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Cover Page Footnote

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ARCHAEOLOGICALLY DEFINING THE EARLIER GARDEN LANDSCAPES AT MORVEN: PRELIMINARY RESULTS

Anne E. Yentsch, Naomi F. Miller, Barbara Paca,
and Dolores Piperno

The first phase of archaeology at Morven was designed to test the potential for further study of the early garden landscape at a ca. 1758 house in Princeton, New Jersey. The research included intensive botanical analysis using a variety of archaeobotanical techniques integrated within a broader ethnobotanical framework. A study was also made of the garden's topography using map analysis combined with subsurface testing. Information on garden features related to the design of earlier garden surfaces suggests the ways in which the Stockton family manipulated their estate to convey a social image of the family to the local Princeton community. This, in turn, provides information that, when combined with collateral ethnographic information obtained from documents, suggests the symbolic content of the garden.

Le premier phase d'archéologie à Morven été projeté examine le potentiel pour autre études du ancien jardin-paysage à une maison du 1758 à Princeton, New Jersey. La recherche à compris l'analyse ethnobotanique intensif qui à utilisée une variété des techniques archéobotaniques lesquels sont intégrés à une stratégie ethnobotanique plus grande. Une étude de la topographie du jardin été fait aussi. Il à utilisé l'analyse des cartes et les sondages souterrain. Des renseignements des traites du jardin relatif au dessein des anciens surfaces du jardin illustre la façon dont la famille Stockton à manipulée leur domaine afin de communiquer une image sociale de la famille à la société tout près de Princeton. Cela, fournie des renseignements qui, combinée avec les renseignements ethnographiques collatéral fournie par la recherche documentaire, laissent supposer le contenu symbolique du jardin.

Introduction

Situated on the old Stockton property in Princeton, New Jersey, Historic Morven is a newly organized state museum for cultural history and the decorative arts administered by the New Jersey State Museum, a division of the Department of State. The museum's study of the 18th-century cultural landscape created by Richard and Annis Stockton, its rearrangement by their son and grandson, and its subsequent evolution is gradually providing information about the Stocktons' use of their family land and about the lifestyles of New Jersey's political elite. The research focus is on past social action, i.e., on the way households created formal landscapes surrounding their family homes that, while decorative and functional, also served as visual signs to the community of the social position of the family. A major emphasis of the study is the tension between the aesthetic organization of Morven's landscape and its functional organization as an income-producing landed estate, and how this tension between form and function was resolved by each generation.

Conceived as an endeavor in garden archaeology, the work described here is humanistic; knowledge of social context and historical precedent is seen as critical to analysis of the garden's various forms and functions over its 230-year history. In essence the study is about the relationship between people and their plants, particularly those plants one might best classify as ornamental (i.e., plants whose symbolic or non-food roles are as important or more important than their role in the food chain).

Today, Morven consists of a three-story central brick block with two two-story wings and has the guise of Georgian symmetry (FIG. 1). This is the result of mid-19th-century renovations (Albee 1988). The original house was started ca. 1758 by Richard Stockton, a signer of the Declaration of Independence for the State of New Jersey. Archaeological evidence indicates that it, too, was a house of Georgian symmetry with a central block and two balanced wings and that the present structure incorporates the original foundations of the earlier building inside its 19th-century footprint (Yentsch, Goodwin, and Kratzer 1988). Morven was occupied for almost



Figure 1. Morven, the former New Jersey governor's mansion and home of Richard Stockton, a signer of the Declaration of Independence. Photograph by Marty O'Grady.

175 years by the Stockton family, in the 1930s and 1940s by Robert Wood Johnson of Johnson & Johnson, and since 1944 by successive governors of the State of New Jersey (TAB. 1). It was given to the State by Governor and Mrs. Walter Edge in 1951 to serve as an executive mansion or as a state museum or historic site. It is now administered as a museum of cultural history by the New Jersey State Museum, a division of the Department of State, and houses the Walter Foran Institute for the Study of New Jersey history.

The overall approach instigated by the New Jersey State Museum is interdisciplinary; architectural historians from the North Atlantic Historic Preservation Center of the National Park Service in Boston and local historians working for Heritage Studies, Inc., are undertaking the architectural (Albee 1988) and the historical surveys (Greiff 1988). The archaeological approach also integrates the different foci within anthropology (i.e., the subfields of oral history, ethno-

botany, and historical ethnography) with field archaeology and garden history. Consultants with training in each of these areas are members of the research team. The preliminary results reported here are part of the first phases of the search for the ca. 1760 garden (FIG. 2). As part of this research, the landscape archaeologists have also been asked to delineate the development of the garden over time. Compare, for example, Figure 2 with Commodore Stockton's garden as shown in Figure 3. Graphic interpretations such as these are prepared so that visitors to Morven can (a) see how the past is incorporated into the present landscape; (b) understand the process whereby people introduce culture change into their built environment; and (c) experience the preservation process in action (Yamin 1988). A public interpretation program has been designed by Dr. Rebecca Yamin using Archaeology in Annapolis as a guide (Leone 1983; Potter and Leone 1987). Funding for Morven's restoration is provided by state and private

Table 1. Ownership and occupational sequence for Morven.

