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THE LOST WORLD OF MONTICELLO An Evolutionary Perspective

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This essay explores how an evolutionary perspective can help historical archaeologists use archaeological evidence to further our understanding of historical dynamics associated with the global demographic expansions of Europeans and Africans that began in the late fifteenth century. It sketches evolutionary models for some of the economic and social strategies of free and enslaved people that created a slave society in the Chesapeake region in the seventeenth century and conditioned its historical trajectory up to the Civil War. Those strategies informed the choices made by Thomas Jefferson as he developed Monticello Plantation around 1770. Evolutionary models offer tools to unravel the historical significance of subsequent change in slave and elite housing, slave settlement patterns, and agricultural ecology, documented in the archaeological record at Monticello and the region.

THIS ESSAY HAS TWO GOALS. The first is to synthesize recent archaeological research into the cultural dynamics behind architectural, settlement, and land-use change in the greater Chesapeake region during the eighteenth and early nineteenth centuries. The second is to explore how an evolutionary perspective can help historical archaeologists make defensible inferences about the meaning of the artifacts they excavate. The two goals are complementary. After all, a good theory provides the conceptual tools required to solve real-world puzzles. As a result, the bulk of the paper is devoted to a case study centered on Monticello Plantation, a 5,000-acre

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estate that produced tobacco and wheat for Atlantic markets. Monticello is located on the Rivanna River, where the river slices through the Southwest Mountains at the western edge of the Virginia Piedmont (Figure 1). It was home to Thomas Jefferson, his family, and hundreds of enslaved laborers, and their families, between 1770 and Jefferson's death in 1826 (Kelso 1997; Sanford 1994, 1995; Stanton 2000).

In the first portion of the paper, I outline how key elements of the material practices that structured the lives of Jefferson and his slaves at Monticello on the eve of the American Revolution had evolved over the course of the preceding century and a half, in response to changing Atlantic markets and the internal dynamics of Chesapeake society. This sets the stage for the second part of the paper, which is devoted to a more detailed look at changing material practices at Monticello, and the Chesapeake region at large, from the Revolution into the early nineteenth century. The trajectory of change reflected in the archaeological record can be understood as the outcome of strategies invented and pursued by Chesapeake elites and free and enslaved laborers to enhance their own and their families' conflicting fitness interests in changing local and Atlantic contexts.

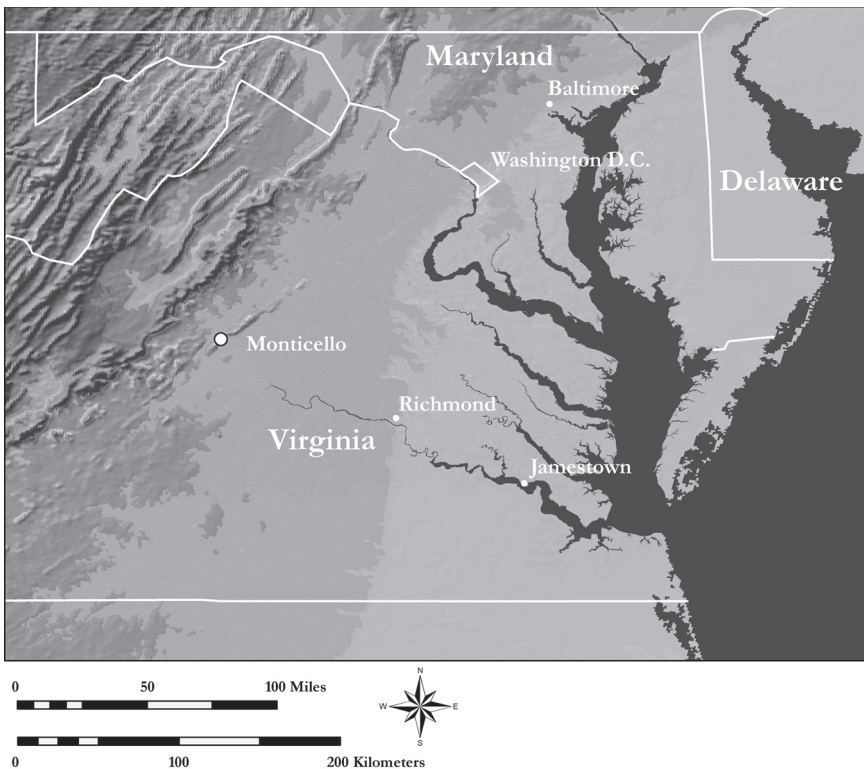


Figure 1. The Chesapeake region. The fall line, running north-south through Richmond (note difference in shading), separates the coastal plain on the east from the piedmont on the west.

HISTORICAL ARCHAEOLOGY

Three decades ago James Deetz defined historical archaeology as the archaeological study of the spread of European culture across the globe, beginning in the fifteenth century, and its impact on native peoples (Deetz 1977:5). Deetz's emphasis on the spread of cultural traditions usefully draws our attention to the movements of people, artifacts, plants, animals, and ideas as key features of the early modern era. The geographic scale and speed of transoceanic migration and exchange inaugurated at the end of the fifteenth century was unprecedented in human history (Crosby 1986; Diamond 1999). However, the movement of Europeans and Africans into the New World was just the most recent of a series of demographic expansions that have profoundly shaped the history of our species. During the Holocene, comparable events included the multiple expansions prompted by the independent advent of agriculture in Southwest Asia, East Asia, and the Americas (Diamond and Bellwood 2003). Sixty thousand years ago, anatomically modern humans spread out of Africa and across the globe (Mellars 2006). On this evolutionary time scale, historical archaeology is the study of encounters and interactions of individuals and groups whose ancestors had parted company when they dispersed from Africa.

This expansive perspective has fruitful and largely unrecognized methodological consequences for the practice of historical archaeology.¹ Evolutionary approaches have been key to improving our understanding of the earlier population expansions. However, so far they have been irrelevant to the most recent one, and to historical archaeology more generally. The importance of population spread points to the need for a theoretical framework that helps us trace the connections among innovations in cultural practices, rates of resource and wealth accumulation, population growth, and the ability of individuals and groups to move to new areas, or to resist such movements. Evolutionary theory offers a powerful explanatory resource since natural selection is the ultimate causal nexus that links these processes (Shennan 2000; Voland 1998).

A LITTLE THEORY

The fundamental idea behind the arguments that follow is that culture is not a separate sphere that exempts humans from evolutionary analysis, but rather an integral part of our biological heritage evolved through natural selection. Human behavioral practices are informed simultaneously by genetically and culturally transmitted variation and thus are outcomes of a complex gene-culture, coevolutionary process (Boyd and Richerson 1985; Cavalli-Sforza and Feldman 1981; Durham 1991). Cultural transmission is ultimately underlain by genetically mediated cognitive adaptations built by natural selection. Natural selection, working on genetic and cultural variation, sculpts human behavioral practices directly. It also works indirectly by building cognitive rules that people use to generate novel practices through individual learning and to decide which socially learned practices they should incorporate into their own repertoires (Henrich and McElreath 2003; Richerson and Boyd 2005). Thanks

to those rules, cultural variation is transmitted and sorted within generations. Thus change, driven ultimately by natural selection, occurs within generations as well as between them.

The methodological promise of the approach lies in its ability to supply models that can help puzzled archaeologists figure out the causal dynamics behind artifact patterning in time and space (Winterhalder 2002). For archaeologists, the powerful insight that links models to variation in the archaeological record is the idea that artifacts—more precisely, certain aspects of artifact morphology—are the “hard parts” of the strategies that individuals and groups use to further their fitness interests (Dunnell 1989:44). This implies that one key to making inferences about the functional significance of formal variation in the archaeological record is to reverse-engineer the role played by artifacts in larger strategies. Archaeological hypotheses about function describe how specific material forms enhanced individual or group fitness in shifting ecological and social circumstances.

Making some simplifying assumptions about gene-culture transmission gives archaeologists access to two powerful kinds of models. Optimization models yield helpful predictions about the strategies that selection is likely to favor when fitness is constant, while game-theoretic models are necessary when fitness changes with strategy frequency within groups (Bird and O’Connell 2006; Smith and Winterhalder 1992). In the latter case, the outcomes can also helpfully be modeled as the result of selection operating at a hierarchy of levels, from individuals to kin groups to groups of unrelated individuals. Selfish strategies are favored by selection among individuals competing within a group; altruistic ones are favored by selection among competing groups (Sober and Wilson 1998). In any case, archaeological hypotheses can be evaluated by checking to see if the trajectories of change in artifacts and the practices they made possible align with independently monitored patterns of change in what the models suggest were the critical contextual variables.

Evolutionary theory implies that key links between artifacts and their historical meaning are ultimately causal. This contrasts with much recent work in archaeology, and especially historical archaeology, which is premised on the idea that the links are symbolic and hence arbitrary. Taken literally, this position implies there is no predictable relationship between artifact patterning and the larger material world in which it occurs. Historical documents are necessary to supply the missing arbitrary links. Neither position encourages serious engagement with archaeological data. This may help explain its near total absence in much recent historical archaeological scholarship (e.g., Hall 2000; Little 2007). Emphasizing the causal connection between artifacts and their meaning both motivates systematic study of variation in the archaeological record and offers helpful clues about what the meanings might be. That in turn makes it much more likely that archaeology can produce knowledge about the past that cannot be gained from documents.

