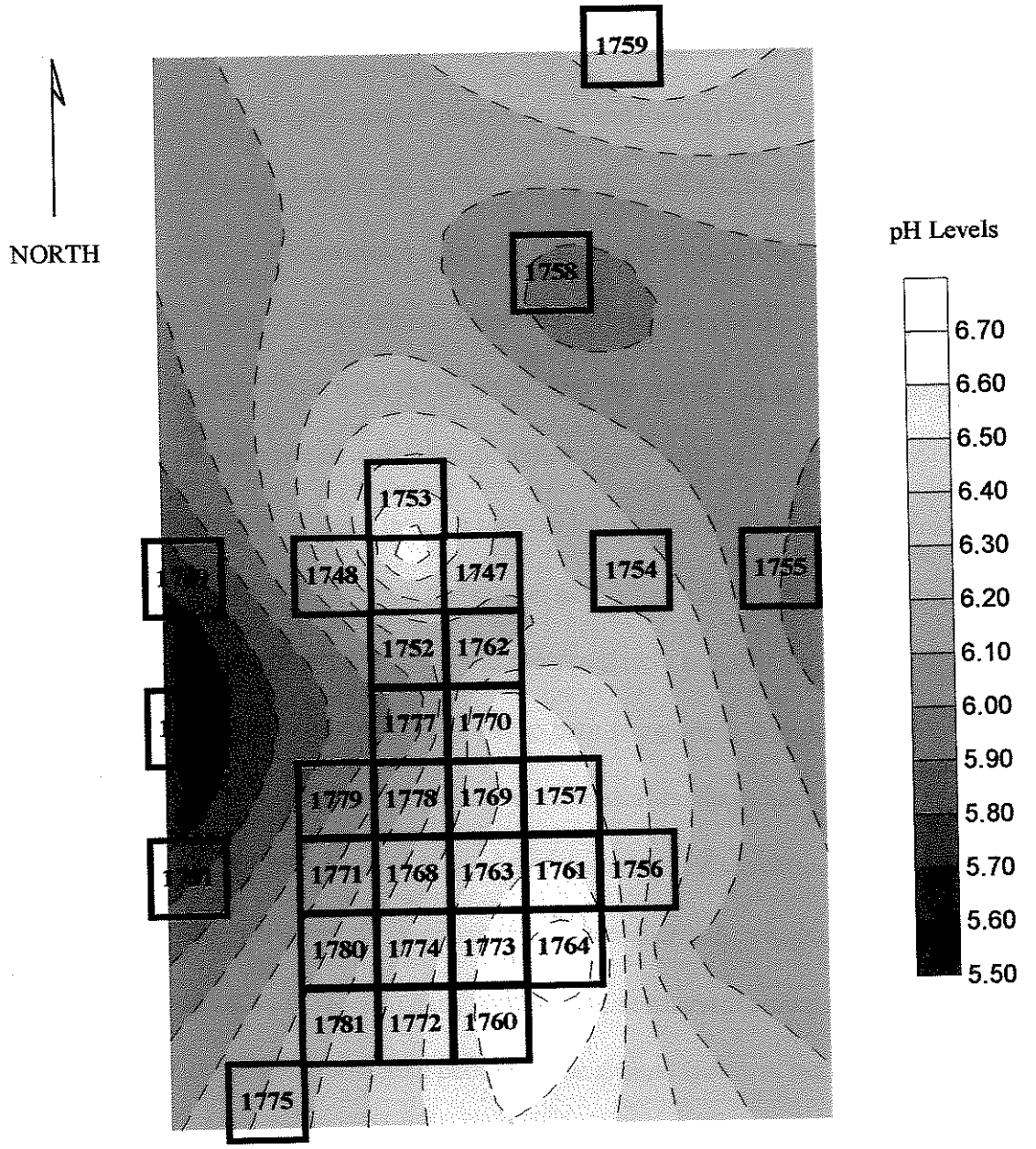


across the site was 6.2, but varied from acidic high of 5.6 to a low of 6.7. A clear spatial trend was indicated by the data, shown in Figure 13. Units 1749 and 1750, on the western edge of the site, were both pH 5.6, below standard deviation for the 18 samples taken. Units 1753, 1757, 1760,1761, and 1762 were all above standard deviation, with pH 6.6 or 6.7. Thus, the soils at the center of the site tended to be more basic while those around the outside tended to be more acidic. The one sample, which appeared not to conform to this trend, was a pH level of 6.4 from unit 1759, which, though below 1 standard deviation, was still a relatively high number. This pit was the furthest north, and was situated well away from the center of the tobacco barn site as indicated by the artifact distribution. While it appears that human activity in some way lowered the acidity of the soil at the tobacco barn, the precise nature of that activity is not certain. Possible explanations discussed earlier in relation to soil chemistry include animal pens, manure storage, wood ash deposition, or food and waste disposal. It is unclear whether the actual storage of tobacco in large amounts would have affected the pH in this way.

