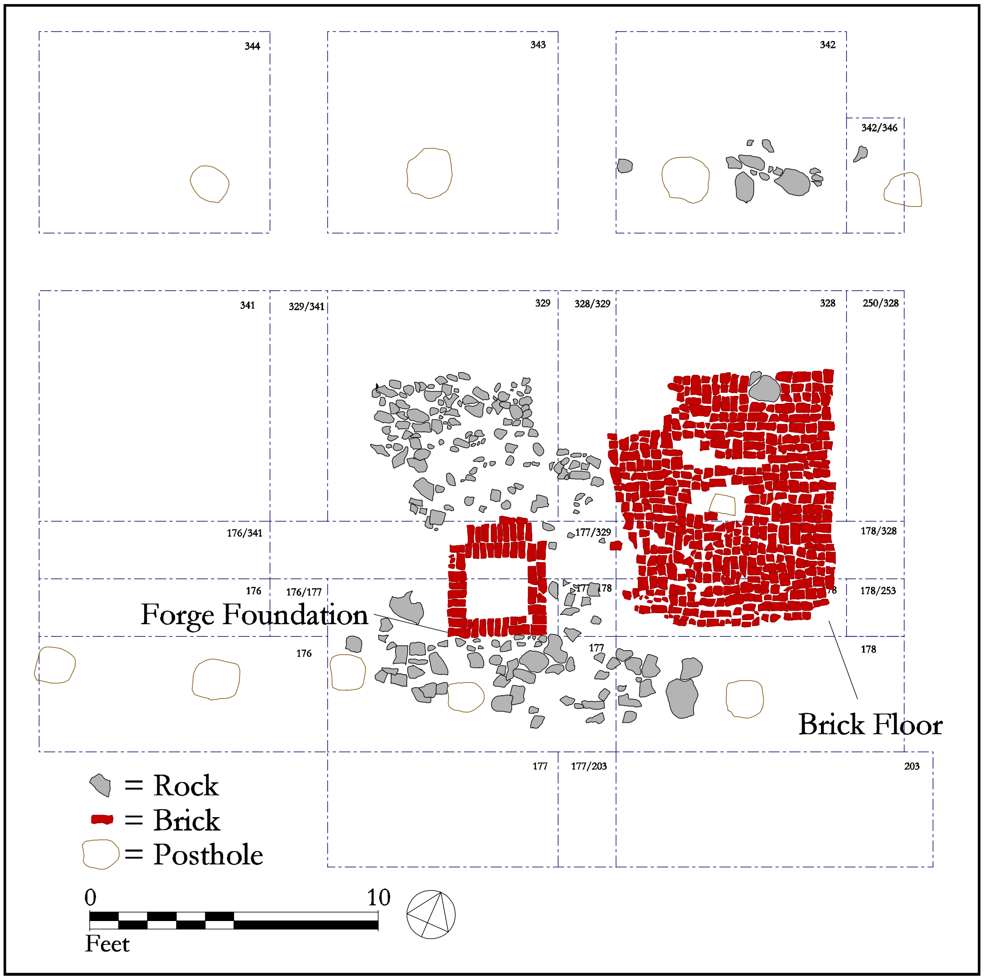
Mulberry Row Reassessment: The Building *l* Site



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Introduction

This report describes a new analysis of archaeological evidence previously excavated from the site of Building *l*, one of the log structures that stood in the late 18th and early 19th centuries along Mulberry Row at Thomas Jefferson's Monticello Plantation. Results of this study include important new insights into the occupation dates for the site, its internal chronology, and the kinds of activities that took place on it. The study has added significance because it serves as a pilot project to two larger research initiatives. The first is the Mulberry Row Reassessment Project, which will review the archaeology of domestic slaves sites that make up the Mulberry Row community. The second is the Digital Archaeological Archive of Chesapeake Slavery. This larger, regional initiative will create a database of the artifacts and field records from slave sites across the Chesapeake in order to address changes in slave life in the late-seventeenth through the mid-nineteenth century.

In 1769 Thomas Jefferson began the development of Monticello Plantation, a 5000-acre tract of land on the banks of the Rivanna River in the Southwest Mountains, at the western edge of the Virginia Piedmont. The most important components of the new plantation were the quarter farms where slave-based production of crops and livestock took place. But Monticello also included Jefferson's mansion, whose construction and reconstruction would occupy the ensuing 50 years, along with an adjacent street of plantation buildings called Mulberry Row (**Figure 1**). The Mulberry Row structures were diverse in appearance and function, and their character changed over time. They initially included buildings dedicated to service activities in support of the gentry lifestyle cultivated in the mansion (i.e. dairy, smokehouse, washhouse). Mulberry Row also included housing for enslaved domestic servants, and for the free and enslaved workers involved in the ongoing construction of the mansion (Shumate 1992).

During the 1790s, the structure and activities on Mulberry Row were reorganized with a new emphasis on industrial production of nails and blacksmithing activities. On the Monticello farm quarters, Jefferson shifted agricultural production from tobacco to wheat, which caused changes in the distribution and organization of slave housing on the larger plantation (Neiman et al. 1998). Monticello's diversification was part of a larger trend in the Chesapeake, encouraged by an increased demand for wheat in Europe and the West Indies (Carr and Walsh 1988; Sanford 1995). In addition, local markets for manufactured goods were emerging in towns like Charlottesville. The shift from tobacco to grain production was linked with increased production and maintenance of the equipment necessary in growing, processing, and selling wheat, including plows, carts and barrels to transport crops to mills (Carr and Walsh 1988). The archaeological record at Building *l* reveals just how activities at this site fit into this diversified plantation economy. It also offers clues about the ways in which the Mulberry Row community changed over time.

Mulberry Row Reassessment Project

As described in more detail below, hundreds of thousands of artifacts were excavated from Mulberry Row during the 1980s in headline-grabbing excavations conducted by William M. Kelso and funded by grants from the National Endowment for the Humanities (Kelso 1997). The Mulberry Row excavations were a watershed in the development of Monticello as a modern history museum. They brought to light in a sustained fashion the material remains of the slave society of which the real historical Monticello had been a part. Because the vast majority of Monticello's residents were enslaved African Americans, most of Monticello's archaeological record is a record of slavery. When the Mulberry Row excavations were in progress, visitors to Monticello saw previously buried physical remains of slave work and living spaces: Buildings *r*, *s*, *t*, and *o*, the Smokehouse / Dairy (*m*), the Storehouse (*l*), the Nailery, the Carpenter's Shop, West Kitchen Yard and Dry Well, and the East Kitchen Yard. During the 1980s, archaeology played a key

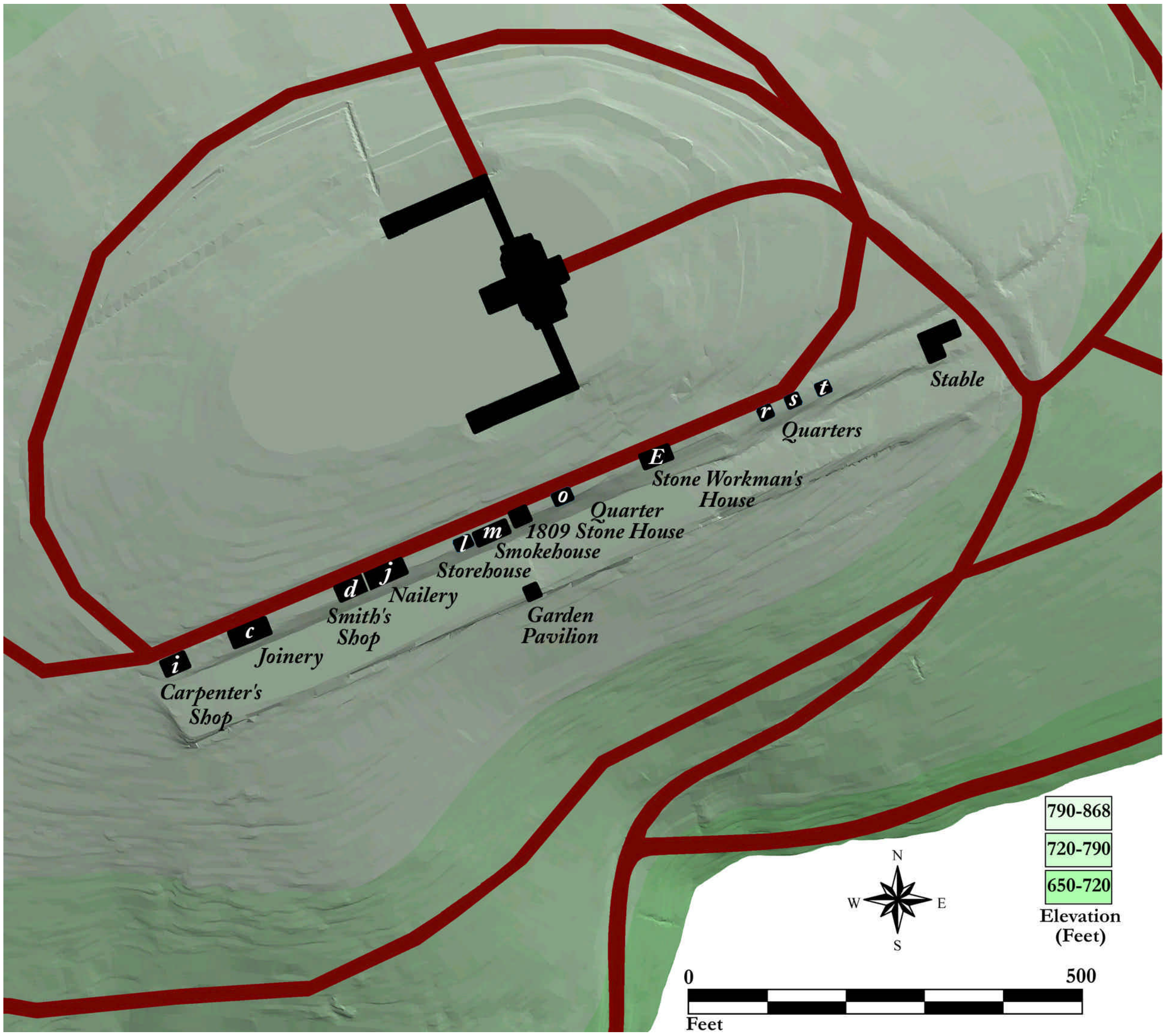


Figure 1. *Location of the Building* l *site on Mulberry Row.*

role in enlarging modern historical memory at Monticello to include slavery. Today the Mulberry Row artifacts present opportunities of a different sort: to enlarge our historical knowledge of social and economic life at Monticello.

Taking advantage of those opportunities requires converting into useful archaeological data both the artifacts and paper field records describing the contexts from which the artifacts were excavated. The key word here is useful. It implies that classification and measurement standards employed to create the data must be relevant to archaeological research goals and consistently applied across all the assemblages. It also implies that the data need to be in digital format. Once this is accomplished, it will be possible to begin systematic quantitative analysis of artifact assemblage variation that, as this report shows, is the key to unraveling the history of social and economic change along Mulberry Row. This is the goal of the Mulberry Row Reassessment Project.

The reassessment of the Building *l* site is a pilot project for and the first contribution to the Mulberry Row Reassessment. Funded by a grant from the Reed Foundation, the Building *l* project created a digital archive of the archaeological data from previous excavations of this site, including data on over 7,000 artifacts in the Monticello collection. The information in the archive is useful in addressing questions specific to this site, and will make up a portion of the larger

Figure 2. *Photograph of 1957 excavations of the Building l site in progress. Note the evidence for three terraces: the Mulberry Row roadbed (upper right), the terrace for Mulberry Row structures and dwellings (center) and the garden terrace (upper left).*

archaeological database that the Mulberry Row Reassessment Project will eventually produce. The analytical protocols developed during the Building *l* project will serve as guides to complete the Mulberry Row Reassessment.

Studying changing lifeways at Monticello requires a complete picture of the plantation's slave sites beyond Mulberry Row. To get a more complete view of the plantation community, the information from Mulberry Row sites must be compared with more geographically removed sites that have been identified through the Plantation Archaeological Survey (Neiman et al. 1998). This will yield a better understanding of the evolution of the plantation during Thomas Jefferson's lifetime.

Finally, the Building *l* project contributes data to a regional initiative, funded by the Andrew Mellon Foundation, to create a Digital Archaeological Archive of Chesapeake Slavery. This larger data set, which will be available over the Internet, will enable researchers to do regional analysis of slave material culture from many plantations across Virginia. Not only does the Building *l* reassessment contribute data to the larger initiatives of understanding slave life at Monticello and in the Chesapeake region, this project helps to refine the methodology that will be used to create and analyze data from many other sites.

History of Mulberry Row Archaeology

Mulberry Row was the focus of archaeological testing in the summer of 1957, when Oriol Pi-Sunyer excavated several Jefferson-period sites. At the time, Pi-Sunyer was an assistant professor of anthropology at Case Institute of Technology. He was hired by the Thomas Jefferson Memorial Foundation to locate and identify the buildings along Mulberry Row, with the still unrealized intent to reconstruct them. Pi-Sunyer excavated a two foot wide trench-grid system parallel to the Mulberry Row road to expose brick and stone features between the 1809 Stone House and the

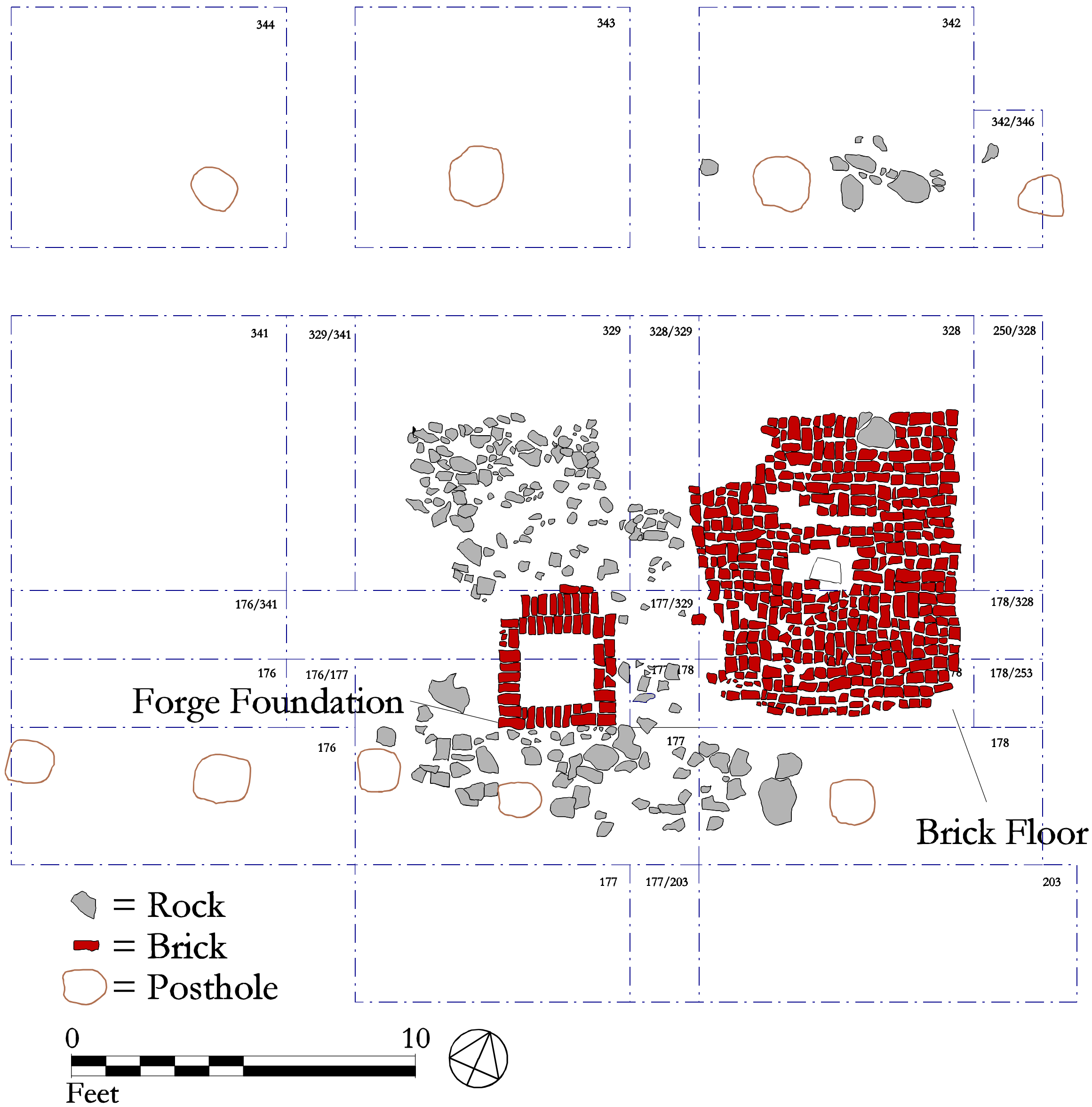


Figure 3. *Plan drawing of the Building l site. From field drawings by Kelso (1982).*

Joinery ruins (**Figure 1**). The trenches were expanded when architectural features were found (**Figure 2)**. He excavated three sites on Mulberry Row: the Joinery ruin, the Nailery and Nailery Addition, and Building *l* or the Storehouse. He also tested the foundation of the 1809 Stone House (1957). These sites were labeled Structures I, II and IIA, III, and V, respectively. These excavations were not conducted with respect for natural stratigraphic layers, nor were elevations recorded. However, site plans and section drawings were made of the architectural features identified. In addition, Pi-Sunyer documented the excavations photographically. The excavated sediments were not screened, but some artifacts were collected. The trenches Pi-Sunyer excavated were divided into sections, and the artifacts were provenienced according to the trench or site that they were recovered from.

In 1979 the Monticello Archaeology Department was created and archaeology resumed on Mulberry Row under the direction of William Kelso. Kelso began by excavating a series of 4- by 10-foot quadrats along the length of Mulberry

Row in order to locate features related to a fenceline that once stood along the edge of the cut bank on the northern side of Jefferson's terraced vegetable garden. In the course of the fenceline excavations, archaeologists identified architectural remains of several buildings which were depicted on the 1796 Mutual Assurance plat. These buildings were the focus of more intensive excavations on Mulberry Row in subsequent years. After the Fenceline excavations, the Smokehouse / Dairy (Building *m*) was excavated, and an area near the stable (Building *f*) was tested in 1980. In 1981, the Building *l* site (the Storehouse) and the Building *o* site (the Servant's House) were excavated. In 1982, archaeologists progressed to the Nailer's Addition (Building *j*). In 1983-84, the domestic sites of Building *r*, *s* and *t*, and the earlier "Negro Quarter" were excavated. The Nailery (Building *D*) and the Carpenter's Shop (Building *i*) were excavated in 1985 and 1986. Over the course of these seven years Kelso excavated the bulk of the Mulberry Row sites. Tens of thousands of artifacts were recovered.