MONTICELLO

In the 1770s Monticello Plantation was a complex social and economic community stretching across several thousand acres. It was controlled by Thomas Jefferson,

whose brick mansion, then still under construction, stood on the terraced top of a small mountain overlooking the rest of the plantation to the east (Figure 2). The mansion represented an enormous amount of effort, extracted from the enslaved and hired workmen who built it and from Thomas Jefferson, whose exacting specifications for its overall massing and decorative details drew on the neo-Palladian styles newly favored by contemporary English elites. Adjacent to the mansion, but detached from it, was a series of outbuildings, including a smokehouse, dairy, laundry, and a brick kitchen, in which enslaved domestics labored to support the elite lifestyle pursued in the house. The log quarters of domestics and their families lay just beyond the kitchen, along Mulberry Row, a 1,000-ft-long street. The plantation was staffed by roughly 120 enslaved workers who grew tobacco on four “quarter farms,” each consisting of a cluster of slave houses along with the adjacent fields in which slaves using swidden techniques grew tobacco for export to European markets.

Slavery, tobacco, quarter farms, fields, outbuildings, log slave quarters, and even the brick mansion itself did not spring fully formed from the head of Jefferson. They were his inheritance from a century and a half of adaptation to the Chesapeake and the larger Atlantic world by English and, later, forced African immigrants. They were the outcomes of a mosaic of selective processes, stretching back across the eighteenth and seventeenth centuries to the establishment of the first English settlement in the Chesapeake at Jamestown. Calling them adaptive does not mean that the outcomes were “good.” Rather it means that, over time, they better served the fitness interests of the elites who dominated Chesapeake society than available alternatives. Those positive effects were ultimately responsible for powering and sustaining the dispersal and reproduction of immigrants across the Chesapeake. Tracing the course of that demic spread offers a window on the processes that created Monticello and plantations like it.

INVASION OF THE CHESAPEAKE

The dispersal of Europeans across the Chesapeake began in 1607 with the founding at Jamestown of what Virginia Company stockholders thought would be a trading post. They had learned of the economic success of European trade castles on the west coast of Africa and in Southwest Asia (Carson et al. 2008; Kupperman 2007). In the case of Jamestown, company agents came equipped to trade copper with native Algonquins. In exchange they hoped to obtain precious metals and other valuables that could be sold in Europe, as well as supplies for their own subsistence. They anticipated using the region’s raw materials to manufacture consumer goods for export, such as glass and tobacco pipes. However, as the recent excavations at Jamestown attest, it was not to be. The detritus from these activities, including snips of trade copper, crucibles, and pipe and glass wasters, is only found in deposits from the first decade of settlement (Kelso 2007).

After a decade of trial and error, colonists had assembled the three key innovations that would drive the spread of settlement across the region. Foremost among these was tobacco, whose high cost attracted English elites looking

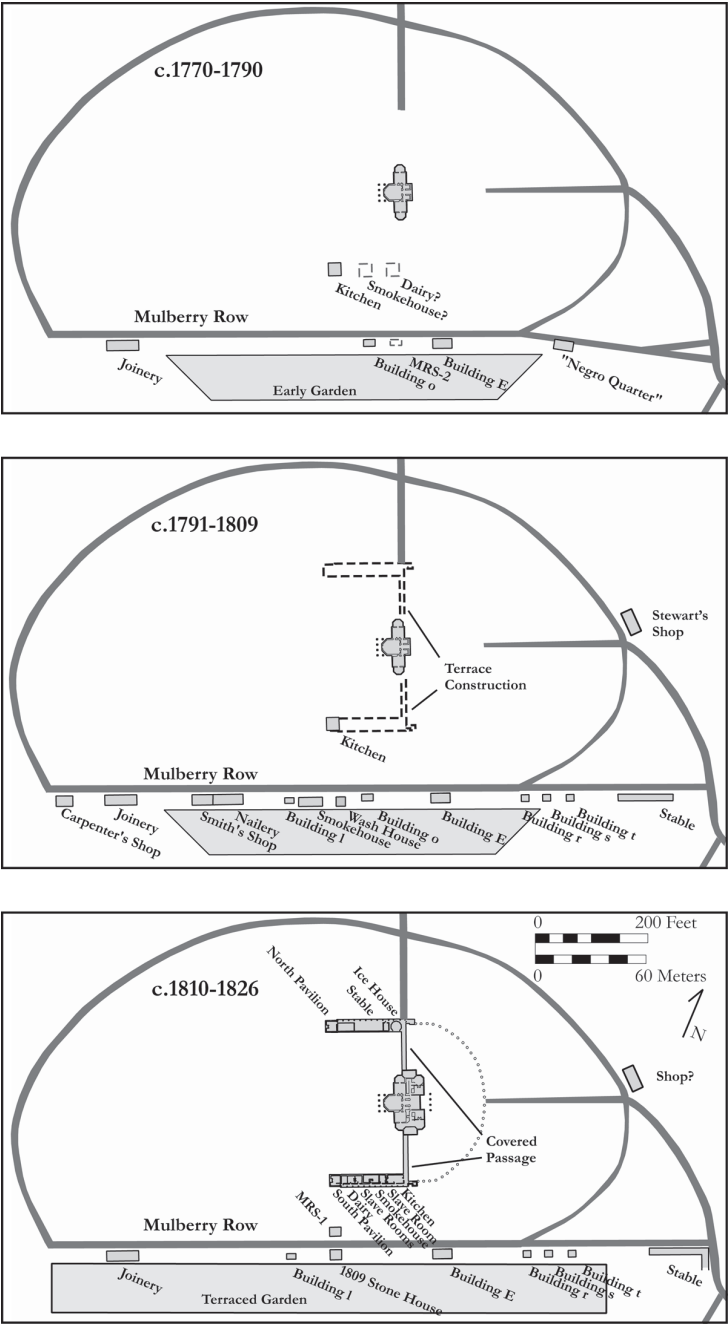


Figure 2. Three temporal phases of the domestic complex at the top of Monticello Mountain during Jefferson's lifetime. Dashed lines show the conjectured locations of outbuildings destroyed by construction of the south terrace wing in the 1790s. They were moved to Mulberry Row during that decade, then to the terrace wing once it had been completed.

for new venues for conspicuous consumption. Second, colonists adopted the natives' swidden agricultural techniques, which were far better adapted to a frontier where labor was scarce and land abundant than traditional English labor-intensive methods. Using hoes to till stump-infested fields minimized the costs of land clearance. Fallowing fields for a decade or more when tobacco yields declined, usually five to seven years after initial cultivation, allowed partial rebound of fertility without the added costs of crop rotation and fertilizer (Earle 1975).

The final ingredient was indentured servitude, a novel credit mechanism that supplied the additional labor required to make individual settlers rich. Servitude allowed prospective English emigrants to sell a contract for their labor for a period five to seven years in return for passage to Chesapeake (Galenson 1981; Horn 1994). The emergence of indentured servitude radically altered settlement strategies. It gave individual tobacco planters access to labor in the Chesapeake. After 1624 servants brought for their owner rights to 50 acres of land. As a result, it became much easier for individuals to establish and maintain their own tobacco farms. This fundamental shift meant that spatially dispersed, family-owned plantations, not corporate settlements patterned after the original Virginia Company's initial effort at James Fort, would be the basis of Chesapeake settlement organization (Kelly 1979). It also guaranteed that kin selection would be the primary integrative force in early Chesapeake society, in contrast to New England where institutions like the town and church were designed to increase the fitness of all group members by suppressing some aspects of competition among their members. The contrast helps explain why the seventeenth-century Chesapeake was characterized by high levels of political violence and, as we shall see, self-serving behavior by elites and their kin toward laborers (e.g., Morgan 1975; Washburn 1957). Once these three ingredients were in place, family-based plantations spread rapidly out of the James River basin.

SETTLEMENT SPREAD

A simple way to chart the changing rate of spread across the region over the ensuing two centuries is to plot the cumulative number of administrative units—counties and parishes—against time (Figure 3). Up until 1670, spread was rapid, as settlers preferentially patented land on navigable water, east of the fall line which separates the coastal plain from the piedmont. By 1670 this resource patch, which allowed easy access to ocean-going ships and English markets, had been exhausted. The spread slowed as settlement density began to increase in place within the coastal plain, as the interior regions of the major peninsulas were occupied. Around 1720, once the carrying capacity of the coastal plain had been reached, dispersal rates increased again and settlement moved west of the fall line and into the piedmont (Graham et al. 2007; Neiman 1990). It was during the 1720s that Thomas Jefferson's father, Peter Jefferson, moved from his birthplace in Henrico County, at the fall line, into Goochland County in the piedmont. In the 1730s he moved to the tract in Albemarle County that his son Thomas would call Monticello Plantation.

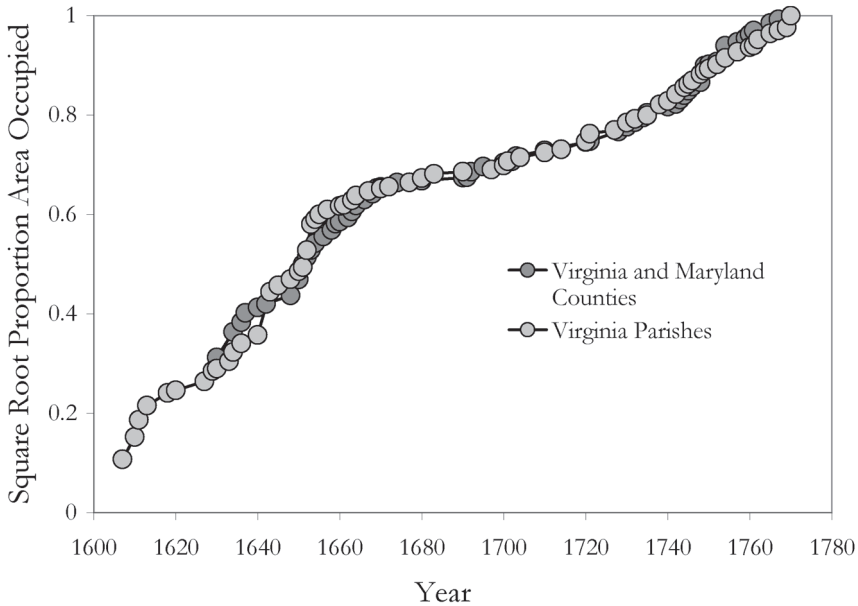


Figure 3. Changing rates of settlement expansion in the Chesapeake, as indicated by the number of Virginia and Maryland counties and Virginia parishes in existence at a given date, re-expressed as a proportion of those in existence in 1775. Taking the square root linearizes the area measure.