1754–(1781)* –1789	Richard Stockton
1789–(1828)† –1837	Richard "The Duke" Stockton
1837–1866	Commodore Robert Field Stockton
1866–1869	Children of Robert F. Stockton
1869–1890	Samuel Witham Stockton
1890–1904	Dr. Charles Shields (owner) Bayard Stockton and Helen Hamilton Shields Stockton (occupants)
1904–1928	Helen H. S. Stockton (occupant and part owner) Bayard Jr. and Richard Stockton (part owners)
1928–1945	Robert Wood Johnson (tenant)
1945–1953	Governor Walter Edge
1953–1981	State of New Jersey Governor's Mansion

*Date Richard Stockton died. Annis Stockton retained control of the property until her eldest son, Richard, came of age and married (1789).

†Date Richard Stockton "The Duke" died. His widow lived at Morven until her death in 1837 at which time the eldest surviving son, Commodore Stockton, took control of the property.

funds. Plans for its restoration include work on the house and work on the land based on the architectural study and the garden archaeology.

Garden Archaeology

Garden archaeology is a derivative of larger landscape analyses pioneered by the British after World War II (Fowler 1972). Logically, this was extended in Britain to the study of English gardens (Taylor 1983). In this country, garden archaeology began in Williamsburg, Virginia, with the search for the Governor's Palace in 1930-31 and with the partial excavation of John Custis' garden by Ivor Noël Hume in 1964 and of the gardens at Carter's Grove in 1968, with work at

the William Paca garden in Annapolis, Maryland, in 1967, and with William Kelso's work at Monticello, Virginia. Noting that it is indispensable for the reconstruction or restoration of any historic site, Audrey Noël Hume (1974: 7) also specified how garden archaeology differs from architecturally oriented excavations:

The archaeological excavation of a garden calls for a degree of skill and perception far exceeding that required of an archaeologist uncovering the foundations of a building. The area to be explored will almost certainly be larger; at the same time the number of datable artifacts recovered from the relevant features will be woefully small, and inclement weather will, in spite of the most careful precautions, do infinitely more damage to the transitory remains of a garden than to those of a house.

Since excavating large formal gardens also seems to bring out the best of a historical archaeologist's craft and ingenuity, technique alone is not the reason why so few gardens have been excavated to date. Instead, the length of time and the labor costs required to carefully excavate large areas are probably the factors most responsible for the small number of gardens that have been fully studied. The low level of federal research funding available to historical archaeologists has also played its role; no garden has been studied as a pure archaeological research endeavor. Primarily, garden archaeology is done on an applied basis by archaeologists on museum staffs using small field crews and/or field schools and volunteers, or by professional consultants hired on a contract basis who, if they are associated with local colleges and universities, may be able to establish field schools. In other words, most garden archaeology falls more within the domain of historic preservation than within the domain of anthropological inquiry.

With the exception of Leone's materialist analysis of Maryland gardens (Leone 1987), few gardens have been excavated using an ethnographically oriented framework. That is to say, there is little or no consideration of context—"the framework of meaning within which individuals act, and the situated improvisations which make up daily life" (Hodder 1987: 425). Although no formal gardens in New England have yet been