Kelso's strategy on Mulberry Row was to excavate a site with a grid of quadrats separated by baulks. This grid was established using an arbitrary grid line through the east-west axis of the mansion. All of Kelso's quadrats were related to a datum in front of the East Portico (the origin of the grid) and a baseline extending from it to a point 200 feet to the southwest. Grid points 250 feet south of this northeast-southwest axis were placed along Mulberry Row at fifty foot intervals.

Kelso excavated Mulberry Row sites, including the Building *l* site (**Figure 3**), in 8- by 8-foot quadrats, with 2-foot baulks, a strategy established by Ivor Noel Hume on other Chesapeake sites (Noel Hume 1969). This excavation strategy, adapted from Sir Mortimer Wheeler (1956), had several short comings. Since each unit was separated from the adjacent quadrat by a two-foot baulk, each eight- by eight-foot quadrat had the potential of being treated as a separate excavation. The system discouraged identification of relationships among strata in adjacent quadrats. This presents problems when reconstructing the formation of the site. Moreover, the "Wheeler Box" strategy did not fit well with Kelso's 1979 excavations of the Mulberry Row fenceline. When the four foot by ten foot fenceline quadrats were expanded, the resulting excavation units were not an even 8 foot by 8 foot quadrat. The excavation strategy resulted in a miscellany of different-sized quadrats, which in turn present problems for the spatial analysis of the site. Contexts are not comparable due to their many different sizes. Kelso's excavations were conducted without the use of screens. The lack of screening biased recovery rates against small objects (e.g. fish bones). It also led to uncontrolled variation in recovery rates among excavators. In addition, elevations were seldom recorded in the early years of the excavations, which further hinders the association and comparison of contexts from different quadrats. These shortcomings present challenges to this project's goal of understanding the Building *l* site, which was excavated relatively early on when Kelso was still refining the excavation strategy on Mulberry Row.

2. The Building *l* Site

Architectural Remains

In 1796 Thomas Jefferson took out an insurance policy on Monticello with the Mutual Assurance Society of Richmond. The plat he drew on this occasion describes Building *l* as "a house 16 by 10 ½ f., of wood, used as a storehouse for nail rod and other iron…"(**Figure 4**) (Jefferson N133; Jefferson in Betts 1976:6). Archaeological excavations revealed the remains of a structure with brick and greenstone cobble paving, with a brick box that excavators guessed served as a chimney base (**Figure 5**) (Pi-Sunyer and Bear 1957:15), or as a support for a small forge (Kelso 1982:61). The size of the feature and its similarity to features uniquely found at sites of documented smithing activity (e.g., the 18th-century Anderson Forge in Williamsburg), indicates the latter alternative is correct. The size and location of these architectural remains suggest the structure that once stood there was what was referred to as Building *l* in the 1796 insurance plat. However, the archaeology suggests that this site did not serve as a "storehouse" throughout its existence. Archaeologists have argued that there were successive phases of nail rod storage, nail-making, and domestic occupation at this site (Kelso 1982; Sanford 1995:185). The character and chronology of these activities on the site is a major focus of this project.

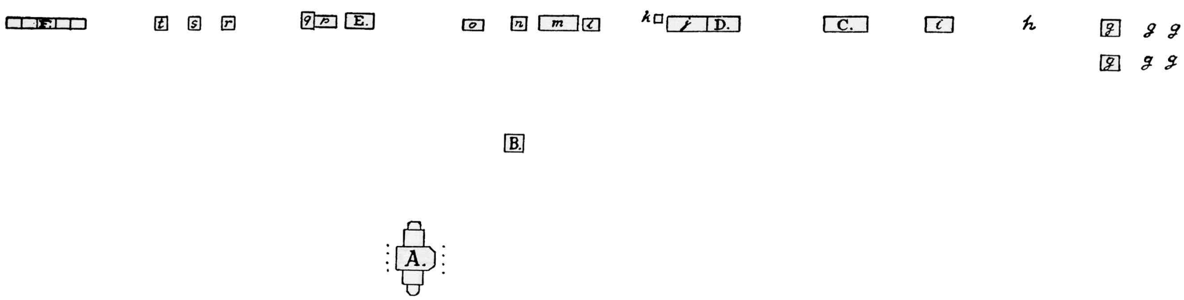
The architectural features uncovered by the excavations of the site indicate a wooden building, a portion of which had a brick floor (**Figure 5**). Pi-Sunyer suggested that the brick paving may have once covered the entirety of the building's floor area, writing that "at one time the floor of Structure III [Building *l*] extended westwards" (Pi-Sunyer and Bear 1957:14). Kelso acknowledged that the brick paving may have once extended across the footprint of the building, but he also argued that the "brick paving and an area of orange clay packed with large greenstones together served as the floor for the structure" (1982:60). The nature of the floor of the structure is ambiguous. Photographs and a section drawing (**Figure 6**) of the site suggest that the clay and cobble portion of the footprint was lower than the brick. This would support Pi-Sunyer's suggestions that brick once covered the whole floor, and perhaps was robbed out. The footprint of the structure (16- by 10½-feet) suggests an undivided space. If it were divided in 2 equal rooms of 8 feet by 10 ½ feet, it would have been too small to accommodate nail rod bundles. These bundles were roughly 10 feet long (Edwards and Wells 1993: Figures 3 and 5).[1] Taken together this evidence suggests that Building *l* was undivided. Artifact distribution maps generated with data from this project may provide another line of evidence about the division of space within the building (see below).

The field records describe several features on the site that are not discussed in earlier reports. One small [9.5 inch (N-S) by 11-12 inch (E-W)] feature in the center of the brick floor was described by the excavators as a "posthole like depression" that was 4-5 inches deep (**Figure 7**). The excavators proposed in the field notes that it might have been a base of another forge feature, but there is no evidence to support this. Another questionable feature of the site was a gap packed with clay between the brick paving and greenstone on the northern wall of the building (see **Figure 3**). It is hard to evaluate these features given the existing data.

Documents and Occupation Dates

The excavators of the site relied on documentary evidence to delimit the period of activity on the site. As mentioned above, the key document that guided much of the research on Mulberry Row was the 1796 insurance plat. Kelso and Pi-Sunyer drew on this document to identify the Building *l* site and to date the construction and initial use before 1796 (Kelso 1982:61, Pi-Sunyer and Bear 1957:15). Kelso interpreted Jefferson's description of the site to mean that it had a single

[1] Nail rod bundles were also quite heavy (40 bundles weighed 1 ton) (Jefferson in Betts 1976: 426). On average each bundle weighed fifty pounds.



Plat of the buildings referred to in the above Declaration of Thomas Jefferson.

A. is the dwelling house 90. feet long 40. f. broad in the middle exclusive of porticos, two story high except the two bows at the ends, the walls entirely built of stone and brick, the floors above ground & the roof of wood.

B. is an Outchamber, with a kitchen below ground 142 feet from the dwelling house one story high, the walls of brick, the floor above ground & roof of wood. 20. f. square.

c. is a joiner's shop, 57. feet by 18. feet, the underpinning and chimney of stone, the walls and roof of wood.

D. is a smith and nailer's shop 37. by 18. f. the walls & roof of wood.

E. is a stone outhouse 34. by 17. f. the floor of brick, the walls & chimney of stone, the roof of wood, one story high.

F. is a stable 105. feet long and 12. f. wide. one story high. all of wood.

the following houses are not included in the insurance, but as they are in a line with those ensured, and in their neighborhood they are described as follows.

g. g. are 2 coal sheds of wood 20. by 15 f. and 22 f. apart, and it is proposed to build 4. others g. g. g. g. about 25. f. apart for coal also. they are to contain about 8000. bushels of charcoal. from the nearest of them is 7 poles 15 links to

h. a saw pit where a considerable quantity of timber usually lies. from the pit is 47. feet to

i. a house 30 by 18½ f. all of wood, the floor of earth, in which is stored plank & such things, it is used at times as a carpenter's shop, and sometimes a little fire is made on the floor. from this house is 56. feet to

C. the joiner's shop before mentioned, one of the ensured buildings. from C. is 98 f. to

D. the smith and nailers shop before mentioned, one of the ensured buildings.

j. is to be added to D. 50. feet by 18. f. for the nailers, to be built immediately, and making one building with D. it is included in the valuation of D. as if it were already built, & is a part of the ensured property. this addition will extend to within 3. or 4. feet of k, a necessary house of wood 8. feet square. from k. it is 67. feet to

l. a house 16. by 10½ feet, of wood, used as a storehouse for nailrod & other iron. from l. it is 8. feet to

m. a house 43½ f. by 16. f. of wood, the floors of earth, used as a smoke house for meat, and a dairy. from m. it is 24. f. to

n. a wash house 16½ f. square of wood, the chimney also wood, the floor earth. from n. it is 38.f. to

o. a servant's house 20½ f. by 12 f. of wood, with a wooden chimney, & earth floor. from o. it is 103. feet to

E. the stone out house before described, being part of the ensured property. from E. it is 7. feet to

p. a shed 25 f. by 12½ f. of wood, the floor of brick, used as a stone house for joiner's work. from p. it is 3. f. to

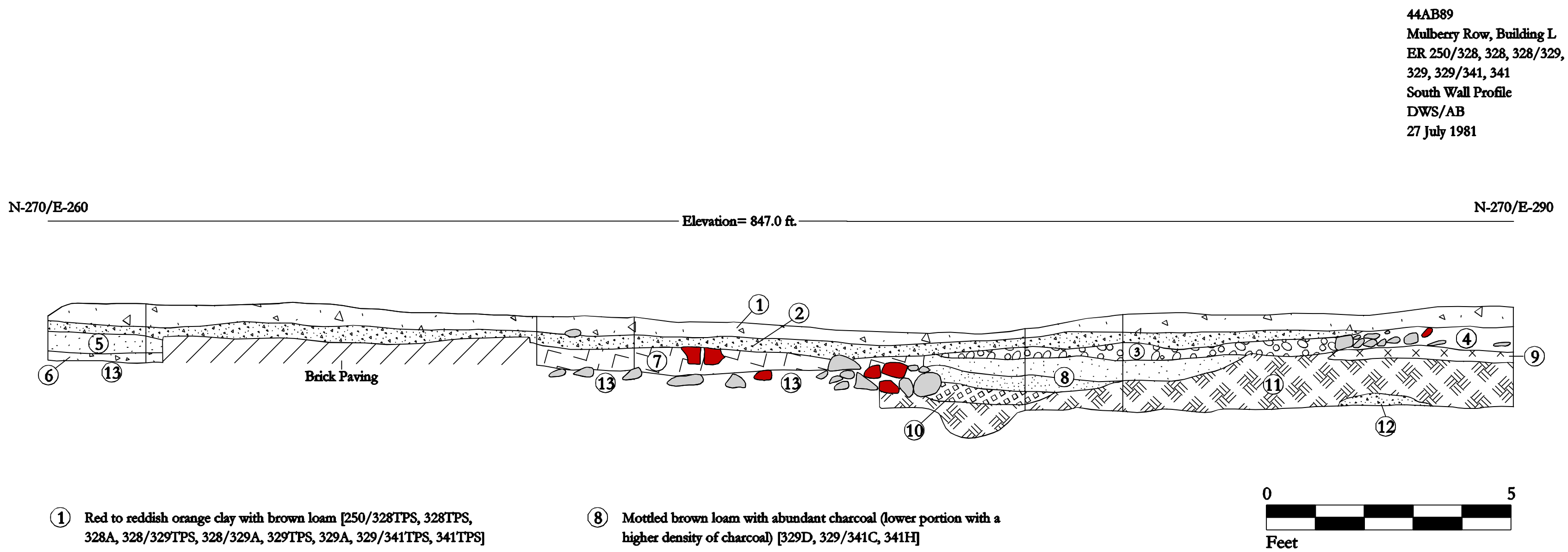
q. a servant's house 14. f. by 17. f. of wood, with a wooden chimney, the floor of earth. from q. it is 75. feet to

r. which as well as s. and t. are servants houses of wood with wooden chimnies, & earth floors, 12. by 14. feet, each and 27. feet apart from one another. from t. it is 85. feet to

F. the stable before described, being one of the ensured buildings. this line of buildings from g. to F. is a strait one, & in it's nearest parts to A. & B. passes 227. feet from A. and 142. feet from B. the whole line i. to F. is shortly to be connected by a row of paling either touching or passing very near to every house between those points in the said line.

Figure 4. *Facsimile of Jefferson's 1796 Mutual Assurance plat.*

Figure 5. *Photograph of the Building l site after the 1981 excavations.*



① Red to reddish orange clay with brown loam [250/328TPS, 328TPS, 328A, 328/329TPS, 328/329A, 329TPS, 329A, 329/341TPS, 341TPS]

② Brown to black loam mixed with red or reddish orange clay with stones and charcoal [250/328A, 328B, 328/329B, 329B, 329/341A, 341B]

③ Orange-red clay mixed with brown loam with greenstone and brick [329/341B, 341D]

④ Brown loam mottled with red clay with small stones and brick fragments [341C, 341E, 341F]

⑤ Red-orange clay mottled with brown loam with charcoal [250/328B]

⑥ Brownish-red clay loam with charcoal [250/328D]

⑦ Brown clay loam mixed with red-orange clay and greenstone [328/329D, 329C]

⑧ Mottled brown loam with abundant charcoal (lower portion with a higher density of charcoal) [329D, 329/341C, 341H]

⑨ Red-orange clay with greenstone [341G]

⑩ Red-orange clay with stones and a few brick bats [329E]

⑪ Brown loam mottled with orange-red clay and charcoal [329F, 329/341E, 341J]

⑫ Green silty loam [341 K]

⑬ Red-orange clay with stones and a few brick bats [250/328E, 328/329F, 329E]

Figure 6. *Section drawing of Building l site.*

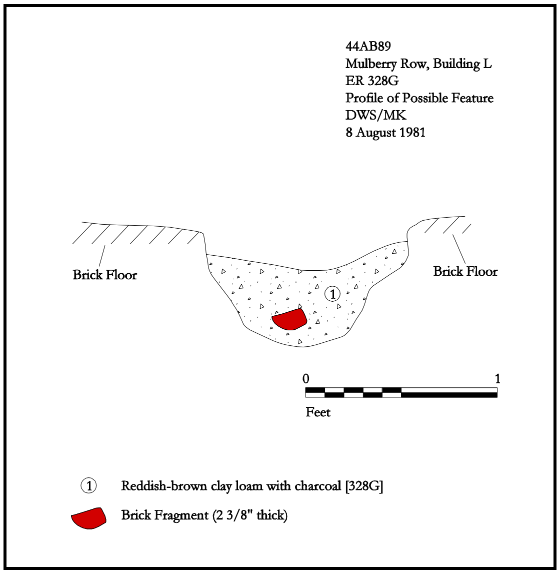


Figure 7. *Section drawing of the feature in the center of the brick paving.*

function as a storehouse for iron in 1796 (1982:64), and "had other uses before 1796" (1982:62). Kelso used both the presence of Annular Pearlware (TPQ: 1790) and Jefferson's first documented shipment of nail rod in 1794 to place the construction of the site between 1790 and 1796.

Scott Shumate (1992:253) used documentary evidence of the construction sequence of Mulberry Row to help date the construction of Building *l*. Shumate argued that the Smokehouse/Dairy, just to the east of Building *l*, had been built in 1790, on the basis of a letter from Jefferson to an overseer regarding its construction. Ash deposits were identified underneath and to the east of the Building *l*"s brick floor paving. Shumate inferred that the ash came from the 1790 Smokehouse/ Dairy. If the inference is correct, then the Smokehouse/Dairy was in use before Building *l* was constructed. However, there is another possibility. The ash layer may be related to an earlier (pre-1790) smokehouse operation on Mulberry Row. Resolution of this ambiguity requires a reanalysis of the archaeological evidence from the Smokehouse/Dairy.

Documents hint that the previously proposed dates for the destruction or abandonment of the Building *l* site are problematic. In his 1801 "General ideas for the improvement of Monticello" Thomas Jefferson allegedly decided to remove all buildings on Mulberry Row except for the stone house (Jefferson N171/K161; Kelso 1982:53). However, Kelso recognized that this was probably one of the (many) plans Jefferson did not execute. Jefferson's 1809 letter to his overseer, Edmund Bacon, suggests that some of the structures on Mulberry Row were still standing then (Kelso 1982:53). The letter stated that Bacon should let Peter Hemings choose for his residence "any one of the log-houses vacant, on the Mulberry Row" (Jefferson in Betts 1976:27-28). In addition, Margaret Bayard Smith's account of visiting Monticello in August of 1809 mentions the "unpleasant" contrast between the slave and worker housing on Mulberry Row and the mansion (1906:68). Kelso interpreted her comment as an impetus for Jefferson to remove these buildings (1982:53). It is not at all clear why the impressions Smith recorded in her private diary would have caused Jefferson to follow through with this earlier plan to remove the log buildings on Mulberry Row.

On the 1809 plat many of the timber buildings listed on the 1796 plat are not represented. As Kelso recognized, this absence may indicate that Jefferson only recorded stone houses on that particular map. This is supported by the 1809 letter from Jefferson to Bacon. It is hard to know how many vacant log houses there were on Mulberry Row for Peter Hemings to chose from in 1809. However, Jefferson's letter to Bacon indicates that there were some vacant buildings, while other buildings on Mulberry Row were inhabited. The letter to Bacon suggests that Mulberry Row buildings were maintained periodically and reused. In fact, layout of the 1809 fenceline indicates that Building *l* was still standing when the fence was constructed (Kelso 1982:63). Since there is no direct documentary reference to this particular structure being demolished, an examination of the archaeology may prove to be more useful in delimiting the occupation of the site.

The foregoing overview of the documentary evidence about the site's occupation dates and function reveals considerable ambiguity on both topics. This study aims to reduce that ambiguity using archaeological evidence. The major issues: occupation span, the history of site formation, as recorded from stratification, and an intersite chronology that can be used to monitor change over time can be found in the character of Building *l*'s artifact and faunal assemblages.

Methods

The reports, original field records and notes from the excavations were reviewed to understand the site formation processes and phases of archaeological investigation that took place at this site. The secondary sources used in this reassessment project included reports from the 1957 and 1979-81 excavations. Pi-Sunyer (1957) and Kelso (1982) included discussions and interpretations of the Building *l* site in their reports on their Mulberry Row excavations. In addition, interpretations and data from the Building *l* site were included in Doug Sanford's dissertation on the archaeology of plantation slavery at Monticello (1995).