SLAVERY

The spread of settlement and the growing wave of population behind it were the outcome of continuing adaptation by Chesapeake immigrants to changing local and Atlantic economic environments. For plantation owners, access to land and labor and gains in labor productivity were the critical determinants of fitness. The most fundamental adaptive shift, affecting all three, occurred in the latter half of the seventeenth century. It was the adoption of slavery. The availability of land on the Chesapeake frontier meant that the wages attractive to free laborers had to exceed what they could expect to make by growing tobacco themselves. But paying wages at that level made wealth accumulation impossible. Sustained accumulation of wealth in the Chesapeake, and elsewhere in the New World, depended on the availability of laborers who were coerced (Conning 2004; Domar 1970). The Atlantic slave trade, and the Africans it supplied, were the key to the long-term economic success of European-derived societies of the New World (Solow 1991).

Before mid century, prospective English servants were willing to sell their labor in the Chesapeake at a discount. From the sixteenth to the mid-seventeenth centuries, rising population levels and wheat prices and declining real wages in England made emigration an attractive strategy for landless laborers (Allen 2001; Fischer 1996; Wrigley et al. 1997). And initially the Chesapeake was an attractive

destination, since tobacco prices were high and land was available (Carr and Menard 1979; Menard 1980). But even with the discount, slaves were a better investment. Before 1660 only a small number of elite planters who had social connections to the Atlantic slave trade, through the Caribbean, were able to take advantage of it (Coombs 2003). They alone had predominantly slave labor forces. By mid century, conditions in England were improving. Trends in population growth, wages, and wheat prices had reversed. At the same time, tobacco prices were declining and land was becoming more difficult to acquire, decreasing the attractiveness of the Chesapeake. As supply of servants went down and their prices went up, the demand for slaves increased. Increased efficiencies in the Atlantic slave trade soon made captive Africans available to all Chesapeake planters who could afford them. By 1700 slaves had nearly entirely replaced servants in the region's tobacco fields (Galenson 1991; Menard 1977). Slavery eclipsed servitude in the Chesapeake and elsewhere in the New World because, over the long term, it lowered labor costs and increased rates of wealth accumulation, wealth that slave owners could ultimately translate into enhanced reproductive prospects for themselves and their kin.

Coercion is fundamental to slavery because it enables owners to benefit from the labor of enslaved people while minimizing the cost. Since slavery is a form of social parasitism, it should be subject to the same kinds of coevolutionary "arms races" as other host-parasite systems. Natural selection favors resistance in hosts, countermeasures in parasites, more resistance, more countermeasures, and so on (e.g., Anderson and May 1982; Foitzick et al. 2003). *Resistance* here refers specifically to strategies enslaved people use to channel the benefits of their labor from parasitic owners to themselves and their families. The coevolutionary perspective has important implications for the archaeological study of slave societies. Selection in favor of resistance, in this theorized sense, is inevitable, but most resistance is likely to leave little or no direct material trace, precisely because enslaved people engineer their strategies to be covert.² This "arms race" implies that the best place to look for traces of resistance is in the durable architectural strategies that slave owners designed as countermeasures.

ARCHITECTURAL SEGREGATION

Pressure for greater profits through lower labor costs, the ensuing transition to slavery, and slave resistance all left their marks on the strategies that labor owners employed to partition their domestic architectural space and arrange activities within it. For much of the seventeenth century, some wealthy planters built houses whose plans were founded on traditional sixteenth-century English farmhouses, which included service rooms for bulk processing and storage of food, and kitchens for its preparation (Johnson 1991; Mercer 1975). However, as the century wore on, the work spaces used by domestic servants and slaves were less frequently incorporated into the houses of their owners. By placing bulk processing of meat and milk, and cooking, in separate structures—smokehouses, dairies, and kitchens—owners could more efficiently monitor and control laborer access to them and to their own domestic space (Neiman 1990, 1993).

A parallel trend is evident in the location of living spaces for laborers. Until the late seventeenth century, many owners housed laborers in the family dwelling or fed them as household members. Separate houses or quarters for servants and slaves increased in frequency in the late seventeenth century (Carson 1978; Neiman 1993). Forcing laborers into separate houses was a way to reduce feeding and housing costs, and limit laborer access to elite resources. Laborer houses were increasingly likely to have multiple small cellars dug beneath their floors. The selective dynamics favoring multiple subfloor pits are complex and will be dealt with later in this paper. Their appearance registers a novel strategy for provisioning laborers, now mostly enslaved, on large plantations. By giving individual laborers a cheap weekly food ration, typically consisting of salt pork and maize, owners not only lowered the cost of provisions, they forced laborers to assume the costs of their own food preparation. Laborers had to keep their weekly ration safe, and the pits were a solution. Faunal samples from large plantations also register the new provisioning strategy: frequencies of pigs, relative to cows, increased at the end of the seventeenth century (Graham et al. 2007).

HOUSE PLANS AND SURVEILLANCE

Enslaved house servants were essential to domestic rituals of conspicuous consumption, including food preparation and service, critical strategies in elite social competition. But this gave enslaved domestics easier access to elite households and opened opportunities for resistance. Elites who embraced slavery benefited further if they found ways to arrange their domestic space so they could monitor and control the movement of enslaved domestics. The resulting countermeasures can be seen in changes in elite house plans during the latter half of the seventeenth century. For much of the century, some owners built houses in which the two main rooms (the hall and parlor) were separated by an H-shaped fireplace between them (Figure 4). The two main interior spaces were accessed through a small lobby entry adjacent to the fireplace. This lobby-entry plan disappeared from the Chesapeake architectural repertoire in the late seventeenth century and was eclipsed by a two-cell, end-chimney plan in which the hall was entered directly from the outside, and the parlor entered from the hall.

From an engineering perspective, the defective feature of the lobby-entry plan in the context of slavery was the difficulty owners had observing the movement of domestics within the house. The central chimney and lobby nearly eliminated sight lines between the rooms, making it difficult to monitor activities in one room from the other. In addition, the small size of the lobby meant there were large opportunity costs for individuals attempting to monitor access to both larger rooms from it. The two-cell, end-chimney plan did not share these defects. Direct entry into the large room lowered the opportunity costs of monitoring access to the house. A door, located along the partition between the two rooms, provided better sight lines between them and ensured that more space in one room was visible from more space in the other. By the early eighteenth century, as wealth from slavery and competition among elites increased, slave owners were building larger houses, some of them two rooms deep. These usually featured entry into a

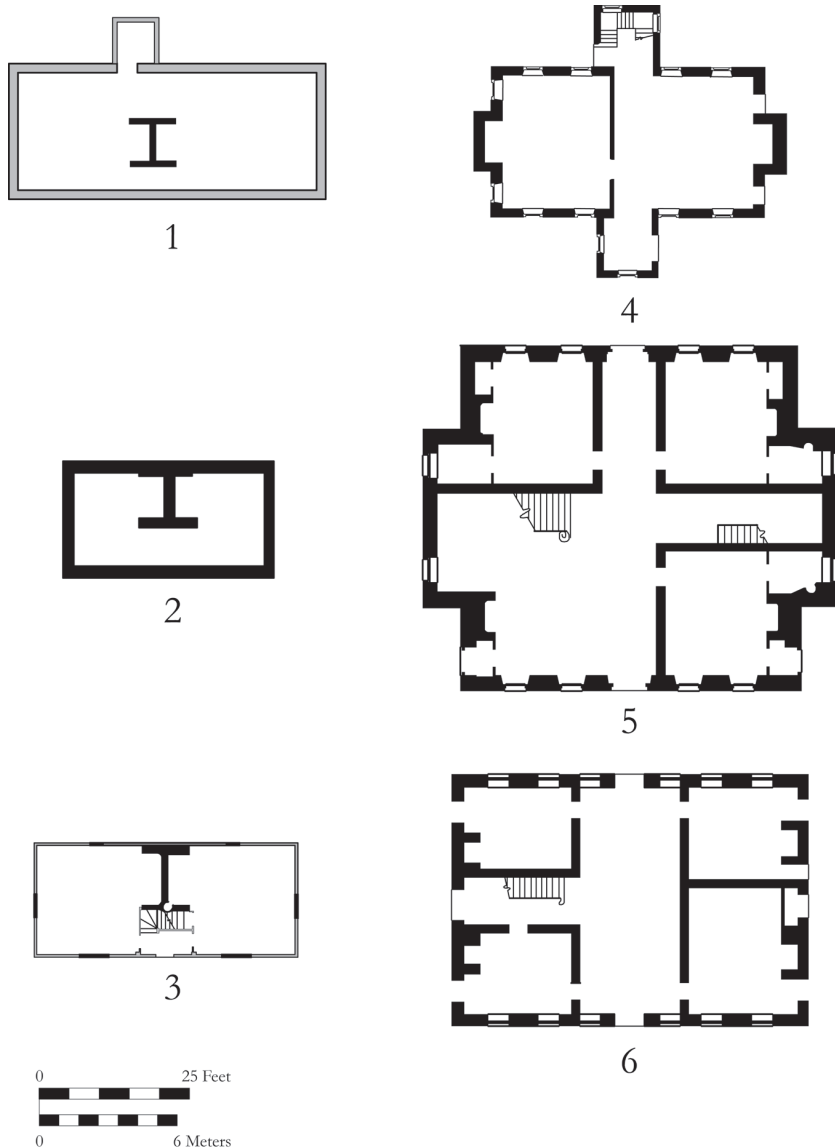


Figure 4. Examples of elite house plans from the seventeenth and early eighteenth centuries.