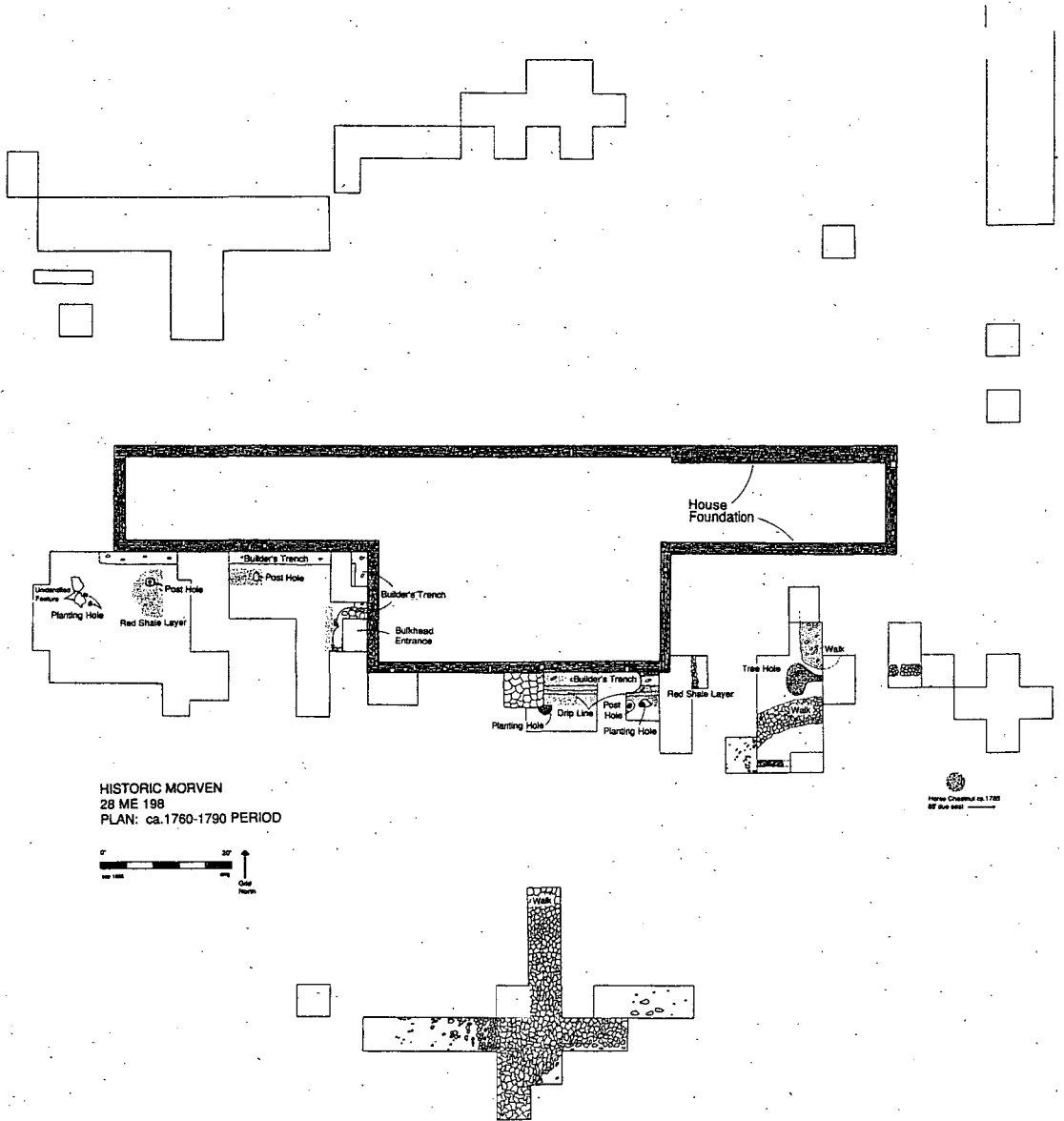


Figure 2. Garden and architectural features associated with Richard and Annis Stockton's household, ca. 1760-1790. Drawing by Conrad M. Goodwin.