The existing paper field records (the 1979-81 records from Kelso's excavation) were converted into a digital format. The information recorded in the field records is now organized in a database at Monticello. The database of the original field records organizes information including the relationships between contexts, sediment descriptions, elevations when recorded, as well as interpretations made by the excavators. The information from the original field records was used extensively in attempts to reconstruct the depositional history of the site, and to understand the post-depositional impacts that affected the archaeological record.

Field drawings were also converted to a digital format. Microstation was used to digitize the pertinent archaeological plans and profiles of the site (Bentley Systems 1995). Plans of the site created by Kelso after his excavations were used to create a vector representation of the architecture, quadrat boundaries, and post hole features on the site (see **Figure 3**) (plan 1.12, DWS 9/11/81, plan 1.9, WK 5/26/81). An advantage of using a CAD program is that multiple maps and images may be superimposed on each other to determine the extent of previous investigation and to create more accurate plans based on different versions of the site plan. For example, a raster image of the plan of the 1957 trenches (Site Location Map I, 1957) was overlaid on the Kelso plan (**Figure 8**) to delimit the area that the Pi-Sunyer excavations impacted. It is also possible to link multiple plans or profiles together to understand the vertical and horizontal relationships that contexts have with each other. To create an accurate map of the Building *l* site in relation to other sites on the mountaintop, the grid system that Kelso used was reestablished. The coordinates of each quadrat were determined.

The material recovered in the excavations of the Building *l* site was analyzed and cataloged electronically for this project. The collections were cataloged using Monticello Department of Archaeology laboratory protocols, which are discussed in the *Monticello Department of Archaeology Laboratory Procedures Manual* (McFaden 1999). Re:discovery, a custom database application written in FoxPro (Re:discovery Software 1998) was used to create the artifact database for the site. Assemblages from both the 1957 excavations and the 1979-81 excavations of this site were included in this analysis. Though the limits of the 1957 excavations are roughly known, the contexts that can be attributed to the Building *l* site were also cataloged. All of the artifacts from quadrats corresponding to the Building *l* site excavated during the 1979-81 field seasons were cataloged for this project, including those recovered from the 1957 backfill.

Integrity of Contexts

Pi-Sunyer found the remains of several buildings including Building *l* or what he labeled "Structure III" (see 1957: Location Map I, and III; Structure III, Floor Plan; Structure III, A-A, B-B). Pi-Sunyer initially identified portions of the hearth and brick floor associated with Building *l* in a trench (A3B3). The sediments sealing these features were removed, and the forge foundation and floor were fully exposed. Overlaying images of the 1957 plans of the Pi-Sunyer excavations (see 1957: Location Map I, and III; Structure III, Floor Plan) on a digital map of Building *l* (**Figure 8**) helps identify the areas of the site that Pi-Sunyer excavated. Photographs of his excavations (1957: Plates I, XIII, XIV, and XVI) show that Pi-Sunyer did not disturb these architectural features with the exception of the forge floor and

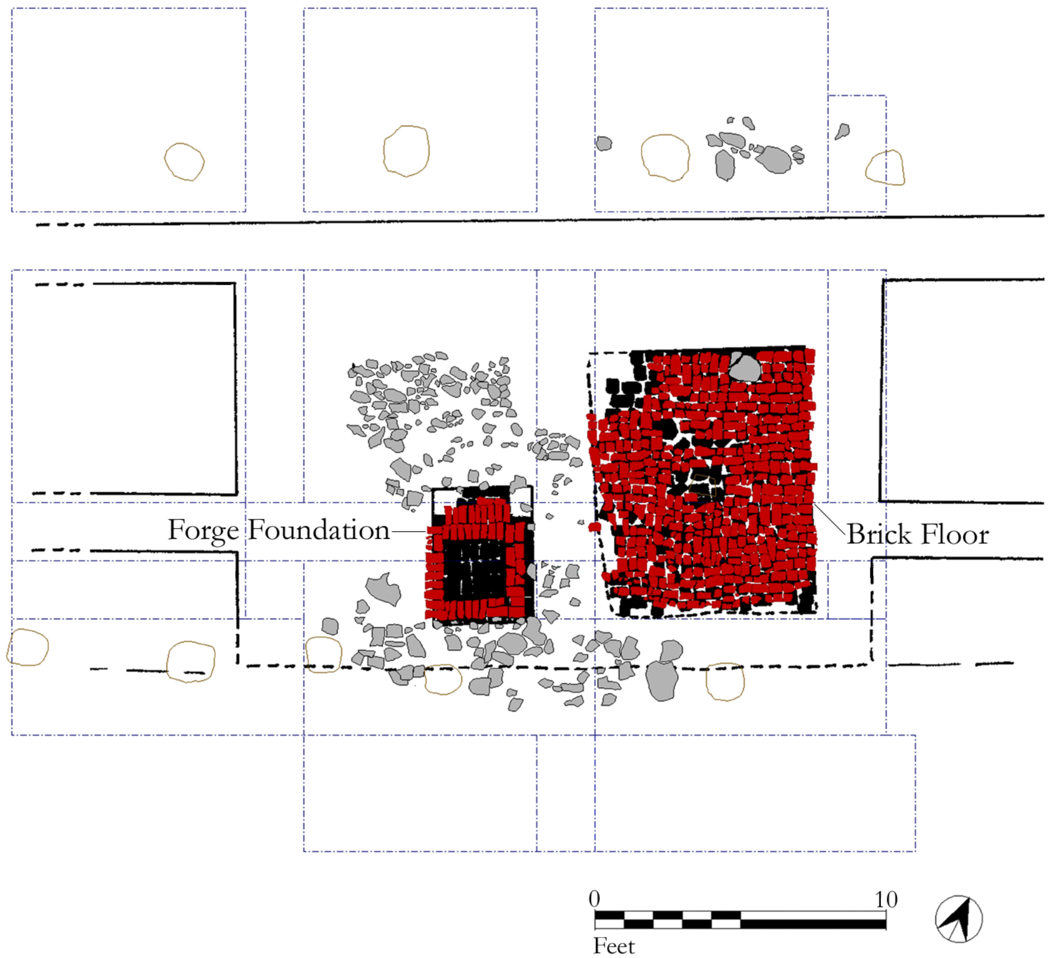


Figure 8. *Plan drawing of the Building l site overlaid with a plan drawing from the 1957 excavations. The limits of Pi-Sunyer's excavations are depicted in black.*

possibly the northwest portion of the brick floor. Pi-Sunyer's section drawings of Structure III or Building *l* suggest that approximately one foot of sediments that overlay the floor of the structure was removed. Sanford states that this site was "little disturbed by modern intrusions, in this case, mainly the shallow, 1957 test trenches by Pi-Sunyer" (1995:183). However, the 1957 photographs indicate that the site was excavated to the level of the brick floor feature, disturbing all of the sediments above it. Since the 1957 excavations were not conducted with respect to natural stratigraphic levels, it is not possible to determine how many strata were removed by Pi-Sunyer in the process of exposing these features.

The Pi-Sunyer excavations had a large impact on the site, but the extent of the disturbance is unclear. We know that sediments sealing the floor and forge features were removed (**Figure 9**). In addition, the remaining area between Pi-Sunyer's initial trenches (**Figure 8**) was excavated to a level just below the bricks, exposing some of the greenstone cobbles, that can be seen in the foreground of **Figure 9**.

The sediments that were excavated from the Building *l* site in 1957 were used to backfill the site (Pi-Sunyer 2000). Though Pi-Sunyer says that they "collected all cultural material [they] found in the course of the excavation" (2000), artifacts were found by Kelso in the backfilled sediments. Since the 1957 excavation backfill contexts excavated by Kelso contained a large amount of cultural material, we know that the Pi-Sunyer's artifact recovery rate was not high. The Monticello Department of Archaeology collections from the Pi-Sunyer excavations are not complete since material discussed in the 1957 report was not located (see **Artifact Analysis** below). The extant collections from the 1957 excavations cataloged in this study are missing large amounts of material discussed in the 1957 reports. Artifacts from the 1957 excavations were cataloged in this study, but should be viewed with caution.

Both the 1957 collections and the artifacts recovered from 1957 excavation backfill contexts (excavated by Kelso between 1979-81) must be excluded from this analysis of the site. Including these artifacts in the analysis of the site may obscure temporal patterning on the site. Because the site was not excavated in natural stratigraphic units in 1957, Pi-Sunyer may have combined artifacts from more than one natural layer. In fact, many of the 1957 excavation backfill contexts have mixed brown loam and red clay sediments that could originally be from two different natural stratigraphic layers. The excavations in 1957 could have also obscured patterns that may indicate how different parts of the site were used over time. Moreover, the 1957 collections are not complete. For instance, the 60 pounds of nail rod uncovered by Pi-Sunyer are not in the collections.

In the course of Kelso's 1981 excavations of Building *l*, excavators identified many contexts as "1957 excavation backfill," as well as backfill from the 1979 excavations tracing the Mulberry Row fenceline (the latter of which would later be called "Hahn strata" by Kelso's excavation crew). In most cases, these field identifications or similarities with the 1957 backfill contexts were noted in the records from the 1981 excavations. These 1957 backfill contexts are generally described as a black or dark brown loam with red clay and charcoal inclusions. The backfill from previous archaeological investigation forms the uppermost layer of the site, but layers deposited before and during the habitation of Building *l* were discovered underneath this disturbance. Grouping contexts by the associations noted in the field records and their sediment descriptions is a method that may help in identifying the episodes of sediment deposition, and reconstruct the formation of the site.

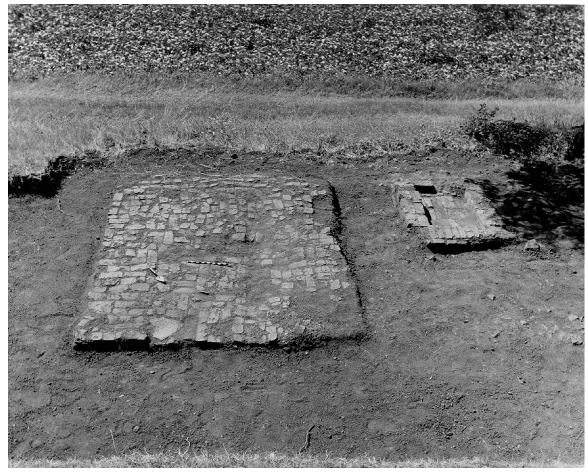


Figure 9. *Photograph of the Building l site after Pi-Sunyer's excavations in 1957.*

Site Occupation Span

The majority of the artifacts cataloged were those from the 1979-81 excavations. These excavations went below the levels impacted by the 1957 excavations, and excavators collected a large number of artifacts from the 1957 backfill strata. All of the contexts from ER numbers 176-178, 203, 328, 329, 341-344 and the excavated baulks between them were included in this analysis. In addition, contexts from ER numbers 178/253, 250/328 and 342/346 were part of this analysis. The faunal specimens removed for Diana Crader's analysis (1984) were cataloged as part of this study along with other faunal material in the collections. This faunal material was not analyzed completely, but counts and weights were recorded.

The 1957 contexts that correspond to the Building *l* site are "Structure III" and "Trench A^3 and B^3, Structure III." The artifacts that were clearly from one of these contexts were cataloged, though there are many unprovenienced artifacts in the collections from the 1950s excavations. The investigating archaeologist, Oriol Pi-Sunyer collected "all cultural material . . . found in the course of the excavation" (2000), but it is probable that the 1957 assemblages are incomplete. Pi-Sunyer reported that 62 pounds of nail rod, "no less than 5 nail rod binders...[and] 70 pounds of miscellaneous metal, much of it having

Figure 10. *Chinese porcelain decorated with overglaze enamel decorations. These are Bands and Lines I: "Husk Chain" (1780-1810) (top left); Bands and Lines II: "Wavy Band" (1780-90); a variation of Bands and Lines V: "Half Circle and Dot" (1780-1800) (bottom).*

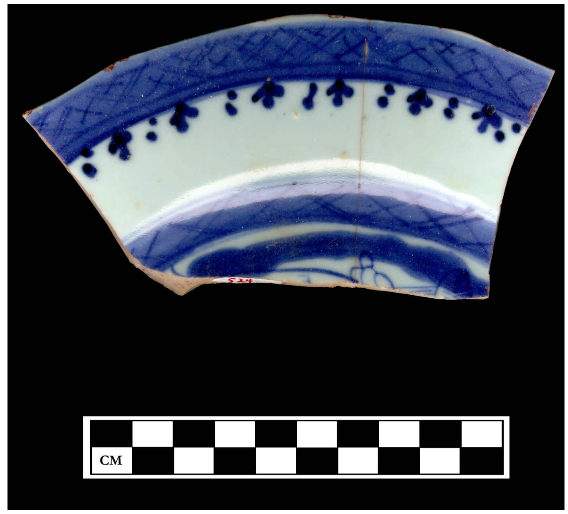


Figure 11. *Chinese porcelain plate with underglaze Nanking/Fitzhugh III style (1765-1820) decoration.*

the look of scrap metal, were collected from the structure and its vicinity" (1957:31, Appendices III, IV). However, the large quantities of nail rod that Pi-Sunyer discusses were not located in the Monticello Department of Archaeology collections. The artifacts that were located were entered in the Re:discovery artifact inventory database (MR 1957 III [IN-IQ]). It is possible that a portion of the unprovenienced artifacts in the Monticello collections is in fact from Structure III and Trench A^3 and B^3. Though a portion of the Pi-Sunyer collections appear to be missing, the "Distribution List of Determined Metal Artifacts" (1957) corresponds to the collections from 1957 proveniences identified and cataloged. It is not clear how much was collected and conserved, and how much of the material was discarded in the course of the 1957 excavations and analysis.

The collections from Kelso's excavations of the Building *l* site are more complete. However, screens were not employed. Many small artifacts were collected, but recovery was not uniform. Moreover, the faunal collections from unscreened, trowel-sorted sites such as this may not be a representative sample of the total faunal material on the site. The collection methods used on this site will make studies of the diet of the site's inhabitants problematic. Joanne Bowen has shown that even using ¼-inch screen archaeologists will fail to recover the smallest bones from fish, mammals, and birds (Bowen 1996:91). Only "the use of 1/8-inch mesh screens, flotation devices, or wetscreens" will collect the smallest bones (1996:91). Thus, it is not possible to get an accurate assessment of the relative frequencies of different species consumed at this site. Moreover, the diversity of the assemblage may not be measured accurately, since the small fish, bird, and mammal bones were not collected. The recovery bias was recognized by Diana Crader in her comparison of the Building *l* site and Dry Well faunal data. Fish bones were recovered from Dry Well contexts that were floated, while sediments from the Building *l* site were not screened. Though it is not possible to address some issues relating to slave subsistence with this data set, the existing artifact collections may be used to study other issues including the changing site use over time, and the duration of occupation. Floral materials like charred seeds, pollen or phytoliths associated with the occupation of the Building *l* site were not collected.

Refining the Building l Occupation Span Using Recent Ceramic Research

A major goal of this study is to define the Building *l* site chronology. Recent refinements in the Chinese porcelain typology were incorporated

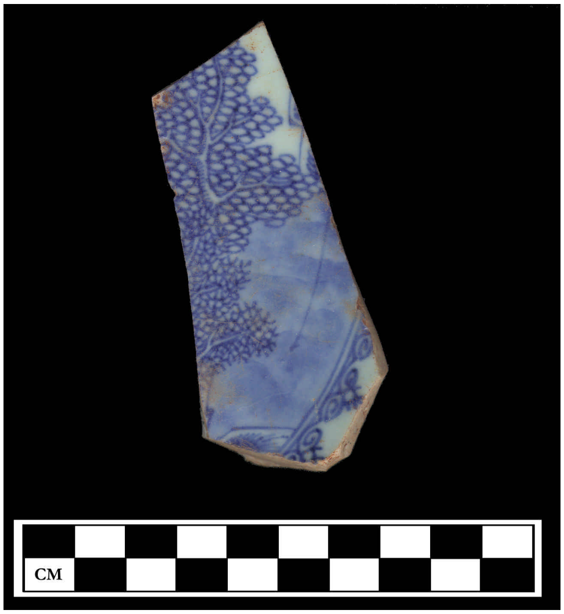


Figure 12. *Chinese porcelain fragment with Blue Spearhead style (1735-70) surrounding the central design motif.*

Figure 13. *Chinese Porcelain plate rim decorated with the Blue Trellis style (1690-1790).*

to achieve this objective. In his master's thesis, Andrew Madsen (1995) identified several variations in eighteenth-century Chinese porcelain found on historic sites in the Mid-Atlantic region. He used these variations to refine the date ranges used in quantitative analyses such as the mean ceramic date formula (1995:76). Madsen established fifteen design styles and motifs that are temporally sensitive. Madsen refined the design styles which are exhibited on the blue and white underglaze vessels, Federal-period overglaze vessels, and using the overglaze enamel color palates (1995:76). Of particular importance on the Building *l* site were the late eighteenth- and early nineteenth-century styles. The overglaze enamel, early Federal period Bands and Lines styles (**Figure 10**) found at the Building *l* site were "Husk Chain" (1780-1810), "Wavy Band" (1780-90), the "Half Circle and Dot" (1780-1800) motifs (Madsen 1995:76). The Nanking/Fitzhugh III style (1765-1820) (**Figure 11**) which is characterized by a wide dark blue trellis band shaded with light blue, and alternating spearheads and dumbbells or double dots. The Blue Spearhead motif (1735-1770) often borders the central design, and is defined as double scroll motifs with half circles radiating five short lines on top (**Figure 12**). Also identified in the assemblage was the Blue Trellis style (1690-1790), characterized by a band of diamonds linked by x's (**Figure 13)**. With these new date ranges, we can avoid using South's wide date range of 1660-1800 for Chinese export porcelain (South 1977: Table 31). Moreover, recognizing the temporal variation of Chinese porcelain design styles provides valuable data to help seriate deposits on historic sites such as this.

Due to good chronological information about transfer-print patterns, changes in the design styles of this ceramic type can help us further to define the duration of occupation at Building *l*. Production of transfer-printed pearlware starts c. 1785; however, it is not until after the War of 1812 that it is found in any great frequency in Virginia. A number of different refined earthenware printed design motif types were identified by Patricia Samford, and have "distinct temporal differences in the periods of peak production" (1997:7). Although it is not always possible to determine a design motif or pattern from just one sherd, certain attributes are distinctive, and can allow a sherd to be included in a certain design type. In addition, attributes such as the color of the design, the engraving technology, or the type of marley motif are chronologically sensitive.