(1) Archaeological plan of St. John's, a lobby-entry house built ca. 1640 by John Lewgar, secretary of the Maryland colony in St. Mary's City. St John's had a cobble stone foundation, but the frame was wood. (2) Archaeological plan of Richneck, a lobby-entry house built ca. 1640 by Richard Kemp, secretary of the Virginia colony. One of the earliest brick houses in the Chesapeake. (3) Architectural plan of the late-seventeenth-century Thomas Lee house, Lyme, Connecticut. Note the interior partitions, typical of a lobby-entry plan, which made surveillance difficult. (4) Architectural plan of Bacon's Castle, built in 1665 by "merchant" Arthur Allen. It features the two-room, end-chimney plan that dominated gentry housing in the next century. (5) Architectural plan of Rosewell, built by slave owner Mann Page ca. 1720, the largest brick mansion built in the Chesapeake to that date. (6) Architectural plan of Sabine Hall, built by slave owner Landon Carter ca. 1740.

large central passage, running the width of the house, from which entry into the structure and into the rooms to the side could be easily observed, and in which the passage could be easily observed from the rooms on either side.

PLANTATION SPATIAL ORGANIZATION

Slavery led to the invention and spread of new strategies of plantation spatial organization. For much of the seventeenth century, the wealthiest Chesapeake planters owned twenty to thirty indentured servants and a few slaves (Galenson 1991). Laborers typically were housed in a single settlement cluster, often adjacent to the owner's own dwelling. By the early eighteenth century, the wealthiest planters owned hundreds of slaves who were housed and managed in smaller groups on multiple satellite farms, each with a resident overseer. These smaller units were called "quarter farms"; the quarter farm adjacent to the owner's dwelling was the "home farm" (Neiman 1993). The increase in the size of the largest plantations can be traced to two factors. Many slaveholders plowed large profits back into the purchase of additional slaves. Chesapeake slaves, unlike slaves elsewhere in the New World, achieved reproductive rates sufficient for natural increase. Pressure on slave owners to divide large numbers of slaves into smaller groups arose from two sources. First, operation of the swidden system required roughly 20 acres of arable land for each laborer (Earle 1975). As labor forces grew, it therefore became less efficient for planters to house laborers in a single settlement cluster. In addition, gangs of laborers tending tobacco required close supervision to ensure a marketable, high-quality product. This increased pressure to limit the size of the field gangs under the management of a single overseer (Morgan 1998). The new quarter-farm settlement system maximized the spatial and management efficiency of tobacco production.

ARCHITECTURAL SIGNALS

Slavery, architectural segregation, and house plans rigged for surveillance were all designed to increase rates at which planters accumulated wealth and ultimately fitness for themselves and their families. Their success should be manifest in patterns of conspicuous consumption across the seventeenth century. Evolutionary models suggest how. They predict that the signals of wealth that individuals use to deter competitors and attract mates and allies should be costly, so they cannot be faked by inferior competitors (Boone 1998; Grafen 1990a, 1990b; Johnstone 1997). Signal cost should be set by the level of wealth of the signaler and the payoff to a given level of signal, which in turn is determined by audience size and prior familiarity. As wealth of the signaler and audience size and unfamiliarity increase, so should signal cost (Neiman 1997).

In the historical context of the early Chesapeake, all-brick dwellings were effective costly signals. For much of the seventeenth century, the majority of tobacco planters chose to build their houses entirely of wood, with the principal vertical support posts buried in the ground. Less frequently, they constructed foundation walls of locally collected and dry-laid cobbles or imported ballast, and

topped them with box frames. Cheap architectural technologies like these were adaptations to the high labor costs that, as we have seen, are typical of frontiers where land was plentiful (Domar 1970). A second critical factor was heavy future discounting, owing both to high returns on immediate investments in productive infrastructure and to uncertainty about the future in the context of high morbidity and mortality (Carson et al. 1981; Graham et al. 2007).

Slavery, segregation, and surveillance increased both the ability and the incentive of elites to pay the heavy costs of brick. The predictable result was an increase in both the frequency and size of all-brick houses in the late seventeenth and early eighteenth centuries. Compare, for example, St. Johns, a modest frame farmhouse built on dry-laid cobble foundation around 1640 by John Lewgar, secretary of the Maryland colony, with Sabine Hall, a two-story brick mansion built by slave owner Landon Carter just across the Potomac River and roughly a century later (Figure 4). The earliest all-brick plantation houses were built by planters who were early adopters of slavery, had the widest social networks extending into the Atlantic economy, or both (e.g., Luccketti 1999; Muraca et al. 2003). Their children and grandchildren would comprise much of the slave-owning aristocracy of the eighteenth century (Bailyn 1959). Further increases in wealth and the geographic scale of their social and political networks in the later eighteenth century would lead them to build even larger mansions, decked out with ever-increasing amounts of costly neoclassical architectural ornament.

MONTICELLO AGAIN

The selective dynamics of the seventeenth century sculpted novel ways in which Chesapeake elites organized tobacco production, arranged activities and buildings within domestic complexes, built costly houses, and partitioned living space within them. When English and African settlement began to move into the piedmont around 1720, the movement was driven by this package of functionally linked strategies. Thomas Jefferson's father took advantage of them when in the 1730s, as part of the wave advancing into the piedmont, he patented and then settled the tract of land his son would later call Monticello. Peter established his home farm at Shadwell on the eastern edge of the tract, where archaeology has revealed the remains of a stylish frame dwelling with a brick cellar and twin brick chimneys, a separate log kitchen, and log slave housing (Kern 2005). He set up several outlying quarter farms, one of them on what his son would call Monticello Mountain, two miles to the west.

Thomas Jefferson inherited his father's land and slaves, and the strategies for organizing and managing them that had evolved over the previous century and a half. Integral parts of that inheritance were the motive and means to construct his own brick mansion, with an adjacent suite of service buildings and slave houses. What was novel about Monticello lay in the design and ornament of the mansion itself. It owed far more to European neoclassical sources than most houses of Jefferson's peers or his father's, and thus cost far more to plan and construct. Its location on the summit of Monticello Mountain made it even more costly to build and maintain. The greater cost was an index of the greater size of the social

and political networks in which the younger Jefferson participated. Monticello Mountain thus became Jefferson's home farm. Shadwell became an outlying quarter farm, and it was later joined by two adjacent quarter farms, Tufton and Lego. The increased scale of tobacco cultivation was made possible by the arrival in 1774 of an additional 135 slaves, an inheritance from Jefferson's wife's father (Stanton 2000).

Thus far I have tried to show how an evolutionary approach can help us understand the broad trajectory of change in the material practices that Chesapeake elites invented and refined to further their and their families' fitness interests over the seventeenth and early eighteenth centuries, in the context of changing Atlantic economic conditions. In the remainder of the paper, I use the same approach to explore in greater detail strategic interactions between elites and enslaved laborers during the late eighteenth and early nineteenth centuries. We have seen how changes in the Atlantic economy affected elite economic and social strategies. Less apparent, but just as important, is how change in elite strategies altered the selective environment in which enslaved laborers lived, and how the strategies that enslaved people invented to pursue their fitness interests in turn affected elites.

The last decades of the eighteenth century would be tumultuous ones for Chesapeake slave owners. The American Revolution disrupted the tobacco export economy for nearly a decade (Walsh 1993). But more far-reaching were the demographic and economic shifts underway in Europe, starting around 1750. After a century of stagnation, English population growth resumed, sparked by improvements in agricultural productivity (Wrigley et al. 1997). As a result, wheat prices began a long-term increase. The increase would accelerate with the advent of the French Revolution and the ensuing Napoleonic Wars, which shut down agricultural production and commerce in large parts of Europe (Fischer 1996). Simultaneously, Virginia tobacco was faced with increased competition from European growers (Walsh 1993). As a result, many Chesapeake tobacco planters, especially those located on less-productive land, diversified their agricultural production to include wheat. Some gave up growing tobacco entirely. Jefferson grew his first wheat crop in 1793 at Monticello. Wheat remained the primary export crop at Monticello until Jefferson's death in 1826, although Jefferson continued to grow tobacco in years when he thought he could make a profit. Economic diversification was clearly an adaptation by slave-owning elites to shifting conditions in the Atlantic market. Less clear are the effects of this adaptation on the strategies that slave owners employed to manage enslaved laborers and the extent to which enslaved laborers might have been able to invent novel ways to pursue their own and their families' interests in this altered environment.

SLAVE HOUSING AT MONTICELLO

A start in clarifying this issue can be made by examining the pattern of change in slave housing at Monticello from ca. 1770 to 1820. The most complete evidence available to date comes from Mulberry Row, the thousand-foot-long street of outbuildings adjacent to Jefferson's mansion. There are archaeological data for the configuration of fourteen dwellings inhabited by enslaved people, most of

them artisans and domestics (Table 1). The size of rooms within these structures is a critical variable that is correlated with the number of individuals occupying each household and may indicate the extent of crowding. A plot of room size against estimated construction date reveals a U-shaped trajectory. Two buildings date from the 1770s. The three rooms comprising these buildings are large, in the 215- to 260-sq-ft range. In the 1790s room size declines dramatically to around 140 sq ft, and then it increases again around 1810 (Figure 5).