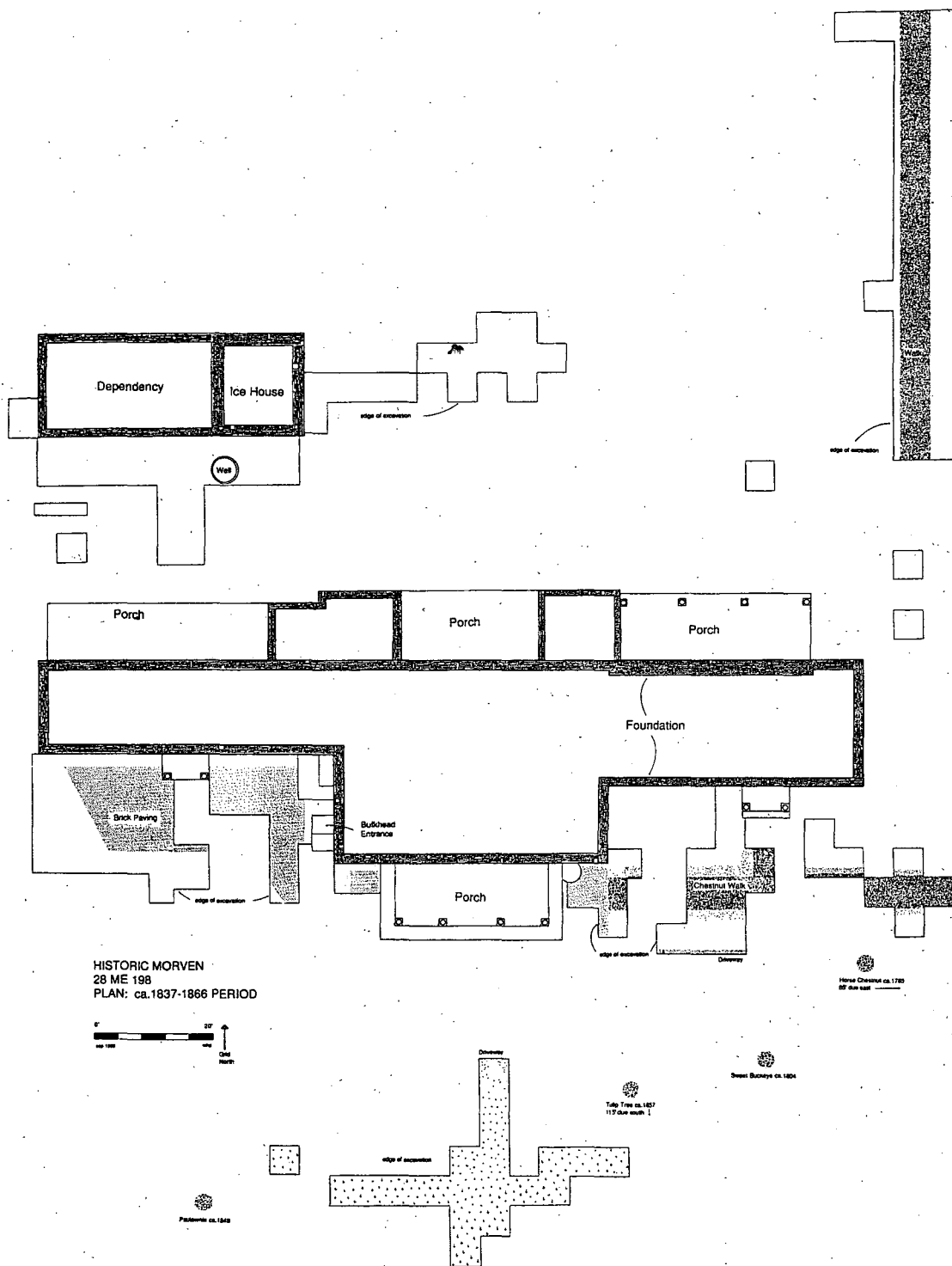


Figure 3. Garden and architectural features associated with Commodore Robert Field Stockton's household, ca. 1837-1866. Drawing by Conrad M. Goodwin.

excavated, New England archaeologists have long been concerned with both the arrangement of features on house lots and with the timing of landscape alterations, i.e., with the way these mesh with social events in the life cycle of the family (cf. Beaudry 1986; Beaudry and Mrozowski 1987b). Such a focus emphasizes context. The work conducted in central Massachusetts by the research staff of Old Sturbridge Village (Simmons and Stachiw 1988; Small and Stachiw n.d.; Worrell 1980, 1988; Worrell, Stachiw, and Simmons n.d.) and in the Connecticut River Valley by Paynter (1982), together with the work of Reinke and Paynter (1984) at Historic Deerfield, is noteworthy in this regard. Beaudry and Mrozowski's study of the Boott Mills also paid close attention to changes in the land, incorporating fine-grained botanical analyses within a contextual approach (Beaudry 1989; Beaudry and Mrozowski 1987a, 1987b; see also Fisher and Kelso 1987). The goal at Morven is to make context essential to the analysis by relating change in the garden to social action and family events.

The garden archaeology program at Morven also draws heavily on the experience of workers at the William Paca garden (Paca-Steele and Wright 1983, 1985, 1987) and the Calvert site in Annapolis (Miller 1988a; Yentsch 1988a, 1988d, 1989) and Mount Clare in Baltimore, Maryland (Akerson, Holt, and Williams 1986; Norman 1985a, 1985b, 1985c; Weber 1986, 1988; Weber et al. 1989), at Monticello (Kelso 1983, 1984, 1989), Bacon's Castle (Lucchetti 1986a, 1986b, 1989), and Colonial Williamsburg (A. Noël Hume 1974; I. Noël Hume 1974; Edwards 1986) in Virginia. The emphasis on ethnobotanical research is a result of the advice of St. Clair Wright of Historic Annapolis, Inc., who knew from the restoration of the William Paca garden in the 1960s that much useful information could be obtained from archaeology with a botanical focus. Horticultural elements of the restored Annapolis garden include species of trees, woody samples of which were identified; the basic design of the garden, including its brick and stone fencing, pond, and terracing, was also revealed during excavation (Little 1967; Paca 1981).