When possible transfer printed sherds

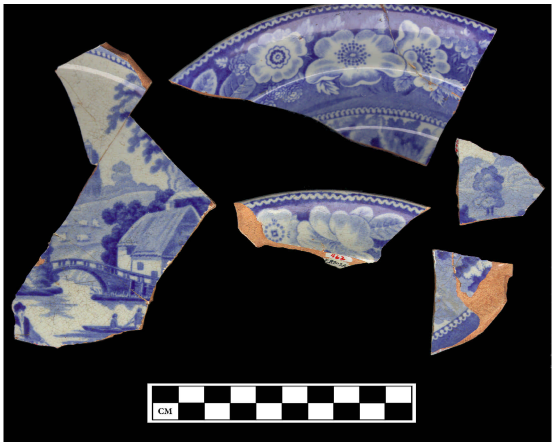


Figure 14. *Underglaze transfer-print pearlware sherds with "Wild Rose" pattern motifs.*

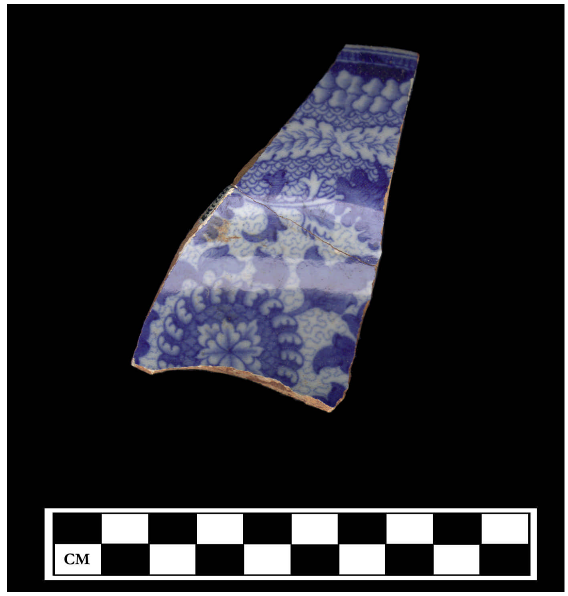


Figure 15. *Underglaze transfer-print pearlware sherd with the distinctive "Pinwheel" design element on the lower left.*

from the Building *l* site are typed according to their pattern or central design motif. The main patterns present in this site's assemblage are "Willow," "Wild Rose," and "Pinwheel." "Willow" pattern is a design that invokes Chinese or East Asian design motifs, and is included in the early transfer print "Chinese/Chinoiserie" category which were produced between 1816 and 1836 (Samford 1997:8). A standardized "Willow" pattern emerged in the first decade of the 19th century (Coysh and Henrywood 1982:402) and has been manufactured ever since. In fact, "Willow" is still in production and available today. The "Wild Rose" pattern (**Figure 14**) is considered a "British View" type according to Samford's (1997) typology, with a dark repeating floral border. The peak production of "British Views" was between 1815 and 1840, and the mean beginning and end production dates for continuous repeating floral borders is 1820-1836 (Samford 1997:9,18). According to Coysh and Henrywood, "Wild Rose" was "extremely popular from the 1830s to the 1850s" (1982:399). The "Pinwheel" or "pinwheel and sunflower" pattern (**Figure 15**) (Kelso 1982:67) is a design typified by a pinwheel shape with vines and flowers on a field of scrolling dotted lines. The "Pinwheel" pattern has not been identified frequently outside of Monticello. This pattern was named by Monticello archaeologists, since it has not been identified in the published printed designs. It has been suggested that this design was produced after ca. 1815 (Kelso 1982:67). Many of the other transfer printed sherds found in the Building *l* assemblage have continuous repeating floral borders and may be attributed to the early portion of the "British Views" style. The types of transfer- print styles from the Building *l* site date from the 1810s and 1820s (Samford 2000). This causes us to revise the Building *l* dates of ca. 1795-1810 (Sanford 1995:185) proposed by earlier investigations.

The presence of large quantities of transfer printed pearlware in deposits related to this site indicate that the site was in use significantly longer than had been previously proposed. Kelso's proposed 1809 date for abandonment and destruction is too early. Since transfer-printed wares are not found in great quantity until after the War of 1812, the destruction date of the site must be later. Moreover, the styles found in the Building *l* site assemblage were probably produced in the 1810s and 1820s. Many of the deposits the excavators attributed to the site's domestic occupation included transfer-printed sherds, which indicate that the site was occupied about ten to twenty years longer than previously thought, quite likely up until Jefferson's death in 1826.

Spatial Patterning

Comparison of the spatial distribution of domestic and industrial artifact classes can yield important insights into the use and maintenance of space on the site. However, these data must be treated carefully due to the disturbances of previous excavations, and the use of different sized quadrats. The spatial patterning of the site that existed before 1957 was greatly disturbed, since all of the sediments sealing the floor surface were excavated. Pi-Sunyer's excavation units were too large to capture variation across the site (see **Figure 8**). Because the 1957 excavations did not capture information on the distribution of artifacts on the site, only the intact deposits excavated by Kelso were used to study spatial patterning.

To compare quadrats of different sizes, artifact densities instead of raw counts were used to generate distribution maps. The artifact counts of the excavation quadrats that include parts of architectural features only reflect the deposits outside the footprint of the building. Therefore, artifact densities were calculated using the area of the excavated deposits outside the architectural features of the Building *l* site. Several of the excavation units downslope from, and to the south of the structure were not disturbed by the 1957 excavations. These intact deposits were included in the artifact distribution maps (177L, 203B).

Figure 16 is a collection of distribution maps for six classes of artifacts recovered from the Building *l* excavations. The maps are arranged along a gradient of artifact distribution similarity. The first map reveals concentrations of slag adjacent to the north and west walls of the structure. Subsequent maps (bottle glass, ceramics, and nails) have similar concentrations of artifacts along the north and west walls but they also have an additional one behind or to the south of Building *l*. The remaining two maps, faunal material and nail rod, have small concentrations of artifacts along the north and west walls of building *l*, but they are overshadowed by a much higher density of artifacts to the south. How do we make sense of this pattern?

The maps in **Figure 16** do not exhibit any differences in the distribution of industrial or domestic related artifacts. Industrial related artifacts are found on both poles of the distribution gradient described above. Slag is concentrated on the north and west sides of Building *l* while nail rod is found on the south side. Domestic artifacts are located similarly. Bottle glass and ceramics have a similar distribution pattern as slag, but the faunal material is concentrated along the southern edge of the site.

The high concentrations of domestic and industrial debris to the south indicates a behavioral pattern of the site's inhabitants that relates to the interference potential of the artifact in question. In particular, larger amounts of nail rod fragments in the activity areas around the building, on Mulberry Row, would not have been desirable. It appears that the waste from the nail making activities on the Building *l* site was discarded outside the footprint of the structure and surrounding activity areas. This behavior of discarding outside of yard or activity areas has been documented on other sites at Monticello like the Elizabeth Hemings site, where the sherds from hollow form vessels were preferentially discarded outside the yard area, since the concave surfaces would impede foot traffic more than flatter sherds from plates (Neiman et. al. 2000:32). The spatial separation of activities that would interfere with each other has been well documented on a diverse set of sites (Binford 1983, 1987; Hitchcock 1987; Neiman 1993; O'Connell 1987; O'Connell et. al. 1991; Wandsnider 1996; Yellen 1997). Since the slope to the garden terrace is directly to the south of the Building *l* site, it offers the lowest cost solution to the disposal of the industrial and domestic waste as to not interfere with activities at the Building *l* site and other sites on Mulberry Row. The pattern of disposal has chronological implications: the garden terrace was not completed until 1809 (Betts 1944:395). Hence the deposition of the bulk of the material on the terrace slope must postdate 1809, providing independent confirmation of our conclusions that Building *l* was occupied past that date.

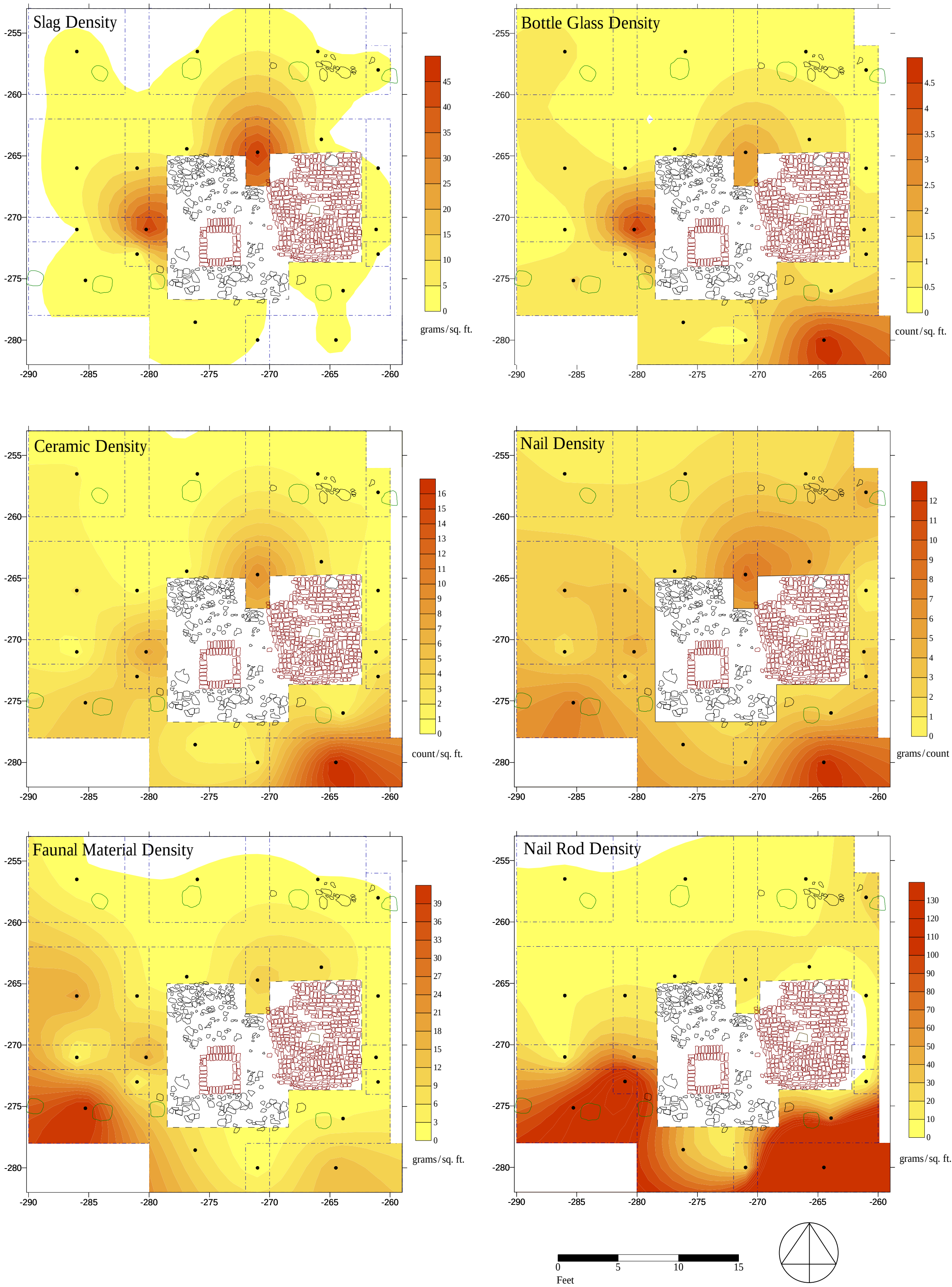


Figure 16. *Distribution maps of domestic and industrial artifact densities.*

3. Intrasite Chronology

Re-Evaluating the Stratigraphy of Building *l*
Among the principle issues we hoped the Building *l* site reassessment would clarify is the changing character of site use over time. The presence of large quantities of ceramics and animal bone in the excavated assemblages indicate Building *l* was the site of a domestic occupation of considerable duration and intensity. On the other hand, large quantities of nail rod and the presence of a brick forge foundation in the structure indicate that the building was also used for nail making and perhaps blacksmithing. The 1796 Mutual Assurance Plat points to a third use as a storehouse for iron. Were these functions simultaneous or consecutive?

Several factors make getting an answer to this question a challenge. Producing a defensible answer from archaeological data depends on the existence of deposits that contain artifact assemblages from successive periods of site occupation, the recognition of these time-transgressive deposits by the original excavators, and the presence of representative samples of artifact in the deposits.

It appears that the 1957 excavators did not recognize stratification within the site. It is also evident that the artifacts recovered and saved at that time represent a small and probably biased sample of those that were actually excavated. As a result, the 1957 assemblage can add nothing to our understanding of intrasite chronology. The 1979-81 excavators did recognize stratification within the site. Artifacts from each excavated quadrat were provenienced in multiple contexts. Within a single quadrat, the excavators defined separate contexts at successively lower depths, hoping that the boundaries between contexts matched the interfaces between deposits. Thanks to their care, it is possible to determine whether their excavated contexts contain assemblages that sample temporally successive periods of the site's occupation.

Harris Matrix
The first step in the re-evaluation of stratigraphy from Building *l* is the summary of the stratigraphic relationships among contexts, as defined by the original excavators. This is accomplished using an analytical diagram called a Harris Matrix (Harris 1979, 1989). The Harris Matrix illustrates the vertical "before and after" relationships, as well as the horizontal "equal to" and "contemporary" relationships of the contexts and groupings of contexts.

Two steps are necessary to produce a Harris Matrix for the Building *l* site. First, within each quadrat, the superpositional relationships of the excavated contexts are determined from excavators's field records. From this, a matrix representing the stratigraphy is built for that quadrat. Second, the relationships between contexts in different quadrats are defined. Whenever the excavators recorded that two or more contexts in adjacent quadrats represented the same deposit, the contexts were set equal to each other.

Once this information is gathered, a computer program is employed to generate schematic representations of the site's stratification portraying the ordering and associations of contexts (for a more complete discussion of this program, see Herzog 1993). The Bonn Harris Matrix program follows Harris's recognition of the four relationships a context may have with one or more different contexts: above, below, contemporary, and equal (Bridger and Herzog 1991). In addition, the "Hahn strata" and "1957 excavation backfill" contexts were also set equal to each other, creating a larger group of previously excavated contexts. The stratigraphic relationships between posthole and postmold features and the surrounding matrix were denoted as "above" the layer that they cut.

The resulting Harris Matrix is shown in **Figure 17**. Each excavated context is contained within a rectangle; vertical lines connecting contexts indicate an above/below relationship while contexts connected by two horizontal lines denote that they are either contemporary or equal. (The exceptions are the two large groupings of contexts in the top center section and is the result of equating the topsoil and disturbed contexts,

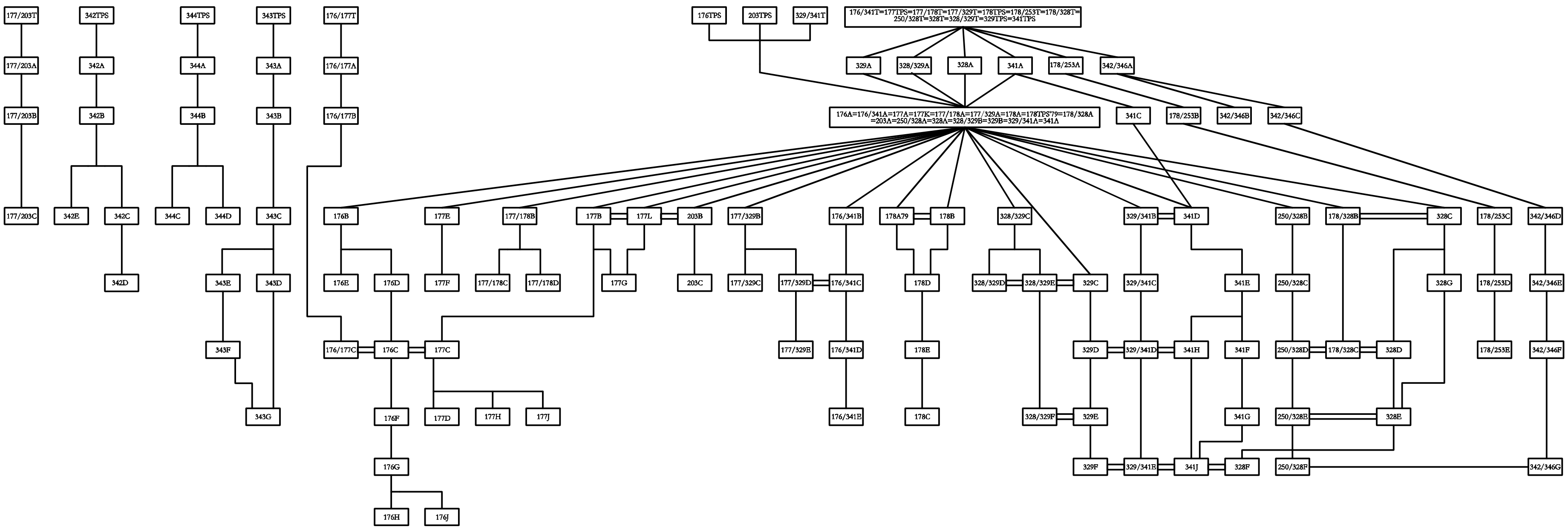


Figure 17. *Harris Matrix of the stratigraphic relationships between contexts at the Building l site.*

i.e., backfill, into two clusters.) The graphic shows visually that the relationships between contexts within quadrats are known and were explicitly documented by the original excavators. There is a general lack, however, of horizontal connections for contexts among quadrats.

For this reason, the Harris Matrix generated from the excavators's observations is not sufficient to answer questions concerning the changing character of site use over time at Building *l*. The matrix does not offer a site-wide chronology that integrates the contexts into a sensible narrative of depositional events. However, by providing for the first time a site-wide representation of the site's stratigraphy, as described by the excavators, the matrix offers an avenue from which further analyses can be tested.

Evaluating Stratigraphic Chronologies Against the Harris Matrix

To seek insight into site use over time at Building *l*, two independent analyses were conducted to build stratigraphic chronologies: lithostratigraphic and ethnostratigraphic. Each chronology is a serial ordering of units comprised of multiple contexts. The goal is an ordering of the units that integrates the many contexts in which Building *l* was excavated into a single chronological narrative.

Each stratigraphic chronology represents a hypothesis. The hypothesis is that the serial order of the units within each chronology is, in fact, chronological. This implies that all the contexts that comprise each unit within the chronology bear the same stratigraphic relationship to one another as do the units. For example, if contexts A, B, and C belong to unit 1 and E, F, and G belong to unit 2, and unit 1 is below unit 2 in the stratigraphic chronology, then A, B and C should be below E, F, and G whenever there are stratigraphic contacts between them. We can use this implication to test the correctness of a given stratigraphic chronology, based on units of contexts with the Harris Matrix in **Figure 17**. Returning to our example, if it turns out that A and B are above F, then the assignments to units are incorrect. So is the portion of the stratigraphic chronology that is comprised of those units.