An engineering approach suggests two hypotheses for the decline in room size. If residential group size remained unchanged, then the smaller room sizes of the 1790s would imply that slaves were now housed at higher densities, a circumstance that would represent a decline in living standards. On the other hand, the decrease in room size might be functionally linked to decreased group size. In this second hypothesis, smaller rooms represent an increase in the frequency with which Mulberry Row residents were able to live in smaller groups, over whose membership they now had greater control, and perhaps a modal choice to live in kin-based groups. The larger rooms of the 1800s would then represent an increase in the amount of space available to these smaller groups. Evaluating these alternatives requires independent archaeological evidence that might be sensitive to the extent to which enslaved individuals controlled residence-group membership. That evidence can be found in the subfloor pits of the Mulberry Row houses.

Subfloor Pits

To see the relevance of subfloor pits requires a brief digression. For the past three decades, archaeologists working in the Chesapeake have discovered that during the eighteenth century enslaved Africans and their descendents typically

TABLE 1
Occupation dates, dimensions, and number of subfloor pits
for slave dwellings along Mulberry Row, Monticello

Structure	Occupation Span	Dimensions (ft)	Number of Pits
Negro Quarter	1770–1790	17 × 34	4
Building o	1775–1800	12 × 20.5	2
MRS 2	1770–1800	Unknown	1
Building l	1790–1830	10.5 × 16	0
Building r	1793–1830	12 × 14	0
Building s	1793–1830	12 × 14	1
Building t	1793–1830	12 × 14	1
South Terrace 1	1800–1830	10.5 × 14.5	0
South Terrace 2	1800–1830	13 × 12	0
South Terrace 3	1800–1830	13 × 13	0
1809 Stone House	1809–1830	17.5 × 21	0
MRS 1	1809–1830	16 × 20	0

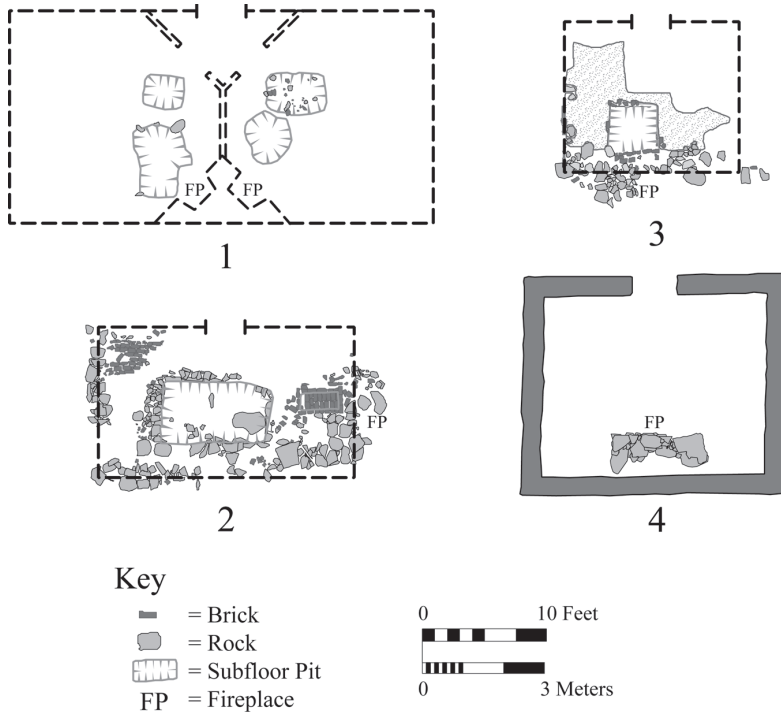


Figure 5. Archaeological plans of four slave houses built on Mulberry Row during Jefferson's lifetime.

(1) "Negro quarter," ca. 1770: a log house, lacking a stone foundation, with four subfloor pits. (2) Building o, ca. 1775: a log house on a stone foundation, with two subfloor pits. (3) Building s, 1793: a log house on a stone foundation with a single subfloor pit. (4) The 1809 Stone House, a stone dwelling lacking a subfloor pit.

dug multiple pits beneath the floors of their dwellings (e.g., Fesler 2004; Kelso 1984; McKee 1992; Samford 1996, 1999, 2000). These features vary from roughly 3×3 ft to 4×6 ft in plan, and from 1 to 3 ft deep. Some are lined with wood or occasionally brick, others not. Up to eighteen pits have been found under a single structure (Kelso 1984). The historical significance of these features remains a contentious matter (Fesler 2004; Samford 1999, 2000). The fact that multiple pits are ubiquitous in the Chesapeake, but unknown on slave sites in South Carolina and the Caribbean, and on contemporary sites in West Africa, suggests that the pits are not Africanisms (Armstrong 1990, 1999; DeCorse 2001; Ferguson 1992; Higman 1998). Rather, they are likely an adaptation to environmental or social circumstances that were unique to the Chesapeake.

Safe-Deposit Boxes

The adaptive hypothesis I offer here is that the pits were "safe-deposit boxes." They were clever inventions by enslaved people to increase the security of the food ration with which they were provisioned on a weekly basis and of

other personal resources. Building and maintaining a pit forced anyone wishing to access its contents to remove the board covering, enter the pit, remove items, and then replace the board covering. Subfloor pits achieved their security function by increasing the chances that individuals accessing others' personal belongings would be observed and accurately identified. Their enslaved builders engineered subfloor pits to increase the reliability of social knowledge about others' past behavior. The safe-deposit hypothesis raises two critical questions. First, why might security of personal belongings have been especially problematic in the Chesapeake? And second, how exactly does more accurate knowledge about others' behavior help to solve the problem? Recently developed game-theoretic models of the evolution of cooperation within groups provide answers to both questions, answers which can be used to evaluate the hypothesis.

Translated into the argot of evolutionary game theory, the first question is about the conditions under which members of a group are likely to choose social strategies that benefit themselves at the expense of other group members (defection) over strategies that might benefit the group as a whole (cooperation). Game-theoretic models show that when individuals are *randomly* assigned to groups, selection always favors defection over cooperation. Cooperation is only favored when interactions are correlated, with cooperators more likely to interact with cooperators and defectors more likely to interact with defectors (Dugatkin 1998; Sober and Wilson 1998). The required correlation can be achieved in several ways, among them relatedness among individuals and the ability of cooperators to choose to interact with other cooperators. Applied to the issue of housing, the models indicate the security of personal belongings should scale with the extent to which co-residents are related to one another and the extent to which they are able to choose residence partners on the basis of whether or not they have proven trustworthy social allies in the past.

Game theory is also relevant to modeling how subfloor pits might have provided a solution to the security problem. In the absence of kin-based altruism and partner choice, one avenue to conditional cooperation is indirect reciprocity, in which individuals in a population continually assess others' reputations or standing and adopt conditional strategies that take advantage of this information (Alexander 1987; Sugden 1986). A particularly clever conditional strategy is the *standing strategy*, in which individuals cooperate with others who are in good standing, while defecting on those in bad standing. Defecting on individuals who are in good standing places one in bad standing, while defecting on individuals in bad standing leaves one's standing unchanged. Within groups initially dominated by defectors, selection can favor the standing strategy. In addition, the standing strategy is evolutionarily stable, in the sense that once it is predominant in a group, selection will not favor an alternative (Liemar and Hammerstein 2001; Panchanathan and Boyd 2003). Of particular relevance to the subfloor pit case is the sensitivity of the dynamics to the probability that individuals accurately know the standing of others. Groups dominated by defectors are more easily invaded by the standing strategy when reputations are widely and accurately known (Panchanathan and Boyd 2003). Subfloor pits would increase the extent and accuracy of the knowledge of past strategic choices that are necessary for

selection to favor conditionally cooperative strategies within groups. In other words, the game-theoretic models suggest that subfloor pits were the “hard parts” of strategies invented by Chesapeake slaves to bootstrap residential group morality in the absence of choice over residence group membership.

Monticello Pits

If the safe-deposit-box hypothesis is correct, then we can use the pattern of subfloor pit occurrence at Monticello to evaluate the two hypotheses about change in room size. If smaller rooms represent an increase in the ability of enslaved people to make choices about co-residents and a modal choice to live in smaller, family-based groups, we would expect that subfloor pits would become less important to Mulberry Row’s residents from the 1790s on. On the other hand, if smaller rooms simply mean greater crowding, with no change in residential group size or organization, then the pits should be ubiquitous across the room-size change. At Monticello the frequency of subfloor pits declines over time (Table 1). The argument thus indicates that the 1790s witnessed a housing revolution of sorts on Mulberry Row, in which more slaves were able to live in smaller, probably family-based groups over whose membership they had greater control.

Comparative evidence from a region-wide sample of 45 excavated slave houses (DAACS 2007; Fesler 2004; Samford 1996, 2000) indicates that this shift was not unique to Monticello. Site occupations range from the beginning of the eighteenth century, when multiple pits first appear in the Chesapeake, to the Civil War (Figure 6). The regional sample reveals that for most of the eighteenth century, Chesapeake slaves were housed in sizable structures, suggesting that the majority of Chesapeake slaves lived in large groups, consisting of multiple families and unrelated individuals. The regional sample indicates that this situation began to change in the last quarter of the eighteenth century. This period saw the appearance for the first time of many single-cell slave houses in the 140- to 200-sq-ft range. This matches the pattern of change in room size we have discerned on Mulberry Row.

If the safe-deposit-box hypothesis is correct, then we should also see a sharp decline in the frequency of subfloor pits throughout the Chesapeake at the end of the century, just as we do on Mulberry Row. The data from the regional sample reveal that this expectation is met. Multiple subfloor pits, which are typical of Chesapeake slave housing across the eighteenth century, disappear from the sample in the last quarter of the century. So the housing revolution on Mulberry Row was not unique. Although there were doubtless exceptions to the trend, the regional sample indicates that similar changes, representing an increase in the ability of slaves to choose residence partners and the choice to live in smaller, family-based groups, were afoot at a regional scale.