Although the William Paca garden was hidden more fully than Morven's garden by 19th- and 20th-century buildings (including a bus station

and parking lot), the situation at Morven is slightly more complex. The greater complexity is introduced by the modifications to the lot made by Richard Stockton's son (known as "The Duke"), by Commodore Robert Field Stockton, and by Helen Hamilton Shields Stockton (TAB. 1, FIG. 4). Across the entire site features associated with Robert and Helen Stockton's gardens directly overlie those of the earliest garden, cutting into and lessening both its archaeological visibility and focus. Methodologically, it has been possible to sharpen the focus of these early features by using a recording system that translates every depth record into an above-sea-level (ASL) measurement and by using these measurements to establish separate depth ranges across the garden for each of its different phases. The feasibility of this approach is based on the fact that the banks of terraces that formed 18th-century descent gardens were horizontal levels into which vertical masses (i.e., plantings) were placed. St. Clair Wright notes that this use of terracing provided a habitat more beneficial to plant growth than the slope gardening that would have been required were terraces not constructed (St. Clair Wright, personal communication). At Morven, alteration of the terraces and south yard was accomplished primarily by filling rather than by cutting away soil layers. While this created complex stratigraphic sequences, it also preserved large segments of the original garden landscape.

How did the Morven staff begin to read the garden landscape? It required some special techniques. Extant vegetation, natural terrain, and local environment provided a baseline. Cultural elements that were imposed on the land had to be considered. These included physical structures (e.g., roads, paths, ponds, parterres, and buildings), conceptual structures (e.g., vistas, access routes, and boundaries), and other traces of earlier human activity (e.g., old ground surfaces, ground coverings, trees, and other plantings). There is no precise order that should be followed in their study. At the start Morven's excavation was guided by information in the historical record, but as work progressed, archaeological findings prompted numerous refinements. The testing began with a vegetation survey, a topographic study, and test units to de-

1754-1789
Richard & Annis (Boudinot) Stockton

A. Nuclear family
 Julia (1759; married 1777)
 Mary (1761; married 1794)
 Susan (1761; married c. 1780-90)
 Richard (1764; married 1789)
 Lucius Horatio (1768; married c. 1790-95)
 Abigail (1773; married c. 1790-95)

B. Extended household
 Richard's siblings
 Afro-American slaves (3 or more)

C. Seasonal Visitors
 Julia Stockton Rush
 Children of Julia Stockton Rush

Richard died at Morven in 1781.
 Annis died at White Hall (Burlington) in 1801.

1837 - 1866
Commodore Robert F. & Harriet Maria (Potter) Stockton

A. Nuclear family
 Richard (1824; married 1850)
 John Potter (1825; married 1845)
 Catherine (1827; married 1850)
 Mary (1830; married 1850)
 Robert Field (1832; married 1857)
 Harriet Maria (1834; died 1901)
 Julia (1837; married 1861)
 Caroline (1839; married 1864)
 Annis (1843; married 1864)

B. Extended household
 Mrs. Stockton's "Mammy"
 Afro-American slaves (3 or more)
 Free Afro-Americans (5 or more)
 Irish maid servants (5 or more)

Cmdr. Stockton died at Morven in 1866.
 Harriet M. Stockton died in 1862.

1789 - 1837
Richard & Mary (Field) Stockton

A. Nuclear family
 Mary Field (1790; married c. 1810-1820)**
 Richard (1791; died 1827)
 Julia (1793; married c. 1813-1823)
 Robert Field (1795; married 1823)
 Horatio (1797; died 1815)
 Caroline (1799; married 1820)
 Samuel Witham (1801; married 1833)
 William Bradford (1802; died 1843)
 Annis (1804; married 1826)

B. Extended household
 Widow Annis Boudinot Stockton (1789-?)
 Widow Mary Field (1790 - 1800?)
 Servants and Afro-American slaves

C. Seasonal Visitors
 Julia Stockton Rush
 Children of Julia Stockton Rush

Richard died in 1828, and Mary died in 1837 at Morven

**The widow Mary Field-Harrison lived with her mother at Morven c. 1830-1840 (Greiff 1988).

1869-1890
Samuel W. & Sarah (Hodge) Stockton

A. Nuclear family
 Charles H.
 Richard
 Mary H.
 Sarah B.
 David H.
 Katherine
 Annis
 Samuel

Samuel d. 1899, 9 years after sale of Morven.

1890-1928
Bayard & Helen Hamilton (Shields) Stockton

A. Nuclear family (with aunt/step-mother)
 Bayard Jr. (1884; died 1912)
 Richard (1885; married 1910)

Figure 4. Household chart: sequence of Morven households with birth and marriage dates for children denoting when each family grew (i.e., births) and when it contracted (i.e., marriage and/or death dates). Data are derived from published Stockton genealogies and unpublished data in the New Jersey Historical Society.