Lithostratigraphic Units

Units of contexts sharing similar lithology or composition are termed lithostratigraphic units (Stein 1987:342). A lithostratigraphic unit is a part of a single geologic or anthropogenic depositional event. Since it is rare that a deposit is excavated in one excavation context, a lithostratigraphic unit is usually composed of multiple excavation contexts.

From analyzing the field records, five major lithostratigraphic units were identified on the Building *l* site (see **Appendix 1**). These units were inferred on the basis of the original excavators's sediment descriptions. Contexts with very similar sediment descriptions were placed in the same lithostratigraphic unit, even in the absence of explicit notation by the excavators that they were equivalent. Of course, lithostratigraphic units also honor the few identity relationships made in the field notes by the excavators.

The following summary of lithostratigraphic units is listed in chronological order, from earliest to latest:

- Brown Loam with Red Clay and Charcoal: These contexts were described as brown loam, which may signify a buried A-horizon. Several of these contexts are interpreted to be the "original mountain slope" in the field records.
- Reddish Orange Clay with Greenstone: This unit may be related to the construction and terracing layer for Building *l* and was identified based on both excavators's field identification and similar sediment descriptions.
- Brownish-Red Clay Loam with Abundant Charcoal: This was identified east of and underneath the brick floor. The excavators associated these contexts with the Smokehouse / Dairy to the east of Building *l*.
- Brown Loam with Charcoal: This unit was identified in several units west of the "brick box" or forge feature. This ash or charcoal layer may be associated with nail making activities.
- Backfill, 1957 and later: This fill is associated with backfilling the 1957 excavation areas as well as the 1979 backfill often referred to as the "Hahn Strata." The 1957 backfill contexts are primarily described as black or dark brown loam with red clay, stone, and charcoal inclusions. Several of the 1979 backfill contexts are described as red or reddish orange clay with brown loam inclusions. However, contexts with

different lithology were also identified as 1957 and 1979 backfill in the field.

While many excavated contexts were assigned to the five lithostratigraphic units, it was not possible to assign most contexts to any of these units (**Figure 18**). The relationships between contexts in adjacent excavation units were seldom noted. The documentation often lacks plan and profile drawings of multiple excavation units depicting the horizontal and vertical relationships between contexts (see **Figure 19** for an incomplete profile). Moreover, when recorded, the opening and closing elevations of each context were given as a high and low point below modern grade or "BMG." This recording style makes it difficult to compare the vertical positions of different contexts.

Enough contexts could be assigned to assemble a working model of site formation. Site formation at Building *l* involved several phases of activity and construction. This model begins with the original mountain slope before Mulberry Row was created. The 1981 excavators identified a brown loam as well as red or red-orange clay layers as a part of this phase (**Figure 19**, layer 4). Sometime after Jefferson began construction on the mountaintop in 1769, Mulberry Row was established as a lane of workshops and dwellings. It appears that the flat area for Mulberry Row was created by terracing along the mountaintop. Photographs of the 1957 excavations reveal that there was a second cut and fill episode to level the building locations along Mulberry Row (**Figure 2**). The reddish-orange clay and greenstone lithostratigraphic unit may represent this cut and fill surface on which the houses and industrial sites on Mulberry Row were built (see **Figure 19**, layer 3). During 1807 and 1808, the vegetable garden terrace was constructed downhill or to the south of Mulberry Row (Betts 1944:359). The terracing consisted of cutting into the mountainside and depositing the soil downslope to create a level surface. The end result was a flat surface to the north (Mulberry Row) with a steep cut directly behind or to the south (vegetable garden terrace). After the terracing, there were episodes of construction, use, and abandonment of these domestic and industrial structures. Two separate charcoal deposits associated with smithing or nailmaking activities at Building *l* were identified (**Figure 19**, layers 1 & 2). This and other sites on Mulberry Row were also affected by post-abandonment processes, especially the archaeological excavations in the 1950s.

The few documented relationships between contexts in different lithostratigraphic units support this proposed sequence. Three of five contexts representing the "original mountain slope" were overlain by the reddish-orange clay and greenstone layer hypothesized to be associated with the terracing and construction of the site (**Figure 18**). In addition, the layer of brownish-red clay loam with charcoal inclusions was deposited on two of these contexts. The similar brown loam layer with abundant charcoal on the western portion of the Building *l* site sealed the reddish-orange clay and greenstone layer associated with the terracing and construction sequence in two instances. There is no direct relationship between these two layers, because the two are in different areas of the site. The modern backfill layers did not directly contact each other, suggesting a depositional event between Pi-Sunyer's and Kelso's excavations.

Calculating mean ceramic dates (South 1977) for each lithostratigraphic unit provides an independent test to determine the validity of the chronology. **Table 1** shows that the lithostratigraphic units fall into two groups. The earliest, with an mean ceramic date of 1784.7 contains the Original Mountain Slope and the Reddish-orange Clay with Greenstone units. Both lithostratigraphic units are stratigraphically below and therefore were deposited prior to the construction of Building *l*. The later group, containing Brown Loam with Abundant Charcoal and Brownish-red Clay Loam with Abundant Charcoal, has a mean ceramic date of 1796.35. This group of deposits is associated with the occupation of the site.

While the lithostratigraphic analysis provides valuable insight into the depositional history of the Building *l* site, it does not answer the question of the changing character of site use over time. By only using the primary excavation records, only 31 out of 124 contexts were assigned to lithostratigraphic units (25%). The resulting matrix does not offer a site-wide chronology that integrates most contexts into a

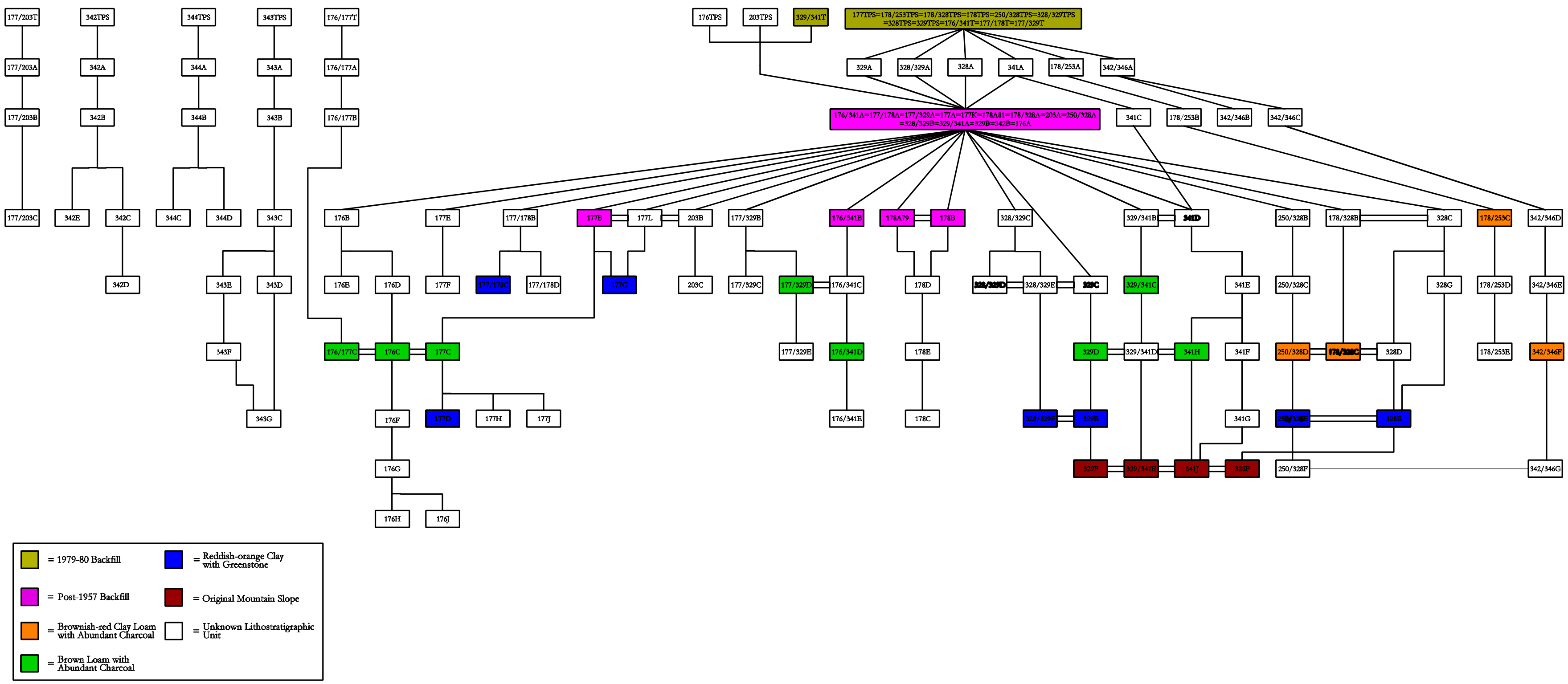


Figure 18. *Matrix of stratigraphic relationships showing lithostratigraphic units.*

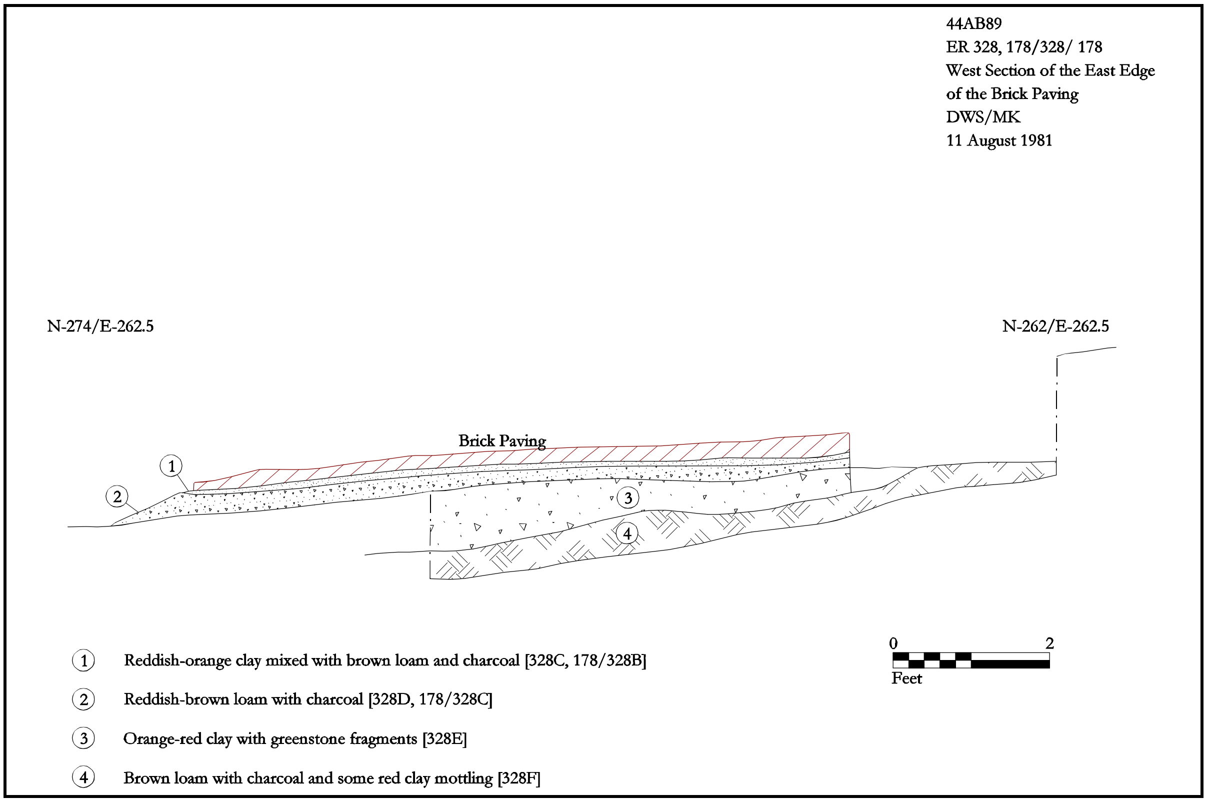


Figure 19. *West section drawing of the brick paving. Note layer* **å** *represents the original mountain slope and layer* **ä** *represents the cut and fill episode to level the Building* l *site.*

sensible narrative of depositional events. An analysis incorporating both the excavators's field notes and the artifacts present in the excavated contexts may provide additional insight.

Ethnostratigraphic Units

Contexts can also be grouped into ethnostratigraphic units. These units are characterized by the artifact classes present in the deposits (Stein 1992:80). In a previous post-excavation analysis of Building *l*, units of contexts were attributed to different phases of site formation (**Appendix 2**)(Sanford 1995). These master contexts were reconstructed based on the identifications recorded in the field records, and on artifacts contained in the deposits. In essence,

Lithostratigraphic Unit	Total Ceramics	Mean Ceramic Date
Post-1957 Backfill & 1979-80 Backfill	1140	1799.07
Brownish-red Clay Loam with Abundant Charcoal	1	1796.00
Brown Loam with Abundant Charcoal	33	1796.70
Reddish-orange Clay with Greenstone	10	1785.40
Original Mountain Slope	32	1784.00
Unknown Lithostratigraphic Unit	558	1797.99

Table 1. *Mean ceramic date for the lithostratigraphic units at the Building* l *site. The ordering of the lithostratigraphic units is from most recent deposition to earliest based upon the Harris Matrix in* ***Figure 17.***

Ethnostratigraphic Unit	Total Ceramics	Mean Ceramic Date
Post-1957 Backfill & 1979-80 Backfill	880	1799.05
Destruction - Storehouse	78	1799.56
Occupation - Storehouse	320	1799.07
Nailmaking - Storehouse	61	1790.51
Construction - Storehouse	1	1791.00
Occupation - Smokehouse/Dairy	3	1793.33
Construction - Smokehouse/Dairy	9	1784.78
Original Slope	1	1763.00

Table 2. *Mean ceramic dates for ethnostratigraphic units. The ordering of the ethnostratigraphic units is from the most recent deposition to the earliest.*

these were ethnostratigraphic units. In addition, the unit names given by the excavators included interpretations of the activities that resulted in these deposits (i.e., nailmaking).

The grouped contexts were interpreted as resulting from destruction, occupation, nailmaking, and the original mountain slope episodes. In addition, sediments deposited during the occupation and construction of the Smokehouse/Dairy site (to the east), and the postholes associated with the Mulberry Row fenceline were identified. **Table 2** summarizes the ethnostratigraphic units from the most recent deposition to the earliest. The fenceline unit is not included in this table due to the lack of any recovered ceramics.

To test the validity of the ethnostratigraphic units, the contexts attributed to each unit were tested against the site-wide Harris Matrix (**Figure 20**). To pass, the contexts assigned to any one unit must not be equated with contexts from any other unit and all the contexts that comprise each unit within the chronology must bear the same stratigraphic relationship to one another as do the units.

In most cases, the groupings pass both tests but there are several discrepancies. First, the Original Mountain Slope unit excludes two contexts included in the Harris Matrix in **Figure 17** (329/341E, 341J). These two contexts were associated with 329F in a profile drawing (DWS, AB 7/27/81). Second, the field notes show that 177/329D and 176/341C are equivalent, while the former is included with the Nailmaking - Storehouse unit and the latter associated with the Occupation - Storehouse unit. Third, there is a discrepancy between the excavators's field notes and the ethnostratigraphic units in the association between the three contexts 176/177C, 176C, and 177C. These contexts were placed in multiple ethnostratigraphic units but the excavators indicated that they represented the same deposit. This suggests that the Nailmaking - Storehouse and Occupation - Storehouse units are not distinct. Fourth, there is some confusion between several quadrat 177 contexts. It appears that when the unit was extended to the south, several contexts were renamed. The field notes say that 177A and 177B were changed to 177K and 177L, respectively. 177A and 177B were identified as "1957 Excavation Backfill" in the field notes but the latter was not assigned to this ethnostratigraphic unit. 177B and 177L were assigned to the Storehouse - Occupation and Storehouse - Destruction units.

The discrepancies with the Building *l* Harris Matrix suggest that while the ethnostratigraphic analysis assigned a greater percentage of contexts to a unit (65 out of 124 – 52%), the validity of the units is problematic. The division between Nailmaking and domestic Occupation of the site should be reconsidered. It is also apparent that several of the contexts in the Original Mountain Slope unit represent different depositional events.

Mean ceramic dates (MCD) were calculated for each ethnostratigraphic unit (**Table 2**). Besides the backfill unit, only three contained sufficient ceramic sherds for meaningful analysis (Nailmaking - Storehouse; Occupation - Storehouse; Destruction - Storehouse). The ethnostratigraphic units fall into two groups; the

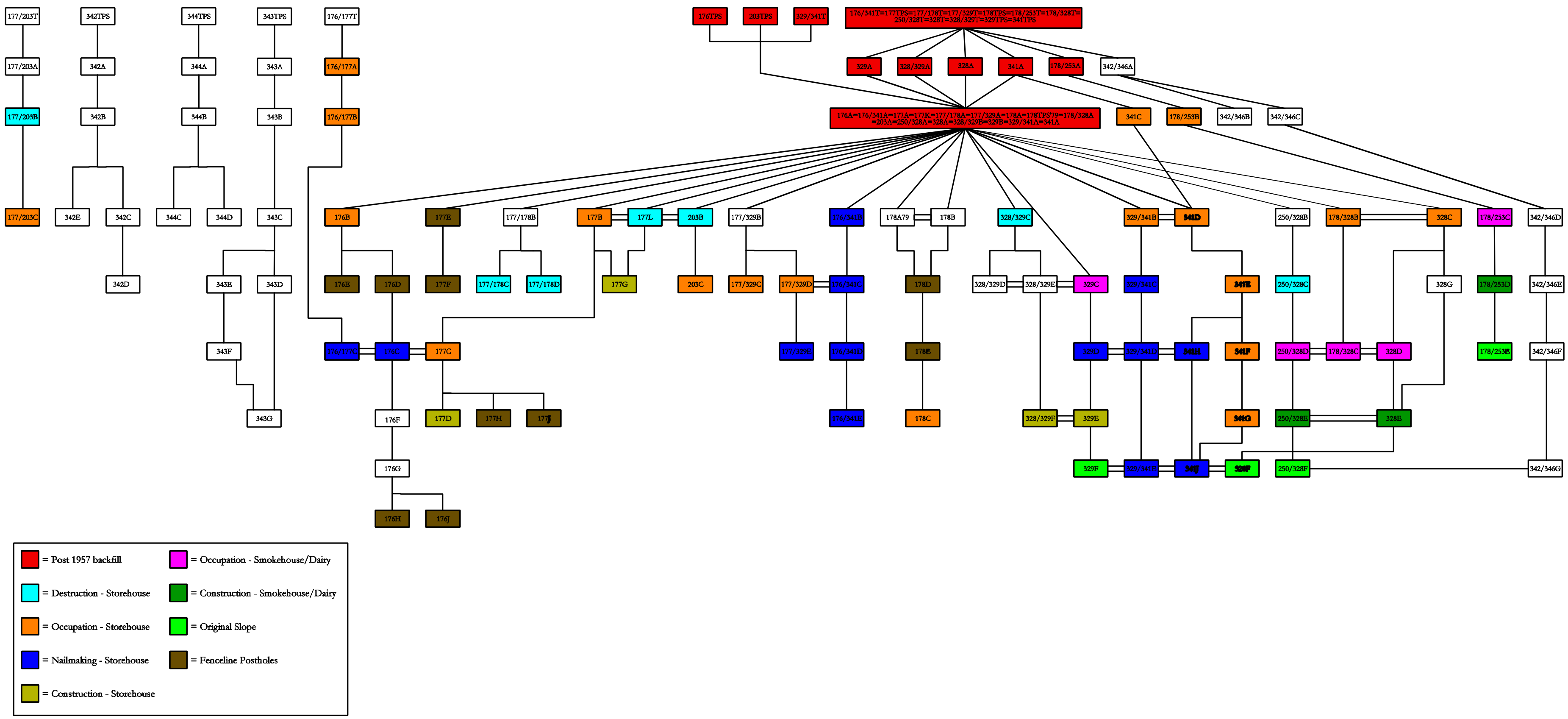


Figure 20. *Matrix of stratigraphic relationships showing ethnostratigraphic units.*

earlier contains only the Nailmaking - Storehouse unit (MCD of 1790.51) while the Occupation - Storehouse and Destruction - Storehouse units are later and have an average mean ceramic date of 1799.32. If the ethnostratigraphic units are correct then the difference of roughly a decade in the mean ceramic dates suggests that nailmaking at Building *l* occurred prior to domestic occupation by members of Jefferson's enslaved work force. The almost identical mean ceramic dates for the occupation and destruction of the storehouse cast additional doubt onto the ethnostratigraphic chronology, however.