The safe-deposit-box hypothesis explains why multiple subfloor pits are absent in the South Carolina Low Country and the Caribbean. Slave settlements were far larger in these regions and typically comprised scores of houses that were smaller than their contemporaries in Virginia (Armstrong 1990; Ferguson 1992; Higman 1998). Larger group size made it more likely that a small proportion of individuals pursuing cooperative strategies could find reliable partners within the settlement, while the multiplicity of houses raised the odds they could live

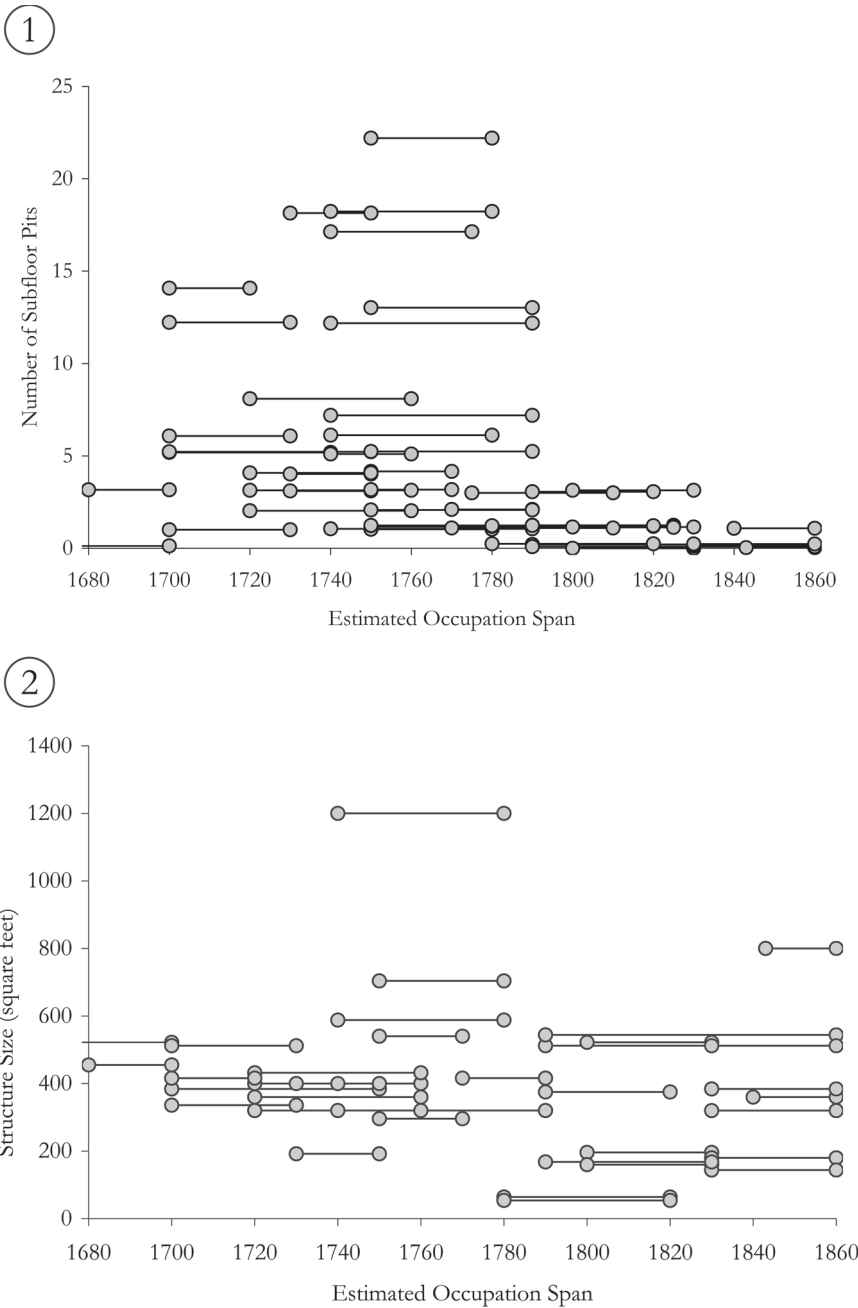


Figure 6. (1) Number of subfloor pits under each dwelling plotted against beginning and ending occupation dates. (2) Floor area of slave dwellings in the Chesapeake plotted against beginning and ending occupation dates.

together (Eschel and Cavalli-Sforza 1982; Hruschka and Henrich 2005). The inter-regional comparison is important because it suggests that it is the inability to choose residence partners, and not the absence of kin ties, that is the crucial variable behind the proliferation of subfloor pits in the Chesapeake.

LABOR MANAGEMENT

From an evolutionary perspective, an explanation for the Chesapeake trend must consider explicitly the conflicting strategic interests of slave owners and slaves. The safe-deposit-box hypothesis implies that the change represented an improvement in living conditions for enslaved people. They gained greater control over the social environments in which they lived. But this came at a cost to slave owners. New buildings had to be constructed to achieve it. This is particularly puzzling, given the ascendancy over the previous 150 years of strategies aimed at reducing the costs of housing and feeding laborers. What changes in the larger historical context might have increased the effectiveness of slaves in negotiating with owners for marginal improvements in their lives—in this case, housing arrangements?

One factor may have been the increase in relatedness among slaves across the eighteenth century, both in the region at large and at Monticello. In 1700 roughly half of Virginia slaves were born in Virginia. By mid century, 80% were, and by 1790, 98% were (Morgan 1998). The increased density of kin ties, especially on large plantations, meant that it became easier for enslaved people to build and maintain kin-based social coalitions to pressure for change. But that can only be part of the story, since it does not explain why, only at the end of the century, slave owners would see it in their interest to accede to the pressure.

The hypothesis I propose here draws on a simple model of labor management strategies in slave societies. It begins with the assumption that coercion and physical violence ultimately lie behind all slave-labor systems. However, there may be variation in the extent to which owners use negative or positive incentives, or both, to motivate work. Owners can punish slaves who do not work or reward slaves who do (Chwe 1990; Fenoaltea 1986; Findlay 1975). Owners should choose the mix of negative and positive incentives that maximizes their own fitness. Enslaved workers should choose to work or not according to their fitness interests as well. The application of both positive and negative incentives requires owners to determine if work demands have been met. But work assessments are prone to error: owners may mistake work for non-work and non-work for work. Variation in the error rate associated with different kinds of labor is a key factor influencing positive or negative incentives. With a high error rate and negative incentives, slaves who work are punished and slaves who do not work are not punished. Both factors reduce the effectiveness of the incentive system, but the former also reduces the work capacity of the labor force and the average productivity of those who work. In contrast, with positive incentives, high error rates simply reduce incentive effectiveness, but not the physical capacity of slaves. The model predicts that when error rates increase, owners who rely more on positive rewards and less on punishment will do better. Error rates are correlated with a second strategic choice for owners: whether to monitor the labor process itself or to inspect

the work product. Key determinants of the cost of these different surveillance strategies are the size of groups in which work is performed and the complexity of the labor process: large labor groups and simple tasks make process-monitoring the cheaper alternative for owners.

The costs of monitoring product or process and the error rates of the resulting determinations will vary on the basis of the kinds of work slaves do. When work requires slaves to be assembled in large groups, all of whom perform relatively simple, repetitive tasks in the same place, the costs of monitoring the labor process and the error rates associated with assessment of work will be low. The model predicts negative incentives will be favored. On the other hand, when work must be done by small groups, widely scattered on the landscape, the costs of monitoring the labor process will be prohibitive. Owners will do better if they inspect the end product. But assessments of work products are more likely to be wrong, especially when products require more skill, discretion, and judgment. Consider, for example, the difficulty of correctly judging whether manure has been evenly applied on a large field, or whether a plow has been properly welded, versus whether one member of a hoe gang was falling behind.

This example is not accidental. It captures just one of the contrasts between the kinds of work that slaves were forced to do under both the tobacco monoculture and the diversified agriculture regime centered on wheat. As we have seen, tobacco was produced in a hoe-based swidden system. Labor tasks were relatively simple and physically demanding, requiring the work of modest-sized gangs, all of whose members did more or less the same thing in the same place. Variation in slave work tasks followed the seasonal demands of the tobacco crop and therefore could be scheduled sequentially. Sequential task scheduling and gang labor meant that surveillance costs were low, and it was easy for owners and overseers to accurately identify individuals who were not working and administer the physical punishments on which a negative-incentive system relies.

Diversified agriculture centered on wheat brought with it very different kinds of work (Walsh 1995; Morgan 1998). It required plows, which in turn required smithing facilities to maintain them and draft animals to pull them, and skilled plowmen to operate them. Smithing required skilled smiths. Draft animals required slaves specializing in their care. Animals required fodder crops. Plowing required permanent fields, and thus the demise of the swidden system. Permanent fields required manuring and crop rotations to maintain soil fertility. Grain, fodder, and manure all required carting, which meant wagon makers and drivers, and more draft animals. Some slave owners, like Jefferson, attempted to increase profits from wheat by exporting it as flour, not raw grain. This strategy required mills and millers, as well as more carts and draft animals. Getting these novel and diverse kinds of work done required slave owners to abandon labor gangs and sequential task scheduling. Success at diversified agriculture required small groups of enslaved workers, each performing different tasks simultaneously at different places on the agricultural landscape. In addition, many of the new tasks required far more skill and discretion than hoeing tobacco. A passage from the diary of Landon Carter, a wealthy slave owner and contemporary of Jefferson, offers compelling evidence for the resulting novel pressures on managerial

strategies and how slave owners registered them. Carter's Sabine Hall plantation was located between the Rappahannock and Potomac rivers. He was an early adopter of diversification, and of growing tobacco and wheat simultaneously. In 1770 Carter wrote:

I rode afterwards to see my pea gatherers and found, notwithstanding, my 11 hay gatherers were put to assist them, there were only 27 people. 6 were sick. 3 were finishing scaffolding the tobacco, 3 with Manuel clearing the grass before his plow. 2 filling up the tobacco house floor; and 3 nay 4 Suckering and topping. Thus it is and has been, at no other work can the hands be kept together but at the hoe (Greene 1965:496).