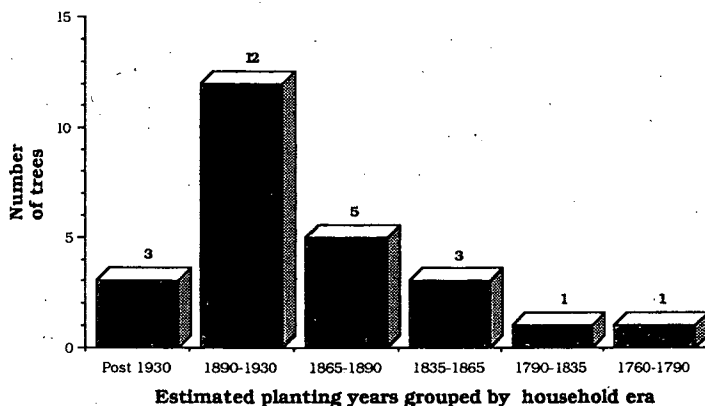


Figure 5. Trees at Morven grouped according to the eras associated with the different households shown in Figure 4.

termine whether archaeological features and earlier strata still existed in an undisturbed state.

Of particular interest were features that would yield archaeobotanical evidence of long-dead plants and trees. While it is possible to identify plants that the Stocktons likely grew at Morven based on general knowledge of 18th- and 19th-century botany, and while in a few cases it is even possible to know the identity of specific plants (particularly from letters to and from Annis Stockton), more "hard evidence" is required to recreate a historical garden. Archaeobotany has the potential to reveal the former presence of and, at times, to indicate the placement and identity of specific types of plants. Ethnobotanists use three different methods of identifying archaeologically obtained plant materials: phytolith analysis; pollen analysis; and identification of seeds and nuts obtained through flotation. Sediment samples for pollen, macro-plant remains, and phytoliths were taken from features associated with the garden landscape and from control units during the testing program. Pollen was present in insufficient quantities to justify identification (Kelso 1988).

In studying a garden, it is critical to know what constitutes a good context for garden seed recovery (i.e., for the recovery of old *uncharred* seed remains). Since no substantial sealed 18th- or 19th-century deposits have been located, the excavation still yields only recent materials. This is a consequence of two factors: (1) the overall

closeness to the surface of even the earliest garden layers combined with normal seed migration depths; and (2) the fact that those sealed deposits that were located were protected by 6-18 in (15.2-45.7 cm) of new garden soil rather than by brick rubble that could retard downward seed percolation. As a consequence, uncharred plant remains such as chickweed and carpetweed dominate the site's flotation samples. These weeds grow profusely on the property today, and the uncharred remains are considered recent (Miller 1988b, 1989).

The other ethnobotanical techniques used to study the historic plants at Morven included phytolith analysis, a program of tree-coring, and a vegetation survey. Although the survey and coring were time-consuming processes, both have proved extremely useful. They were non-destructive of archaeological resources, and they provided information useful for evaluating archaeobotanical remains. They enabled the ethnobotanist to begin identifying, mapping, and dating the extant garden components and to begin dividing these into sequences of growth or landscape modification associated with the various historical households that lived on the site (FIG. 5; see also FIG. 4).

Joan Lee Faust (1987: 69) reviews the difficulties of garden restoration: "[Garden restoration] includes far more than putting back what is believed to have been planted there. Garden restorers deal with an organic topic and nature is

never the same from one year to the next. Plants mature and die and are replaced." A garden landscape is ever-changing.

What Faust did not acknowledge in her short review, and perhaps did not realize, is that it is not just the plants associated with a garden that mature, die, and are replaced. This is also true of the households and families who maintain a garden. Study of their social behavior must be integrated with the archaeological findings before a detailed ethnographic description can be written of the people who created, maintained, and altered the garden. Understanding the relationship between people and their plants as it was expressed in a Princeton garden throughout its 18th- and 19th-century existence is as much historical anthropology as it is historical archaeology. One means of combining the two approaches—anthropological and archaeological—is by conceiving of the garden as representing the work of a series of related households and casting each garden sequence against knowledge of the people who formed it and their individual family cycles.

The Social Context

At Morven, the people who maintained the gardens were different members of five Stockton households (FIG. 4). The New Jersey State Museum's goal is to find archaeological and documentary evidence of how the lifestyles of each generation varied to determine how their households reflected the cultural values of the time, and to see in what ways these values show evidence of change or stability as expressed in the material domain of daily life. This should appear in the evidence of the way each generational branch of the Stockton family managed their land, especially the grounds surrounding the dwelling where the ornamental and food gardens would have been.