Seriation Chronology

Our two attempts to integrate most of the contexts on the site into a single stratigraphic chronology have yielded less than satisfactory results. The fundamental sticking point in both cases appears to be the scarcity of information on stratigraphic relationship among contexts in adjacent quadrats. Thus if we are to build a chronology for the site that incorporates more contexts, we cannot look to stratigraphy for guidance. An obvious alternative is to attempt to build a chronology of individual contexts by dating the ceramic assemblages they contain. We used frequency seriation for this purpose. The seriation method is based on the assumption that the relative frequency of each ceramic type exhibits a battleship-shaped curve through time. Thus the order of assemblages in which the expected battleship curves are best approximated by the frequencies of all the types is the order most likely to be a chronology (Dunnell 1970).

It is important to note that the event being dated in a seriation chronology is slightly different from the event being dated in a stratigraphic chronology. Seriation orders the center of gravity of interval over which the ceramics in the assemblage accumulated. Stratigraphy orders the *deposition* of the sediments, in which the ceramics happen to be included. Because it is likely that artifacts lie around on and in the ground for considerable periods before they are eventually incorporated into the deposit from which they are excavated, a deposit can be considerably more recent than some fraction of the artifacts it contains. Other things being equal, we expect that the orders produced by stratigraphy and seriation will be different, but they should be correlated.

We took a statistical approach to the problem of estimating the order of assemblages that fits the seriation model. Correspondence Analysis (CA) (Baxter 1994) is a multivariate statistical technique that is well suited to this purpose. The basic idea behind CA is to replace a complex, multi-dimensional data matrix with a much simpler, low-dimensional representation that captures as much of the original information as possible. In seriation applications, we are primarily interested in a one-dimensional representation, although CA also produces the best two, three, and higher-dimensional representations. CA generates these representations as sets of scores. There is one set of scores for each dimension and each assemblage has a score on each dimension. The scores are computed so that they provide the best low-dimensional portrayal of the original multidimensional pattern of similarity among the assemblages. The first dimension scores provide the best one-dimensional picture of the overall pattern of similarity among assemblages; the first and second dimension scores provide the best two-dimensional picture; and so forth for higher dimensions. If the type frequencies monitored in the assemblages really do display symmetrical battleship-shaped trajectories in time, the assemblage scores on the first dimension will be proportional to the mean of the period over which the ceramics accumulated (ter Braak 1986). CA offers a numerical indication of the extent to which the pattern of inter-assemblage similarity really is one-dimensional, as is implied by the seriation model. The measure is the proportion of variation, or *inertia* in CA jargon, in the original dataset that is accounted for by the dimension scores. A high inertia value for the first dimension (and sometimes for the second dimension as well – see *e.g.* Neiman and Alcock 1995), is an indication that the assemblages can be ordered so that the type frequencies display battleship-shaped curves.

CA not only yields scores for the assemblages, it also produces an analogous set of scores for the ceramic types. For a one-dimensional representation, the type scores offer the single best picture of the pattern of similarity among the types. If the type frequencies display symmetrical battleship-shaped trajectories in time, then the score for each type will be proportional to the point in time at which it was most popular. Of course, both the type and assemblage scores are estimated on an arbitrary statistical scale, not in calendars years. Some sense of how the scores fit in time can be supplied by independent evidence on about the calendar age of the assemblages.

There is one further feature of CA worth highlighting here. The score for each assemblage is a weighted average of the scores for the types that occur in it, where the weights are the type frequencies. This relationship is precisely the relationship between the mean ceramic date for an assemblage and the estimated midpoints of the manufacture dates for the ceramic types that occur in it (South 1977). The parallel is useful. It means that one can use the correlation between the mean ceramic dates and CA scores for a set of assemblages as an objective evaluation of the extent to which either method is actually measuring chronological variation in a particular application.

The correlation will not be perfect. Several factors may be responsible for this. Most importantly, the mean ceramic date method assumes that the timing of type frequency change in the local area from which the assemblages come matches the manufacturing history of the types in the Atlantic world. This is unlikely to be the case. When it is not, the CA-based seriation method, which honors the local pattern of change, is likely to yield more accurate results. On the other hand, if the local type frequencies do follow battleship curves, there is no guarantee that the curves fall along a chronological gradient, as opposed to a synchronic functional or cost-related gradient. A positive correlation between the CA first-dimension scores and mean ceramic dates is thus a valuable indication that the dimension recovered by CA actually is correlated with time.

A potential pitfall with seriating assemblages from individual contexts is the issue of sample size. Assemblages from individual contexts will be small. As a result, sampling error is likely to obscure much of the chronological signal that lies behind the type frequencies. We have attempted to mitigate the distorting effects of small samples using Bayesian methods to improve our estimates of type frequencies. The basic idea here is a simple one. It is that our best guess about the frequency of a given ceramic type, say creamware, in a context, ought to take into account not only the what was in that context, but also our prior knowledge about what was likely to have been found. Bayesian methods use our *prior* beliefs about what type frequencies are likely to occur in a sample to improve our *posterior* estimates of the type frequencies in the population from which the sample was taken. In this case the sample is the ceramic assemblage from a specific context, while the population is the larger hypothetical assemblage from which the few sherds that context were drawn.

Our prior beliefs about the population, what was found in the sample, and our posterior estimate about the population can be expressed numerically (for the statistical details, see Iversen 1984; for an archaeological application see, Robertson 1999). In the case at hand, we assume that the actual frequency, *x*, of a given type – say creamware – in a sample is drawn from a binomial distribution with parameters *B* and *n*, where *n* is the size of the sample and *B* is the unknown population parameter. We summarize numerically our prior beliefs about likely values for *B* with the help of a beta distribution, with parameters *a* and *b*. Our prior beliefs are derived from *all* the assemblages excavated at the site. So *a* and *b* are estimated as

$$a = m\left[\frac{m(1-m)}{s^{2}} - 1\right]$$

$$b = (1-m)\left[\frac{m(1-m)}{s^{2}} - 1\right],$$

where the estimates of *:* and *F* are based on the actual relative frequencies ($p_i = x_i / n_i$) of the type in question in each of the *i* assemblages. For the *i*'th assemblage, our posterior estimate of the unknown population parameter, incorporating both the prior information and the evidence from the samples itself is:

$$m_i' = \frac{x_i + a}{n_i + a + b} \ .$$

We used the forgoing empirical-Bayes technique to compute posterior estimates of type frequencies for 32 assemblages, out of a total of 95 contexts. Assemblages derived from post-1957 backfill were not included in the analysis, because they represent in unknowable ways multiple 18th, 19th , and 20th -century depositional events. Assemblages in which the ceramic sample size was less than 5 were also excluded. This sample-size threshold may have the unintended effect of forcing earlier assemblages out of the analysis, if early assemblages tend to be smaller. But this bias is the unavoidable price we must pay for an accurate chronology at the context level. The parameters for prior beta distribution, *a* and *b*, which summarize our prior beliefs about the ceramic type frequencies we are likely to encounter in each assemblage, were estimated using only the 7 assemblages whose size was greater than 30.

Once the posterior estimates of ceramic types frequencies in the 32 assemblages had been computed, they were analyzed using CA. The first CA dimension accounted for 42 percent of the variation (inertia) in the data matrix. The fact that the second dimension accounted for a scant 13 percent is a good indication that the structure behind the ceramic ware frequencies is essentially one dimensional. It also suggests that the distributions of some type frequencies along that dimension roughly fit the battleship model. Does this dimension represent time? To answer this question, we computed mean ceramic dates (MCD) for the 32 assemblages, using the posterior type frequency estimates. The correlation between the MCDs and CA first-dimension scores was surprising high (Pearson's *r*= .94, Spearman's *r*=.92 and Kendall's J_b=.78). The high correlation with the MCDs provides strong independent evidence that CA has successfully extracted a previously unknown chronological signal from these data (**Figure 21**).

How important were the empirical-Bayes estimates of ceramic type frequencies in achieving this analytical success? We can answer this question by comparing the Bayesian results to the

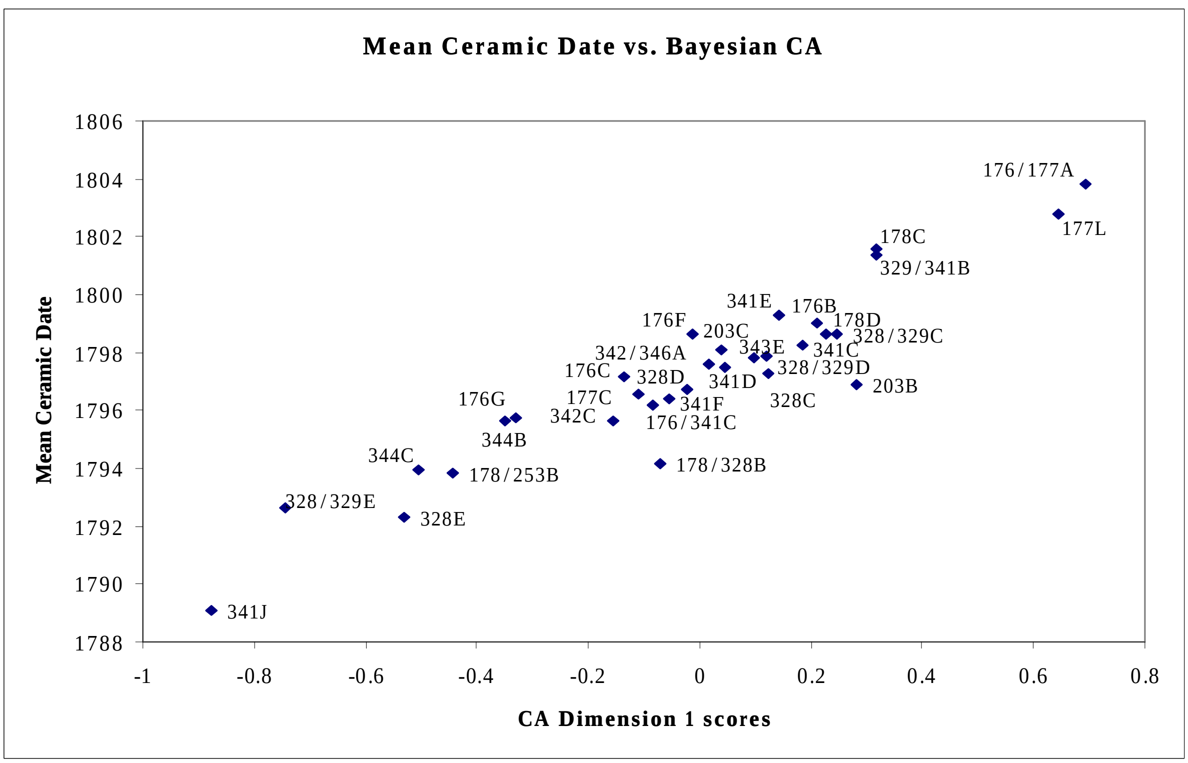


Figure 21. *Scatter plot of the first correspondence analysis dimension scores and mean ceramic dates.*

outcomes of CA and MCD analyses using the raw data. The first CA dimension extracted from the raw ceramic count accounted for a scant 23 percent of the inertia in the data, a considerable reduction that is the entirely predictable result of greater sampling error in the raw data than in the posterior estimates. In addition, the correlation between the CA first dimension cores and MCDs for the raw data were significantly lower (Pearson's *r*= .83, Spearman's *r*=.85 and Kendall's J_b=.71). These differences, while not enormous, point to the practical efficacy of the Bayesian approach.

Our seriation-based approach is a remarkable result, given the small sample sizes involved. It has important implications for the future study of the rest of the Mulberry Row sites excavated in the 1980's. It means that even if stratigraphic analysis of the sort attempted at Building *l* fails on the other Mulberry Row sites, it will still be possible to build intra-site chronologies using the seriation-based methods outlined above. And this is in turn opens the door to the systematic archaeological study of change over time in the lifeways of Mulberry Row's inhabitants.

4. Documenting Patterns of Change

Domestic versus Industrial Activities

Using the seriation chronology developed in Chapter 3, we address the issue of changing site use over time. Kelso's (1982, 1997) analysis of the site concludes that it was used consecutively as a nailery, then as a dwelling. As stated previously, the Nailmaking and Occupation ethnostratigraphic units do not appear to be distinct. Field records, profile drawings, and analysis notes indicate that there is overlap between these activities. Change in relative frequencies of several different artifact types over time, as defined by the seriation results, may be used to evaluate the temporal relationships between the industrial and domestic components of the site.

Before differentiating between the industrial and domestic activities at Building *l*, the first aspect to be considered is the intensity of all activities taking place over time. **Figure 22** is a scatter plot of both the total artifact count (blue) and total weight (orange) densities by context. The densities were calculated by dividing the counts or weights by quadrat size. Densities could not be computed using context volumes since elevations were rarely recorded. The contexts are arranged in seriation order with those deposited the earliest on the left and those deposited the latest on the right. To highlight trends in these noisy data, we used locally weighted regression or 'loess' (Cleveland 1993). Loess estimates of the trends are represented by the continuous lines. Both the artifact counts and weights exhibit an increase in density starting with the middle of site occupation. This increase in artifact density reflects an intensification of the use of space at the Building *l* site.

Returning to the issue of changing site use over time, we examined the abundance of domestic artifacts relative to industrial artifacts in