By "people" Carter meant slaves. "Suckering" and "topping" are ways of trimming tobacco plants to make them more productive. The critical passage is the complaint Carter registers in the last sentence and its implication that on diversified plantations, financial success and large labor gangs were incompatible. Less obvious in this passage, but clear elsewhere in Carter's writing, is his recognition of Manuel's extraordinary skill with the plow.

For slave owners who undertook it, the transition from tobacco monoculture to diversified agriculture centered on wheat sent the costs of monitoring labor processes skyrocketing, both because work group size went down and because the complexity of many tasks went up. This forced slave owners to increase their reliance on inspection of completed work products, with error rates further increased by the greater skill and discretion required. The foregoing model suggests these are precisely the conditions under which slave owners who increased reliance on positive rewards would have done better. It was this development that gave enslaved people the additional leverage required to achieve marginal improvements in their lives at the end of the eighteenth century. Greater control over residence-group membership was one of their achievements. I suggest that it is the resulting strategic switch in the mix of positive and negative incentives that is responsible for Jefferson's willingness in the 1790s to improve the living conditions of his enslaved laborers on Mulberry Row. The timing of the change on Mulberry Row is suggestive here. Family-based housing appeared on Mulberry Row in 1793 with the construction of buildings r, s, and t. This is precisely the time at which Jefferson began to shift from tobacco to wheat cultivation at Monticello.

Comprehensive evaluation of the foregoing model and its relevance to the history of Atlantic slavery is a task for the future. However, we can make a start for Monticello by looking at two additional categories of evidence: data on shifts in the distribution of the houses of enslaved field laborers and geoarchaeological evidence for change in the kinds of agricultural labor that field hands performed.

SETTLEMENT PATTERNS

If change in labor management strategies linked to agricultural diversification was responsible for change in the living conditions of enslaved domestics and artisans on Mulberry Row, then we should expect to see it registered in the living

conditions of enslaved field laborers as well. Ongoing archaeological survey of Monticello Plantation is providing us with evidence of a shift in the spatial pattern of slave settlement on the home farm quarter. The shift is synchronous with the architectural changes on Mulberry Row. Based on current evidence, during the 1770s and 1780s an overseer and most field hands working the Monticello home farm lived at two adjacent sites: Sites 7 and 8 (Figure 7). In the 1770s an overseer's house stood on the northern half of Site 7, with a slave settlement occupying the southern half. There was a roughly contemporary slave settlement at Site 8. Site 8 was abandoned sometime in the 1790s, and the overseer's house on Site 7 was abandoned in the following decade.

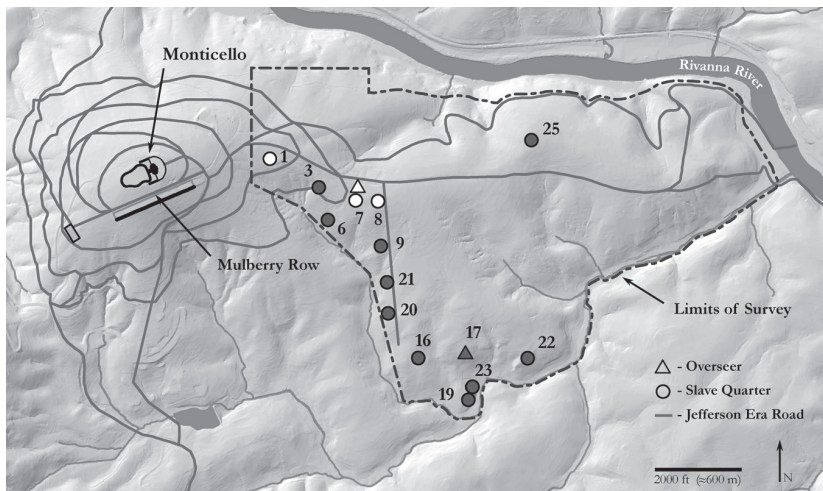


Figure 7. Changing settlement patterns on Monticello Mountain.

The dashed line shows the limits of shovel-test-pit survey coverage. Circles represent domestic sites occupied by enslaved fieldworkers. Triangles represent overseers' houses. Open symbols represent sites occupied in the late eighteenth century. Shaded symbols are sites occupied in the early nineteenth century.

The settlement pattern of the early 1800s was quite different. A new overseer's house was constructed at Site 17. Most slaves now lived in dispersed locations, far from one another and from the overseer's house (e.g., Sites 3, 6, 9, 20, 21). The shift suggests more autonomous living situations for slaves, with less-frequent surveillance of domestic activity. It duplicates at a landscape scale the change in housing we saw on Mulberry Row. Caution is necessary here since survey coverage of the Monticello home farm is incomplete and new results may alter the current picture. We currently lack survey evidence from other plantation landscapes that is comparable to that from Monticello, so we do not know if the Monticello results are typical of the Chesapeake region as a whole.

THE GEOARCHAEOLOGY OF SLAVE LABOR

The archaeological record also offers evidence of change in slave work routines. The data come from excavations into sediment impounded behind a rock

alignment on the northern slope of Monticello Mountain. The alignment was built at right angles to the Paw Paw Valley in which flowed what Jefferson called the Falling Spring, an important water source for the mountain’s residents (Figure 8). Excavations into the sediment behind the wall revealed a modern A horizon (layers 1–2), weathering on 2.5 ft of colluvium (layer 3). This in turn overlay a darker layer, which initially appeared to be a single buried A horizon. However, chemical and magnetic stratigraphy divided this lithological unit into two parts. At the bottom lay the real buried A (layer 4b). Overlying it was a 0.45-ft-thick colluvial layer composed of topsoil eroded from upslope (layer 4a). The obvious inference is that the layer 3–4 transition marks the shift from tobacco to diversified agriculture. If correct, it implies that erosion rates under the two regimes were radically different. Layer 4b is a thin colluvial deposit dating from the cultivation of tobacco on Monticello Mountain, from around 1740 to 1793, what we would expect from the traditional Chesapeake swidden system in which groups of slaves wielded hoes to cultivate partially cleared, temporary fields. Layer 3 and the sediment on which the new A horizon is weathered is a much thicker colluvial deposit dating from the 1790s and early nineteenth century. Again, this is what would be expected from the establishment of permanently and totally cleared fields, cultivated with a plow.

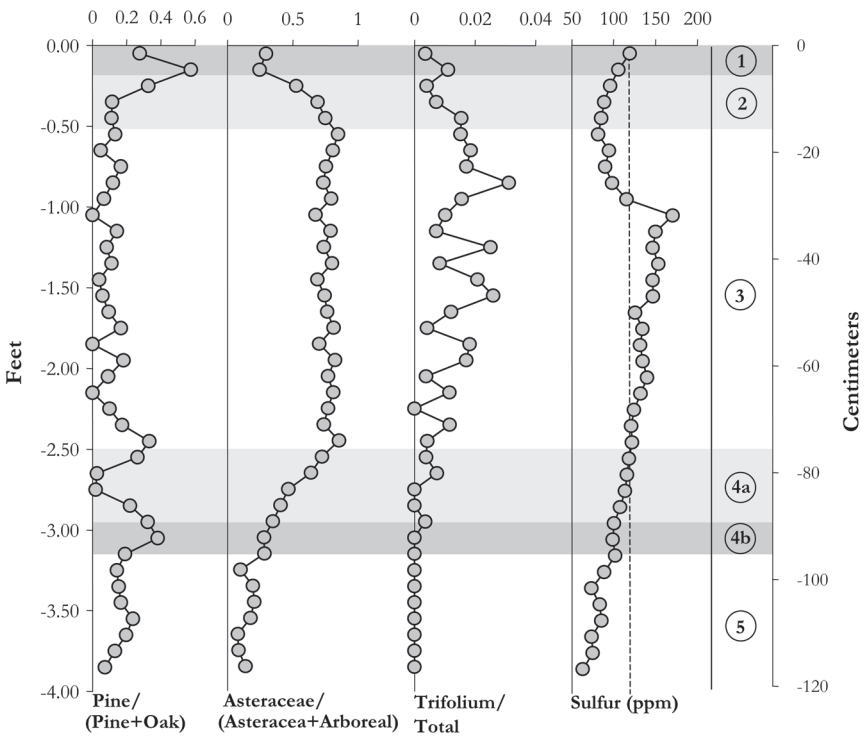


Figure 8. Geoarchaeological evidence from sediment trapped behind the Paw Paw Valley rock alignment reveals radical changes in slave work routines and land use on Monticello Mountain.

Independent evidence for this hypothesis comes from pollen spectra in sediment samples collected at 0.1-ft intervals down the stratigraphic profile.³ The ratio of low-spine Asteraceae to arboreal pollen offers a good indicator of the extent of field clearance. This ratio increases slowly across layer 4, with an upward spike at the 3–4 boundary, representing increased field clearance for diversification. It remains high throughout the remainder of layer 3 and then declines at the top of the sequence, as the mountain was gradually reforested after Jefferson's death. The ratio of pine to oak pollen tracks the rise and demise of the swidden system. High and variable pine-oak ratios characterize samples from layer 4, representing swidden plots in various stages of ecological succession. But the ratios decline significantly in layer 3, as permanent fields replaced abandoned plots studded with pine trees. Pollen evidence for crop rotation (*Trifolium*) increases significantly in layer 3. Finally, sediment chemistry reveals that the application of gypsum (calcium sulfate), a fertilizer, began in layer 3. Levels of sulfur exceed background values at the 4–3 transition and remain high throughout much of layer 3.