This aspect of the study differentiates between the Stocktons as a sequence of related families and the Stockton households associated with each distinct set of property owners. A household is composed of the people, not necessarily related by kinship ties, who occupied any given domestic site (i.e., house, adjacent outbuildings, and the external yard space associated with

these structures) and who shared in the daily activities associated with the sphere of household production (i.e., tasks associated with social sustenance—eating, sleeping, resting, leisure—and reproduction of the family unit as well as the economic activities needed to sustain it). This definition is broader than Laslett uses (1972: 24) and more in accord with the one used by Wilk and Rathje (1982) and Beaudry (1984). Of concern is the ability to extend the definition to include those servants and slaves who resided in nearby quarters at plantations or other servants or slaves who slept in barns, kitchens, work houses, etc., but were also involved with household production on an estate. The use of this procedure in studying archaeological features and deposits is reviewed by Beaudry (1988).

A family is not necessarily a household (although it may be) because family membership is derived through kinship ties whereas membership in a household is not. An example drawn from the history of the Stockton women illustrates this. Julia Stockton Rush remained a Stockton after she married Benjamin Rush and moved to Philadelphia. Annis Boudinot Stockton remained a Stockton while she boarded with a local Princeton family in her widowhood. Neither were members of the Stockton household during the years they lived away from Morven. Conversely, during the months Julia's son lived with his grandmother, he became a member of the Morven household. At all times the cognatic ties between these individuals made them part of the same family and operated irrespective of spatial separation.

Families and households change with time. They pass through developmental cycles (Goody 1972) that are best defined in colonial society in association with change in nuclear families. They expand and contract, placing different demands on a home and affecting the artifact assemblages created from domestic refuse. With the death of both mother and father, a family comes to the end of its developmental cycle. Beaudry's 1988 review of the literature indicates that significant phases of a household's developmental cycle may be reflected by changes in the archaeological record of a domestic lot. A home and its lot are particularly vulnerable to change when property ownership changes, whether through

inheritance or purchase. Frequently, rich sealed archaeological deposits are created at such periods as when wells or privies are filled and capped, houses are renovated, and gardens modified. At Morven a clear relationship between architectural change and landscape alterations is already visible, but tighter dating of the artifact assemblages is required before specific landscape changes can be assigned to narrower time ranges within the different generations of households.

Historical Precedent for the Garden

To trace the change in Morven's gardens, a baseline is necessary. First, the Stockton gardens were a New World adaptation of an Old World practice. To understand how Richard and Annis Stockton designed their garden, it must be placed in the tradition of English gardens and English norms used as the initial standard for considering its organization. This is being done by considering the historical precedents for (a) plant use and (b) the design and topography of the garden.

Gardens as Collections of Plants

Brookes (1984: 29) notes that "in medieval Europe a garden meant an enclosure, a sanctuary from the wilderness of nature, connected as much with the production of food and medicinal herbs as with enjoyment." Medieval English gardens were a cultural expression of English men's and women's profound love of nature and interest in plants, based on a world view in which plants had deep symbolic meaning corresponding to the structure and behavior of society (Foucault 1973; Thomas 1983). These medieval gardens set the cultural framework for future English gardens which continued to be places where new plants could be introduced and developed. Because horticultural skill was involved in the introduction and development of non-indigenous species and in the development of additional domesticated species, this pursuit was an apt way for members of an agrarian society to demonstrate botanical expertise and access to scarce resources. Such attributes set some men above others in a community. In this, gardens

were alternatively viewed as "collections of plants and as artistic compositions" (Brookes 1984: 29) through which people expressed their skill with plants.

Eighteenth-century men demonstrated their superior knowledge, gardening expertise, love of nature, and alliance with nature by cultivating new and exotic plants just as their medieval predecessors had done. If, as oral tradition relates, Richard and Annis Stockton did plant horse chestnut trees in 18th-century Princeton, then these trees would have been perceived as exotic species and hence would represent a continuation of the medieval garden tradition of collecting plants, ordinary and extraordinary. Later Stockton households also planted non-indigenous species in their ornamental garden at Morven, importing some from France and England and obtaining others in this country. One example is a sweet buckeye (*Aesculus octandra*) planted during the era of Richard "The Duke" in the early 19th century, one of the oldest trees within the present bounds of the front yard. This tree, native to southwestern Pennsylvania and similar regions, was first brought to the attention of settlers in 1785 by an explorer in the Allegheny Mountains (Hedrick 1950: 92). Its natural range does not extend to central New Jersey.