CONCLUSIONS

The artifact assemblage recovered from the tobacco barn was useful in several ways. The fact that all of the nails were hand-wrought, along with the two pieces of creamware and the tombac button, all indicate that the site was indeed a Jefferson period barn. The distribution of artifacts across the site allowed a reasonably precise determination of the location of the barn to be made. Thus the 1801 map of Jefferson's holdings at Poplar Forest, showing the tobacco barn, proved to have been surveyed with a high degree of accuracy. This will prove useful at other outlying sites extant on lands owned by Poplar Forest. The large numbers of pulled nails

FIGURE 13: pH LEVELS



indicated that the building was salvaged, and did not burn. Although the assemblage did not contain any building hardware that would have indicated construction details or the method of tobacco curing being used, air curing appears the most likely. The negative evidence of a lack of hinges or specialized hardware would be consistent with air curing. It also should be noted that all Jefferson era tobacco barns appearing on historic maps are located on the tips of hills or ridges, which would be the ideal placement for air curing. The button and creamware were the only personal items recovered. The creamware may indicate that the people who worked at the barn would occasionally eat meals or prepare food there, but little else can be discerned from so few items. As a whole, the assemblage from the tobacco barn was sparse, but probably typical of an artifact assemblage from this type of isolated outbuilding.

The results of chemical analysis indicate that the tobacco barn left a clear chemical imprint that is still extant today. The fact that high phosphate, potassium, calcium concentrations, and low pH correlate so closely with artifact density at the site plainly suggests that these chemical signatures are related to human activity at the tobacco barn structure or within surrounding activity areas. Several potential explanations for these chemical readings have been discussed, but no hard conclusions can be drawn due to a lack of corroborating artifactual or archaeological evidence. The chemical signature of the barn and the artifact distribution maps may indicate that the barn was oriented along a north-south axis, with a slight northwest to southeast tilt. The absence of a square or rectangular post hole pattern in the ground indicates that the barn was probably a log sill structure, and the exact size of the building remains unknown. In addition, no coherent pattern could be discerned from the post holes, which could be attributable to a fence, a pen, or shed. Without hard archaeological evidence of the size and orientation of the barn

structure, and without a clearer understanding the cause of the post holes to the north, it is impossible to do more than speculate on the specific meanings of the chemical signatures found at the site.

FURTHER RESEARCH

The acquisition of the prize barn property by the Corporation for Jefferson's Poplar Forest represents an opportunity to study another agricultural outbuilding on Jefferson's plantation in Bedford. The tobacco barn project has provided an excellent basis for comparison, but was hampered by the inherently sparse nature of the artifact assemblage from what was essentially a temporary storage barn. The prize barn would have been a center of activity during several key times of year on the plantation. It will therefore probably yield a more diverse and informative artifact assemblage than the tobacco barn, and may have the potential to shed light on the lives of Jefferson's slaves and their activities associated with tobacco production. Future excavation at the prize barn site is recommended.

It is important to note how closely the highest chemical readings were associated with the center of the barn activity area. Each overall chemical signature, while differing in some respects from the others, was clearly similar to the artifact density distribution map. Shovel tests at an interval of twenty five feet produced no clear artifact based indication of the location of the barn (noted in the introduction to this project). In fact, without the 1801 map showing the location of the barn, it is questionable whether standard field testing alone would have located this structure. This may suggest that a sampling strategy based on soil chemical data, rather than artifact data, may be worth attempting in the future at isolated outbuilding sites such as the tobacco barn.

A theoretical comparison of the two sampling strategies is worth discussing. The initial survey of the tobacco barn field was accomplished using two people, each digging 2x2 foot shovel tests on a grid pattern every fifty feet. When this methodology yielded little helpful information, the interval was reduced to every twenty five feet. This crew averaged six shovel tests per day, and were each paid 8.50$ per hour. To cover a 100x100 foot section of field at an interval of 25 feet, 25 shovel tests would be necessary. It therefore took these two people 4 and 1/4th days, at a total payroll cost of 578.00 $ to test a theoretical 100x100 foot section. This same two person crew could easily dig 25 "sampling holes", just enough to get a soil sample from within the plowzone, in just one day. Twenty five samples at 7.00 $ per sample equals 175.00 $, and could be obtained with a one day crew payroll of 136.00$. Therefore, the total cost of chemically sampling the same area at the same interval would be only 311.00 $ compared to 578.00 $ if done the traditional way. In addition, it is possible that these chemical indicators of human occupation may in fact show up better in this type of survey than the "hit or miss" artifact based method. The traditional field testing method used on this project yielded inconclusive results, while a chemical analysis survey coupled with a metal detector survey to roughly date the site, would have almost certainly pointed out the location of the barn. The major potential drawback for this type of survey would be the difficulty in interpreting isolated chemical anomalies that would likely occur. However, the twenty five foot testing interval would ensure that several test units would register high at such a site, making it easier to ignore random, individually high readings. In addition, the fact that four different chemicals and the pH of the soil would be tested in each sample should provide enough complimentary data to prove this method a useful tool. It would be valuable to combine this methodology with a traditional survey on a future project to test this hypothesis.

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APPENDIX I:

Soil Chemical and Artifact data

Pit #	northing	easting	artifacts	ph	P	K	Ca	Mg
1751	120	100	3	5.9	2	141	672	108
1750	140	100	0	5.6	2	135	552	113
1749	160	100	2	5.6	1	180	504	106
1748	160	120	20	6	2	62	1032	161
1753	170	130	8	6.7	8	248	1488	214
1752	150	130	21	6	3	148	1152	146
1747	160	140	8	6.2	5	145	1464	194
1762	150	140	23	6.6	2	126	1680	204
1760	100	140	18	6.6	1	284	1488	214
1759	230	160	1	6.4	1	164	984	170
1755	160	180	3	5.9	2	62	816	158
1761	120	150	17	6.6	2	44	1608	190
1757	130	150	25	6.6	3	106	1506	185
1756	120	160	3	6.2	3	148	1368	223
1754	160	160	12	6.3	2	62	1392	190
1758	200	150	2	5.9	1	135	888	142