The rock alignment itself is testimony to the radical difference in cultivation methods, and their unintended consequences for erosion. The wall rests on top of layer 4, implying that it was built shortly after diversification began. With the introduction of plowing, colluvium threatened to bury the rock outcrop across which the Falling Spring flowed, where water could be easily collected. To ensure that it did not, Jefferson's slaves built the rock alignment just upstream.

Additional evidence for the increased erosion rates resulting from diversified agriculture comes from the spatial distribution of gullies across Monticello Mountain. Because wheat but not tobacco yields scale with winter solar radiation, the south-facing slopes of Monticello Mountain were the most productive (Fischer 1985). Erosional gullying is far more extensive on the south, despite the fact that the oldest cultivated field on the mountain is on the north slope (Figure 7).

Were the changes in slave labor tasks and their ecological consequences as documented in the Paw Paw Valley sediments typical for the Chesapeake region? There is some geoarchaeological evidence to suggest they are. Recent work at Sweet Briar Plantation, 50 miles south of Monticello, points to massive gullying dating to the end of the eighteenth century (Ambers et al. 2006). Recent sediment cores from the Chesapeake Bay (Colman and Bratton 2003; Zimmerman and Canuel 2002) and change in oyster-shell growth rates (Kirby and Miller 2005) reveal that the increased erosion rates found at Monticello were occurring all across the Chesapeake Bay drainage around 1800.

The settlement pattern evidence collected thus far suggests that the shift to kin-based housing in the 1790s on Mulberry Row was paralleled by a change in the spatial arrangement of the houses of field laborers on the Monticello home farm. Both shifts are compatible with marginal increases in the ability of slaves to control who they lived with and, in the case of field laborers, greater distance from and less-frequent supervision by an overseer. These changes are synchronous with the advent of diversification. And geoarchaeological evidence confirms that diversification at Monticello and elsewhere in the Chesapeake really was accompanied by a fundamental change in the kinds of work slaves did.

MONTICELLO I TO MONTICELLO II

One implication of the labor-management model is that any increase in positive incentives that accompanied diversification was a self-serving strategy adopted by owners who remained committed to slavery. If that is correct, then the arms race between enslaved people and owners should have continued across this period, and we should expect to see countermeasures to slave resistance built into Jefferson's dwelling. Monticello II, the result of a massive renovation Jefferson began in 1796, conforms to this expectation (Figure 9). Like early eighteenth-century gentry houses, it was engineered for surveillance. Movement around the house was easily monitored from a large central hall, which controlled access to the three major ground-floor rooms (Jefferson's bedroom, the parlor, and the dining room), and to two side passages, which controlled access to an additional four ground-floor rooms and the stairs to the basement, used by enslaved domestics to access the ground floor. A single observer standing in the side passages or the center of the hall could monitor access to the majority of the house. But there are novel features as well, not found in earlier dwellings. Movement of enslaved domestics, from their living and work spaces in the south terrace wing to the dwelling's basement, was constrained through a long subterranean passage. Slaves bringing food to the dining room placed it on a revolving door that allowed it, but not them, to enter the room. Similarly, bottles of wine could be transported from the wine cellar below into the dining room on a dumbwaiter. Architectural controls on slave movement to and around elite domestic space and on slave access to elite gossip are countermeasures not found in early eighteenth-century Chesapeake houses.

The plan of Monticello I is a curious anomaly. On the one hand, the dumbwaiter and the subterranean passage from the terrace wings to the house were a part of the original design, although they were not built until the 1790s. On the other, the ground-floor plan was poorly suited to surveillance. The problem lay in Jefferson's eschewing the proven idea of a single large room or passage from which access to other rooms could be easily monitored. Instead, Monticello I featured a small vestibule, open to the elements on one side, with a door in each of the other three walls, each giving access to a different room—a parlor and two stair landings. Thus there was no room on the main floor from which access to the rest of the house could be conveniently monitored. This made it difficult for family members on one side of the house to see or hear what was happening on the other. The Monticello I floor plan was even more flawed than the lobby-entry plan that Chesapeake elites had rejected nearly a century before. It seems likely that Jefferson was attracted to the vestibule idea because it signaled his familiarity with costly neoclassical English designs. Similar vestibules can be found in English pattern books (Gibbs 1728) and the houses of English aristocrats, and it may have ultimately derived via Palladio's reading of Vitruvius from Greek sources (Harris 1995; Hewlings 1991).⁴ If so, then the design for Monticello II represents Jefferson learning for himself that planning ideas refined by generations of slave-owning elites worked better in the Chesapeake than did novelties from Europe.

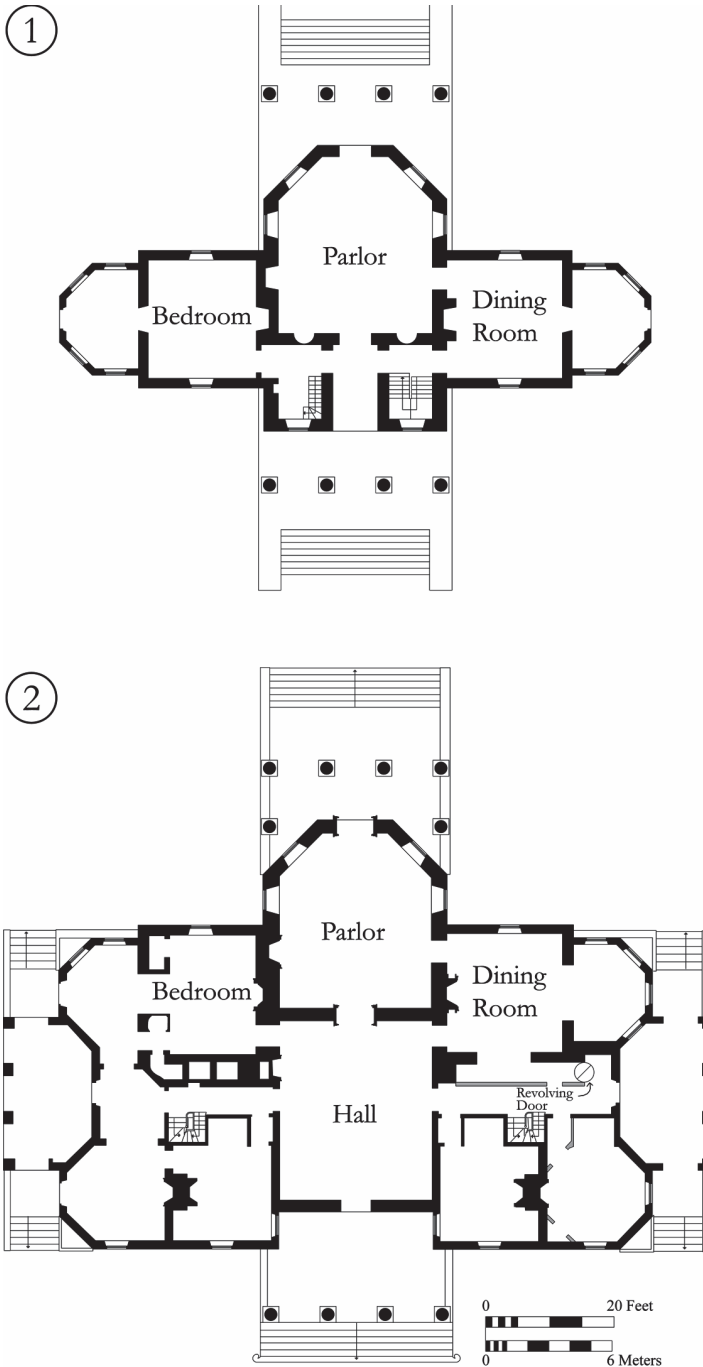


Figure 9. (1) Floor plan of Monticello I, on which construction began in 1770. (2) Monticello II was the result of a massive renovation begun in 1796.

CONCLUSION

Jefferson's death in 1826 presaged the end of Monticello. The mansion, fields, and two hundred enslaved people were sold to help pay his debts. But the reproduction and expansion of slave-based plantations continued. In the early nineteenth century, plantations, now growing cotton for U.S. and European markets, spread west into Tennessee and Kentucky, and south into Georgia, Alabama, Mississippi, and Texas. It would be another four decades before the Civil War brought it to an end. In evolutionary perspective, the Civil War was a contest between two radically different demographic expansions. As we have seen, the Southern one was based on slave agriculture. But an equally successful expansion, in demographic and Darwinian terms, had begun further north at Plymouth in 1621. It was based initially on family labor and, in the early nineteenth century, manufacturing (Main 2002). The contest between the two populations was, predictably, over which group would have unfettered access for its members' offspring to land and resources further west.

NOTES

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1. Exceptions include Carson et al. 2008 and Galle 2006.

2. An enormous historical and archaeological literature highlights "resistance," without embedding the concept in a larger, explicit framework (e.g., Ferguson 1992; Singleton 1995; Orser and Funari 2001). Lacking the theoretical support required to incorporate it into analytical models, "resistance" has become an all-purpose interpretive trope that can be used to gloss nearly any activity or artifact associated with enslaved people, from locally made pottery to trash deposits adjacent to houses.

3. John Jones of the Department of Anthropology at Washington State University analyzed the pollen. I thank him for allowing me to use his data here.

4. I am grateful to Bill Beiswanger for discussion here and the reference to Hewling's work on Lord Burlington's Chiswick.

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