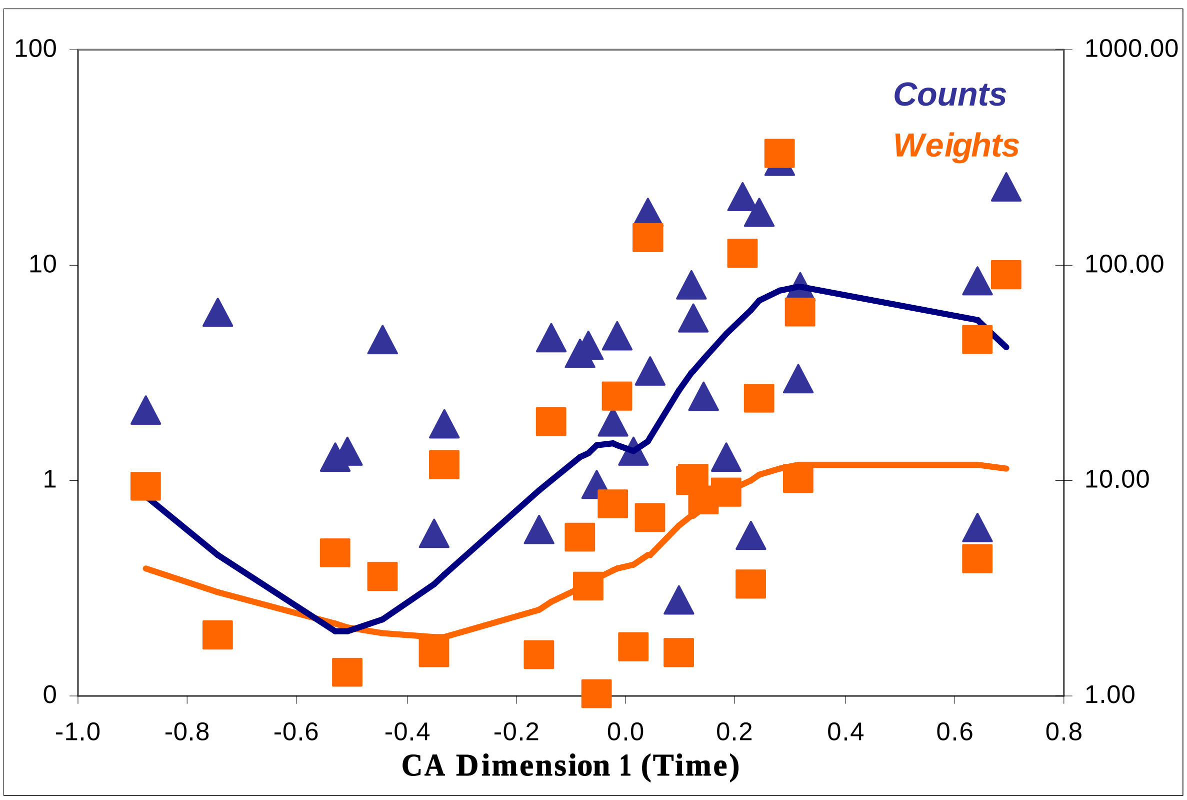


Figure 22. *Scatter plot of artifact weight density and artifact count density.*

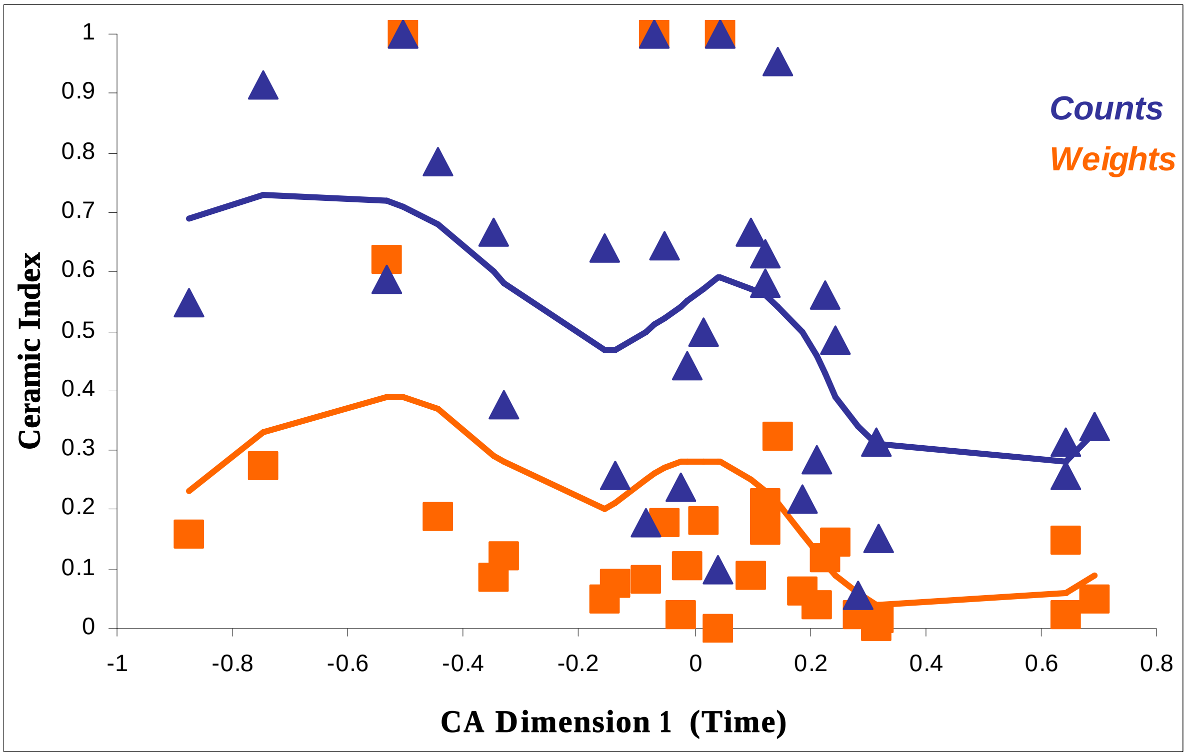


Figure 23. *Scatter plot of Ceramic Index values in seriation order.*

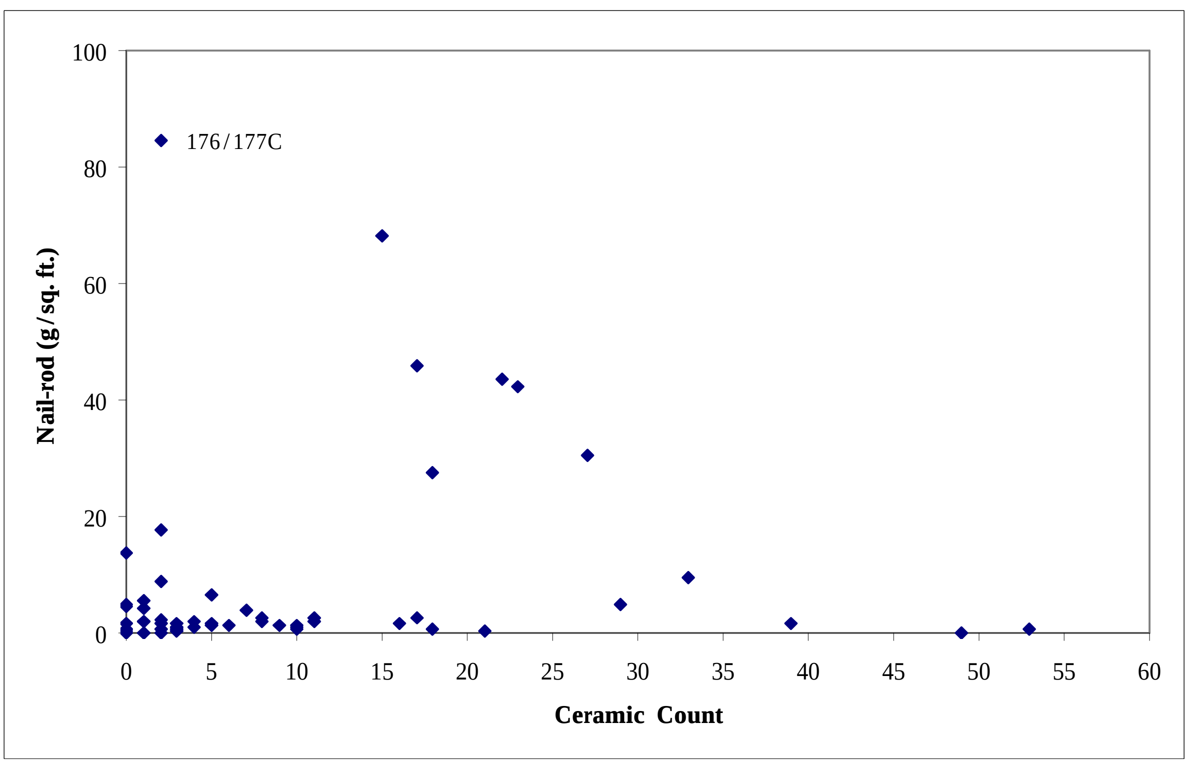


Figure 24. *Scatter plot of ceramic count and nail rod density for all excavated contexts.*

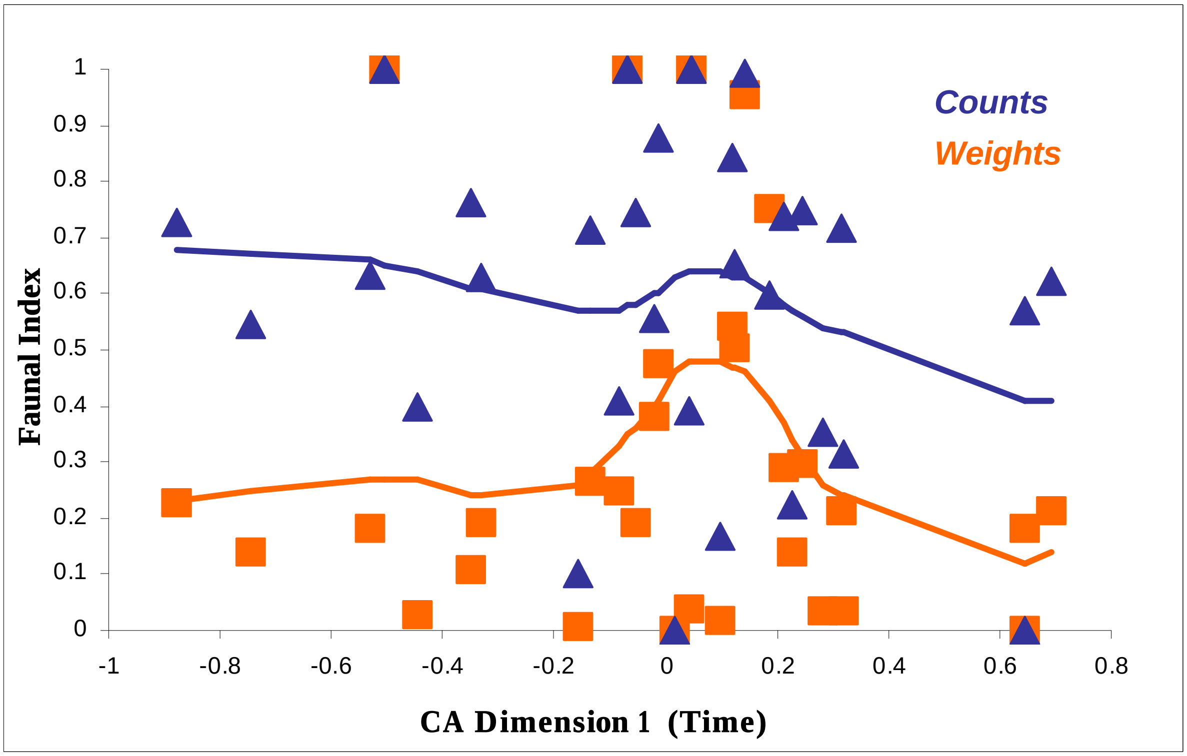


Figure 25. *Scatter plot of Faunal Index values in seriation order.*

each of the seriated contexts. We used three measures of the relative abundance of domestic artifacts based on ceramics, faunal remains and bottle glass. For each of these we used two measures of abundance, one based on artifact counts, the other based on artifact weights.

Our first estimate of the frequency of domestic versus industrial activity at the site is the Ceramic Index (ceramics/(ceramics+nailrod)) (**Figure 23**). This scatter plot shows Ceramic Index values based on counts and weights in each of the seriated contexts.

Both the count and weight data suggest a general decrease in the abundance of ceramics relative to nailrod. The fitted loess line hints at a short-lived increase in ceramic abundance during the middle of the occupation.

Since this chronology was derived using ceramic data from contexts that were relatively ceramic rich (n>4), it is possible that some nailmaking contexts may not have been included in this analysis. However, only one context (176/177C) had a relatively high nail rod density and ceramic count less than the five sherd threshold of the CA analysis (**Figure 24**).

The second estimate of the frequency of domestic versus industrial activity is the Faunal Index (faunal material/(faunal material+nailrod)) (**Figure 25**). The loess fitted trend lines show a general decline in faunal material deposition relative to nailrod.

The last estimate of the frequency of domestic versus industrial activity at the site is the Bottle Glass Index (bottle glass/(bottle glass+nailrod))(**Figure 26**). Once again, we see a decrease in the abundance of bottle glass relative to nailrod, punctuated by a reversal of this trend during the middle of the occupation.

The loess fitted trend lines for all three Artifact Indices have a similar pattern showing an overall decrease in domestic activity relative to industrial activity, with a short-lived reversal of the trend near the middle of the occupation. The agreement between the three Indices is remarkable given the small artifact sample size for many of the excavated contexts.

What can we conclude from this analysis? First, the analysis offers no evidence to support

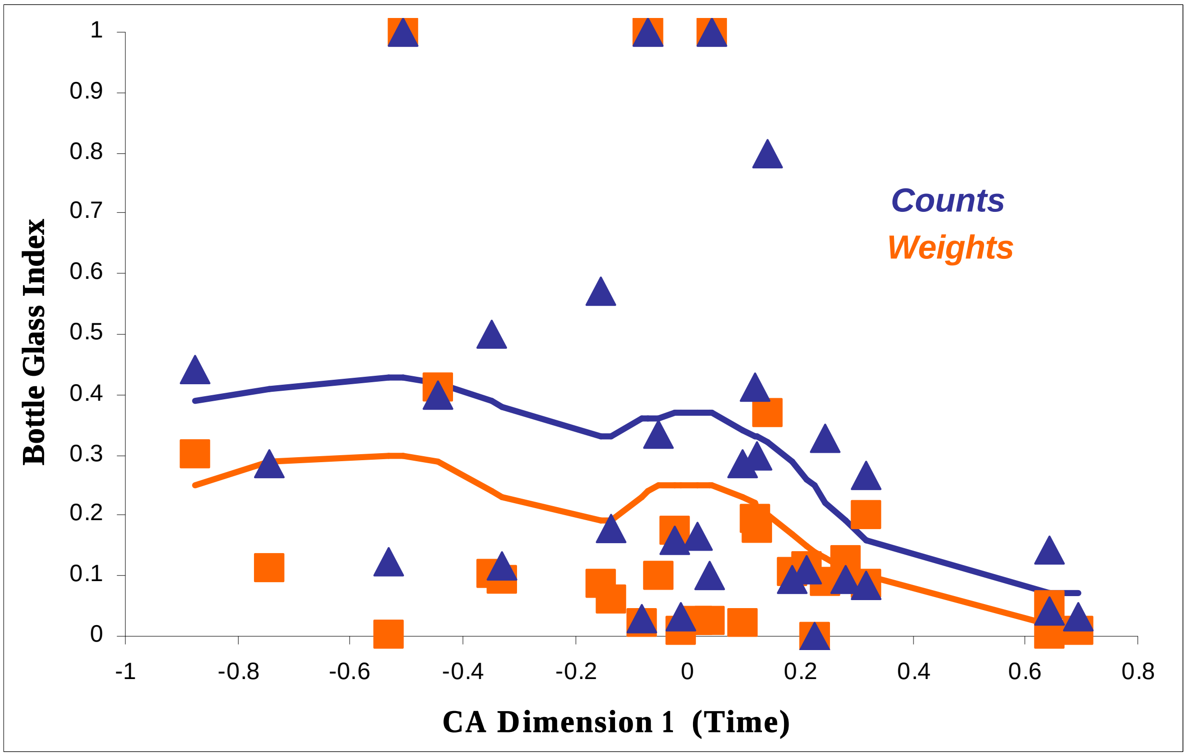


Figure 26. *Scatter plot of Bottle Glass Index values in seriation order.*

the idea that the occupation of the Building *l* site was comprised of discrete phases of nail-making and domestic activity. Contexts that are contemporary, according to our seriation, contain both domestic and nail-making debris. This might indicate Building *l* was used simultaneously as a dwelling and a nail-making facility throughout its occupation. On the other hand, it might also result from time averaging in the formation of the archaeological record. In other words, even though industrial and domestic phases of occupation were discrete, the contexts that they produced contain artifacts that were deposited over periods of time long enough to sample both the domestic and industrial phases. Future study may resolve this ambiguity.

There is much less ambiguity over the conclusion that the intensity of nail making activity at Building *l* increased over time, relative to domestic activity. But the trend was neither linear nor unidirectional. The bumps in the loess curves for the ceramic, faunal, and bottle-glass indices point to an initial increase in nail making, followed by an increase in domestic activity, followed by a second increase in nail making. So we see a shifting pattern of usage that fits comfortably with the emerging picture of slave housing in urban Chesapeake contexts, for example Williamsburg. In the eighteenth century, Williamsburg's urban slaves lived in secondary spaces of their owner's dwellings and workshops, not in structures constructed specifically for housing slaves (Chappell 1994:191-92). With the diversification of the plantation economy, Jefferson followed the urban precedent.

Implications for Crader's Faunal Analysis

The chronology identified by the correspondence analysis has implications for Diana Crader's faunal analysis of the site (1984). Crader analyzed much of the faunal material from contexts in this chronology, but not all of it (**Appendix 3**). The contexts that Crader analyzed and compared with the Monticello Dry Well assemblage are the members of the "Occupation" unit (notes 1981). Since it is clear that the nailmaking and domestic occupation phases of the site are not distinct and domestic activities at the site last until Jefferson's death in 1826, the analysis of animal bones from this site should be reexamined. The "Occupation" unit analyzed by Crader is only a subset of the contexts related to domestic activity on the Building *l* site. Therefore, further phases of reassessment should be analyzed within the framework of the seriation chronology to identify changes in subsistence patterns over time.

Analysis of Ceramic Vessel Form and Consumption Patterns

It has been clear for two decades that slaves at Monticello invested in stylish ceramic plates and tea wares (Kelso 1997; Neiman et al. 2000; Sanford 1995). This was part of the larger, regional trend in which pewter plates were being replaced with ceramic ones. The use life of these ceramic plates was much shorter than their pewter counterparts. Because these ceramic vessels offered no functional advantages and yet were more costly, investment in this material must have had other advantages. The investment in these costly forms has been interpreted as a form of social advertising (Neiman et al. 2000).

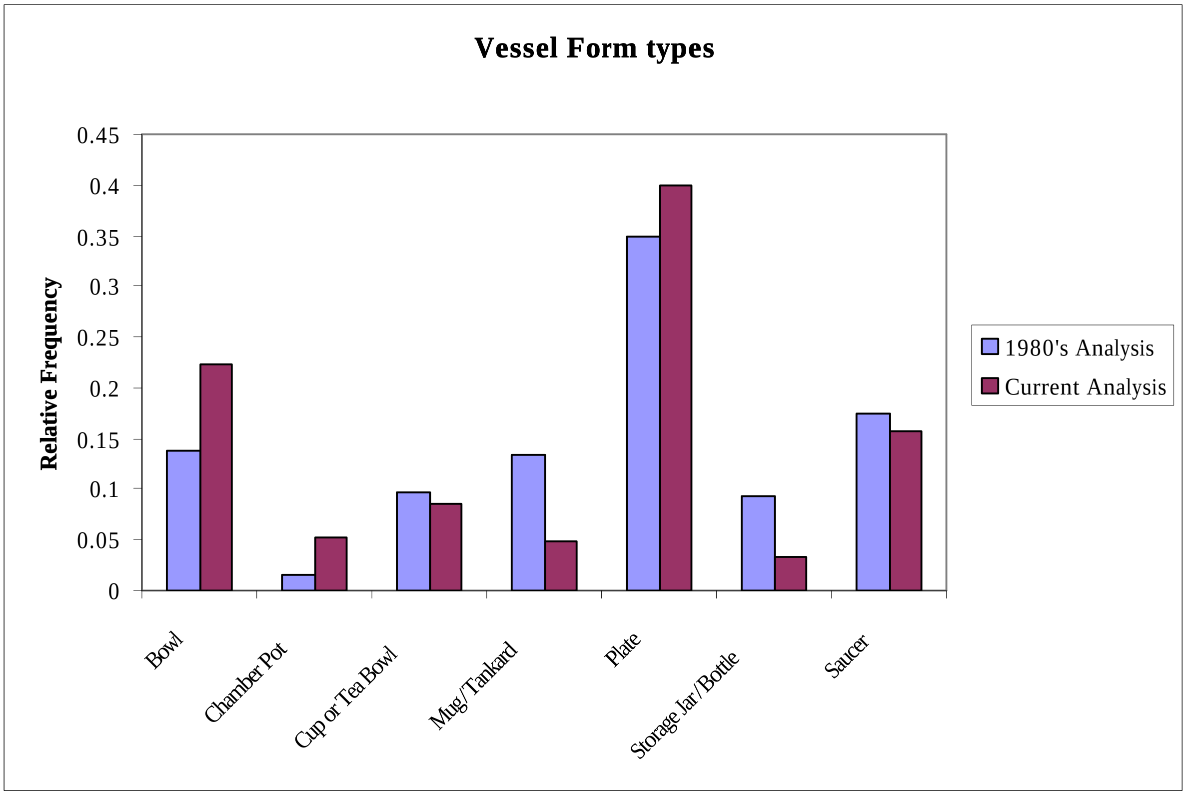
Comparing the ceramic assemblage of Building *l* with other sites along Mulberry Row may show differences in consumption patterns for the inhabitants. The seriation chronology for Building *l* provides an additional opportunity to examine change over time within the site as well. Building *l* was occupied for a relatively long time (c.1790-1826). Changes in the ceramic assemblage over time may provide insight into apparent discrepancies when comparing it to other assemblages at Monticello.

The traditional method of calculating ceramic abundance on historic sites is to calculate the minimum number of individual vessels or MNIs. This labor-intensive process involves crossmending to reconstruct ceramic vessels and oftentimes requires assigning the presence of a vessel on the basis of a single sherd. Research has shown that MNIs are biased as measures of the proportions of types (Orton, Tyers and Vince 1993). Further, MNIs are biased in assemblages with large quantities of undecorated ceramics. The percentage of crossmended undecorated creamware sherds, for example, rarely approaches or exceeds the percentage of crossmended sherds from other, highly decorated wares.

The reanalysis of the Building *l* ceramic assemblage allows us to test a statistically unbiased method of measuring vessel type proportions. This method is called estimated vessel equivalents (EVE). The EVE analysis will be compared to a traditional MNI study completed on the same assemblage in the 1980s to determine the extent to which proportions of vessel types differ. Second, this analysis will use EVEs to look into consumption-related changes in the Building *l* assemblage.

Relative frequencies of ceramic vessel forms were calculated using estimated vessel equivalents. Estimated vessel equivalents were calculated using rim diameter and percentage measurements made using a rim radius template (Egloff 1973; Orton and Tyers 1990). By matching a sherd with the appropriate arc on the template, a sherd's radius and the proportion of the vessel's rim may be determined. Vessel equivalents were estimated by adding the rim percentages for each vessel form. Estimating vessel equivalents is a method "for measuring proportions within an assemblage and for comparing them between assemblages," which is not affected by the fragmentation of the assemblage (Orton and Tyers 1990:171). The estimated vessel-equivalent technique is more efficient than the traditional approach to minimum vessel counts. This technique is also less biased towards highly decorated sherds than traditional minimum vessel counts. In this study, the minimum vessel count and estimated vessel-equivalent methods were compared. The estimated vessel-equivalent was used to measure change over time in relative frequencies of vessel forms at Building *l*.

The vessel form data from the early 1980s laboratory analysis may be evaluated with the estimated vessel-equivalent data from this project. The 1980s analysis of the Building *l* ceramics used the traditional method to identify the minimum number of vessels. In the absence of an intrasite chronology, all sherds were analyzed together. The relative frequencies of different vessel forms from the Kelso analysis and the EVE analysis are fairly similar (**Figure 27**). However, the vessel form types that were used in the two tabulations were not identical. The comparable vessel forms are bowls, chamber pots, tea bowls, mug/tankards, plates, storage jar/bottles, and saucers. The different categories



used in the two analyses may account for some differences in the relative frequencies. Although there are some discrepancies, the two vessel measurement systems produced similar results.

In the context of the late eighteenth-century Chesapeake, the amount of social advertising that a site's inhabitants engaged in can be examined with the discard rates of ceramic plates and tea vessels. To measure this trend, we use the Plate Index (PI) and the Tea Index (TI) (Neiman et al. 2000), which are measures of the frequency of plates and tea vessels in relation to bowls and mugs. These indices assume that mug and bowl discard rates are relatively stable through time. The values of PI and TI may be estimated using EVE's or the minimum vessel count from the 1980s analysis. The PI calculated with rim percentages is 0.596 while the PI derived from the minimum vessel counts from the Kelso analysis is 0.562. The TI values were also quite similar. The TI calculated from the rim percentages is 0.472 while the TI value from vessel counts is 0.50.

Three Mulberry Row sites, Buildings *r*, *s*, and *t*, were inhabited and abandoned at the same time as Building *l*. Comparing the Building *l* ceramic assemblage to these contemporary sites is enlightening since any observed differences will not be the result of different occupation dates. Buildings *l*, *s*, and *t* have similar TI values, with only Building *r* having a significantly different value (**Table 3**). Differences occur with the Tea Index values, however. Building *l* has the lowest value (0.47), with Buildings *r*, *s*, and *t* being significantly higher (0.91, 0.55, and 0.66, respectively).

These higher TI values suggest that the inhabitants of Buildings *r*, *s*, and *t* had access to and invested in the costly implements used in the newly emerged ritual of tea consumption. Jefferson's letters show that he assigned his domestic house slaves to these buildings when they were constructed in 1793. Building *l*, on the other hand, was a workshop for producing nails that also housed its enslaved workers. This implies that there may have been a differentiation in patterns of consumption among the Mulberry Row slaves.

The deposits were grouped into early, middle and late phases in order to measure

Site	Plate Index	Tea Index
Building *l*	0.60	0.47
Building *r*	0.88	0.91
Building *s*	0.55	0.55
Building *t*	0.63	0.66

Table 3. *Comparison of Building* l *Plate Index (PI) and Tea Index (TI) with contemporary sites at Monticello.*

Phase	Plate Index	Tea Index
Early	0.40	-
Middle	0.60	0.41
Late	0.73	0.55

Table 4. *Plate Index and Tea Index values by occupation phase at Building* l*.*

change over time in patterns of consumption for Building *l*'s inhabitants (see **Appendix 4** for context assignments; **Table 4**). The early phase contexts are not all related to activity on the Building *l* site, but are in part related to an earlier configuration of Mulberry Row. The middle and late phases are related to the inhabitants of the Building *l* site. Both the TI and PI values increase over time, though the sample sizes are low for the early phase deposits. No TI value was calculated for the early phase because there were no tea bowl or saucer rims in the associated contexts. However, the TI increases from 0.41 to 0.55 from the middle to late phases at Building *l*. The PI increases from 0.40 to 0.60 from the early to middle phases. The late phase exhibits a higher PI value of 0.73. Thus the Building l assemblages show a pattern of increased levels of ceramic plate and teaware consumption, as measured by TI and PI values, that parallels the trend for Monticello as a whole.

5. Conclusion

The reassessment of the Building *l* site presented several challenges due to the fragmentary nature of the drawings, elevations, and field records of the excavations. However, a quantitative approach to the existing archaeological data allowed us to answer research questions about dating and the activities on the site through its existence. The Harris Matrix constructed from the extant field records: profile drawings, context records, elevations, and recorded stratigraphic associations was not complete. Analysis of the primary field records provided information useful in grouping contexts that may have been created by the same depositional events. These lithostratigraphic units allowed the evaluation of the groupings that the excavators identified. The low percentage of contexts assigned to lithostratigraphic groups, however, prevented meaningful analysis. An investigation using both the field records and the artifacts found within the excavated contexts attempted to identify ethnostratigraphic groups. While more encompassing than the lithostratigraphic analysis, these ethnostratigraphic groups did not follow the law of superposition: contexts within groups did not adhere to the same stratigraphic ordering as the groups themselves.

To form a chronology of the site in the absence of detailed stratigraphic information, artifactual data was used to seriate the contexts. It was with this chronology that the changing nature of the domestic and industrial activity on the site and change in consumption patterns by its inhabitants was addressed.

The techniques we have developed to build a seriation chronology for Building *l* are worth emphasizing because they will certainly prove useful in future work with the Mulberry Row Reassessment, with the Plantation Archaeological Survey, and with the Digital Archaeological Archive of Chesapeake Slavery. Successful seriation of assemblages from individual excavated contexts, as opposed to groups of contexts, is likely to run afoul of small sample sizes. We have shown how the distorting effects of random sampling error can be mitigated by the use of Bayesian techniques, which take into account prior information about the frequencies of ceramic types that are likely to occur in small samples. We have shown how correspondence analysis can be used to build seriations that honor local chronological variation, and how mean ceramic dates can be used as an independent check on the CA results. Our success in applying these techniques to the Building *l* assemblages offers reason to believe that they will be applicable to the rest of the Mulberry Row sites. This is an enormously significant finding because it means that it will be possible eventually to construct an archaeological chronology for Mulberry Row as a whole. The chronology will enable us for the first time to systemically document change over time and spatial variation in the intensity and character of the occupation.

Our analysis of the Building *l* material has produced important new insights into the shifting character of the occupation of the site. First, it is now clear that the site was occupied into the 1820s and up to Jefferson's death, longer than has previously been appreciated. The large quantity of ceramics on the site from the 1810s and 1820s indicates that Jefferson's plans to dismantle all the log buildings on Mulberry Row, laid in 1801, never came to fruition.

The chronology also allows us to monitor change over time in the use of the site. There is no evidence for discrete phases of domestic and industrial occupation. Rather both domestic artifacts (ceramics, fauna, and bottle glass) and industrial artifacts (nailrod) are mixed together throughout the seriation chronology. This may indicate simultaneous use for both purposes. Or it may be a result of time averaging in the formation of the archaeological record. It is clear, however, that the frequency or intensity of industrial activity, relative to domestic activity, increased over time. In addition, there are hints that this trend was interrupted briefly by a return of a greater domestic emphasis. This conclusion contradicts the impression of the original excavators that the industrial phase preceded the domestic one. Our analysis is based on an independently evaluated chronology (i.e. CA results checked against mean ceramic dates) and our estimates of domestic activity relative to industrial activity are quantitative and agree across independent artifact classes. On this basis, we credit the current analysis over the conclusions of the original excavators.

The shifts in nail-making intensity that we have documented at the Building *l* site may be part of a larger, cyclic pattern of expansion and contraction in nail making as Jefferson attempted to accommodate shifting market opportunities. If this is right, we should not think of economic diversification as a process that leads only to an increase in the number of work activities pursued at one time, but also to oscillations over the course of several years or even decades in the kind of work that slaves performed. Enslaved workers in a more diversified economy were more likely to move from one job to another. Obviously a complete account of change over time in the frequency nail making at Monticello awaits completion of the Mulberry Row Reassessment, and also integration of data from outlying sites currently being located by the Plantation Archaeological Survey.

Finally we note the implication of our analysis for our understanding of the consumption of stylish ceramics by enslaved workers. Our seriation chronology has allowed us to chart for Building *l* an increase in the Plate Index and the Tea Index, pointing to an increase in the frequency with which meals were eaten from stylish ceramic plates and with which tea was sipped from cups and saucers. We have previously detected these changes in other slave assemblages from Monticello (Neiman *et al.* 2000). The pattern appears to have been a part of the "consumer revolution" that affected much of the Atlantic world. So the fact that we have found it in the Building *l* assemblages is no surprise. What is novel in this analysis is the fact that the change can be detected within a single site. This raises the possibility that, as work on the Mulberry Row Reassessment goes forward, we will be able to compare patterns of change in consumption among different sites.

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Appendix 1. Lithostratigraphic group membership with elevations and sediment descriptions.

Context	Opening BMG	Closing BMG	Color	Texture	Inclusions
Original Mountain Slope:					
328F	15-16"	17-20"	brown	loam	charcoal, red clay
329F	10.5-18"		brown	loam	red clay, some charcoal
341J			brown	loam	orange-red clay, charcoal
329/341E	14-17"	18-23"	brown	loam	red clay with charcoal
Reddish-orange Clay with Greenstone:					
177/178C	11.5"		reddish orange	clay	stones
177/329F			unexcavated		
177D				clay	greenstone
177G			reddish brown	clay	some brick and stone
178/328D			unexcavated		
250/328E	14-16"	18-26"	orange-red	clay	greenstone
328/329F	9"		reddish orange	clay	stones, brick bats
328E	15-16"		orange-red	clay	greenstone
329E	9-15"	15-18"	reddish orange	clay	stones, brick bats
Brown Loam with Abundant Charcoal:					
176/177C			mottled brown	loam	concentrated charcoal
176/341D	10-16"	13-19"	reddish brown	loam	charcoal
176C	10"		mottled brown	loam	concentrated charcoal
177/329D			brown	loam	mottled, charcoal
177C			mottled brown	loam	concentrated charcoal
329/341C	8-11"	16-17"	brown	loam	abundant charcoal
329D	9-10"		brown	loam	abundant charcoal
341H	10-13"	14-15"	brown	loam	abundant charcoal
Brownish-red Clay Loam with Abundant Charcoal:					
178/253C	9-10"	11"	brownish red	clay loam	abundant charcoal
178/328C			brownish red	clay loam	charcoal
250/328D	11-12 to 17-18"	15-19"	brownish red	clay loam	abundant charcoal
342/346F	11"	14"	brownish red	clay loam	abundant charcoal
Post-1957 Backfill:					
176/341A	3-4"	6-8"	black	loam	
176/341B	6-8"	9-11"	reddish orange	clay	brown loam with small stones, charcoal and brick fragments
177/178A	4.5-5"	6-6.5"	black	loam	red clay, charcoal
177/329A			black	loam	red clay, stones, charcoal
177A ('79)	0-2"	4"	dark brown	loam	charcoal
177B ('79)	2-4"	4-7"	black	loam	red clay, charcoal
177K	1-3"	4-6"	reddish brown	loam	
Context	**Opening**	**Closing**	**Color**	**Texture**	**Inclusions**

	BMG	BMG			
178/328A			black	loam	red clay, stones, charcoal
178A ('79)			dark brown	loam	charcoal
178A ('81)	2-4"	2-7"	dark brown	loam	
178B ('81)	2-7"	3-8"	black	loam	red clay
178TPS('79)			dark brown	loam	charcoal
203A	1-3"	4-6"	reddish brown	loam	
250/328A	5-10"	7-11"	black	loam	red clay, charcoal
328/329B	4-6"	6-8"	black	loam	red clay, charcoal
328B	4-8"	6-14"	black	loam	red clay, stones, charcoal
329/341A	4-7"	6.5-10.5"	brown	loam	red-orange clay, some charcoal
329B	3-7"	5-12"	black	loam	red clay, stones, charcoal
341B	4-7"	5-8"	brown	clay loam	orange red clay
1979-80 Backfill:					
176/341TPS	0"	3-4"	brown	loam	
177/178TPS	0"	4.5-5"	brown	loam	
177/329TPS	0"		reddish orange	clay	brown loam
177K	1-3"	4-6"	slightly reddish brown	loam	
177TPS	0"	2-4"	dark brown	loam	
178/253TPS	0"	5-6"	dark brown	loam	
178/328TPS	0"		reddish orange	clay	brown loam
178TPS	0"	2-4"	red	clay	brown loam
250/328TPS	0"	5-10"	dark brown	loam	
328/329TPS	0"	1-3"	reddish orange	clay	brown loam
328TPS	0"	2-5"	red	clay	brown loam
329/341TPS	0"	4.5-7"	reddish orange	clay	brown loam
329TPS	0"	1-4"	red	clay	brown loam
341TPS	0"	4-7"	reddish orange	clay	brown loam
342/346TPS	0"	5.5-6"	brown	loam	

Appendix 2. Group membership from Doug Sanford's (1981) analysis of the Building *l* site.

Group 1:
Post-1957
176/341A
176A
177/178A
177/178B
177/203A
177/329A
177/329B
177A('79)
177K
178/253A
178/328A
178A
178B
203A
250/328A
250/328B
328/329A
328/329B
328A
328B
329/341A
329A
329B
341A

Group 2:
Destruction - Storehouse
177/178C
177/178D
177/203B
177L
203B
250/328C
328/329C

Group 3:
Occupation - Storehouse
176/177A
176/177B
176B
177/203C
177/329C
177/329D
177B('81)
177C
178/253B
178/328B
178C
203C
328C
329/341B
341B
341C
341D
341E
341F
341G

Group 4:
Nailmaking - Storehouse
176/177C
176/341C
176/341D
176/341E
176C
177/329E
329/341C
329/341D
329/341E
329D
341H
341J

Group 5:
Construction - Storehouse
177D
177G
328/329F
329E

Group 6:
Occupation - Smokehouse/Dairy
178/253C
178/328C
250/328D
328D
329C

Group 7:
Construction - Smokehouse/Dairy
178/253D
250/328E
328E

Group 8:
Original Slope
178/253E
250/328F
328F
329F

Group 9:
Fenceline Postholes
176D
176E
176H
176J
177E
177F
177H
177J
178D
178E

Appendix 3. Total faunal material and the faunal material analyzed by Crader (1984) in the contexts included in the chronology from this analysis.

		Faunal Assemblage:		**Crader Analysis:**	
Context	**CA Dim. 1**	Mass (g)	Count	Mass (g)	Count
341J	-0.876812	93.4	64	0	0
328/329E*	-0.745635	2	6	0	0
328E	-0.531955	8.5	12	0	0
344C	-0.506248	18.1	15	0	0
178/253B	-0.444614	0.2	2	0.2	2
344B	-0.348512	9.3	16	0	0
176G	-0.330106	105.2	51	0	0
342C	-0.156629	0.7	1	0	0
176C	-0.136182	252.5	158	0	0
177C	-0.110848	0	0	0	0
176/341C	-0.083358	20.1	22	0	0
178/328B	-0.069411	6	12	4.5	10
341F	-0.053442	9.8	29	0	0
328D	-0.021967	60.4	20	0	0
176F	-0.013649	618	208	0	0
342/346A	0.015707	0	0	0	0
203C	0.040512	83.8	97	83.8	97
341D	0.044395	268.6	124	268.4	123
343E	0.097914	1.7	1	0	0
328/329D	0.121011	47.3	47	0	0
328C*	0.123905	96.5	50	94.5	49
341E	0.142844	470.5	132	470.3	131
341C	0.185532	404.1	43	276.5	41
176B	0.21225	1652.9	753	1493.7	748
178D	0.227004	13.5	2	0	0
328/329C	0.245019	65.5	105	0	0
203B	0.281421	159	157	159	157
329/341B	0.316915	29.3	28	29.3	28
178C	0.318115	59.7	67	59.7	67
177L	0.64304	363.2	199	363.2	199
176/177A	0.693327	73.9	48	73.1	46

*Oyster shell not analyzed by Crader.

Appendix 4. Contexts assigned to phases of occupations at the Building *l* site.

Early	**Middle**	**Late**	**Unassigned**	
176G	176B	176/177A	176/341B	329L
178/253B	176C	177L	176A	329TPS
328/329E	176F	178C	176TPS	341A
328E	177C		177/178A	341B
341J	178D		177/178B	341G
344B	203B		177/203T	341TPS
344C	203C		177/329A	342/346T
	328/329C		177/329B	342C
	328D		177/329C	342TPS
	341C		177/329T	344TPS
	341D		177A '79	
	341E		177B '81	
	342/346A		177H	
	343E		177K	
			177TPS	
			178/253C	
			178/328A	
			178/328B	
			178/328T	
			178A	
			178B	
			178E	
			203A	
			203TPS	
			250/328A	
			250/328B	
			250/328T	
			328/329A	
			328/329B	
			328A	
			328C	
			328TPS	
			329/341A	
			329/341E	
			329/341T	
			329A	
			329B	
			329D	