As knowledge of botany developed and was dispersed, plants that once were curiosities became commonplace and, in the metaphorical language of plants, the symbolic importance of individual species shifted. Their placement in the symbolic plant hierarchy shifted because their cultivation no longer denoted any degree of extraordinary horticultural skill and/or control of scarce resources by their owner. Citrus plants, for example, were replaced by pineapples as the high-status fruit tree of the 18th century and, over the years, gillyflowers, tulips, hollyhocks, auriculas, and ranunculus successively lost favor. Pretentious landowners planted trees that grew quickly or bought "quicksets" at nurseries, altering their plant stock to suit changing fashions. While one might gain immediate status by planting rare or exotic species, aged trees were highly valued, and a man who could grow and maintain a series of rare trees for a number of years demonstrated greater skill and had

greater horticultural status than one whose plants died young. The importance of mature trees is emphasized in Thomas Jefferson's 1793 (Betts 1981: 197) statement to his daughter: "What I would not give that the trees planted nearest round the house at Monticello were full grown." Undoubtedly Richard and Annis Stockton shared Jefferson's desire for mature trees.

Gardens as Organizational Elements for Vistas

Gardens, of course, were attached to houses, and hence the way a house was sited on its land affected the placement and design of its garden. Houses embodied memories and stood for families; their command of community space was symbolic. Houses were metaphors expressing the rank of households by the vistas they controlled and by their visibility in the community. For example, in Annapolis, Maryland, the Charles Calvert house, located on a high terraced level of a steep, sloping hillside above a formal terraced garden, provided its occupants with a panoramic vista of the town and of the Chesapeake Bay. It was also a highly visible element in the townscape, thereby denoting the position of leadership the Calvert family held in the Province of Maryland as relatives of Lord Baltimore and as his official representatives (Yentsch 1988a). The concept of elite status at the Calvert site was expressed through the medium of the vista in two distinct ways. First, there was the public dimension or view of the house and its garden that Annapolitans had from their two waterside commercial activity centers and the one that visitors had entering Annapolis from the Bay. These two related vistas were open to the town and, indeed, this was a major reason for their existence: they were a means to enhance the political power of the Calvert family. Yentsch (1988d) describes the second vista as a private one, by which she means that it was possible for the Calverts to offer or deny access to it because it was a view radiating out over the town and its waterfront from a central point within the garden. As Humphrey Repton stated a century later, the power of such a private vista rested on the fact that its basis was "appropriation . . . that charm which only belongs to ownership, the *exclusive* right of

enjoyment, with the power of refusing that others should share our pleasure" (Repton 1816: 233, quoted in Daniels 1988).

Visibility was of equal importance to families living in the rural Chesapeake countryside, as witnessed by the careful placement of houses, outbuildings, and terraces in the many plantations along the shores of the James River in Virginia. High land was culturally valued (cf. Forman's 1968 survey of Maryland mansions, Waterman's discussion of James River plantations [1950], and Smolek and Clark's 1982 archaeological study of southern Maryland site locations). Implicit in the value of high lands among the elite was the concept of a vista. In the late 17th and early 18th centuries, the vistas were composed of formal elements such as parkland plantings close to country mansions "with long vistas radiating from the country house [that] expressed a military sense of command" (Daniels 1988: 45).

The historical precedent for vistas began with land reclamation projects in 16th-century Venice, Italy. Many of the men involved in land reclamation were individuals like Cristoforo Sorte who also were involved with artistic representations of landscape, two activities closely tied to geometry (Cosgrove 1988). As Cosgrove (1988: 256) observed:

In late Renaissance Italy not only was geometry fundamental to practical activities like cartography, land survey, civil engineering, and architecture, but it lay at the heart of a widely accepted neo-platonic cosmology and related esoteric and occult beliefs and practices which found expression in the art of the period. The speculative and the practical are often indissoluble in 16th-century culture. They are equally important in understanding the idea of Venetian landscape at this time.

Through the artistic incorporation of geometric principles into landscape design, the bounds of the Italian garden were visually expanded to include the surrounding land.

The Italian practice quickly spread to England, where upper class Englishmen became highly conversant with the techniques for creating spatial illusions in their gardens. Not only were vistas of the nearby cultivated and natural countryside incorporated into the English garden

landscape, but by the mid-18th century, the surrounding countryside itself was transformed to satisfy the aesthetic requirements of "picturesque" landscaping (cf. Jacques 1983: 105; Thacker 1979: 182 ff.). The surrounding countryside was conceived of in terms of its pictorial impact, or as a series of scenic tableaux (Crook 1988) containing distinct visual units such as stationary elements like groves of trees or scenic ruins, and dynamic elements—the people who walked the countryside and even the livestock that roamed across it. Walpole, for example, actually raised herds of miniature sheep to graze on the hillsides near his home. Their small size increased the perception of depth in the vista from his garden (Stuart 1979: 51).

In a 1771 essay on gardening, Walpole (1827) urged the use of flocks and herds in the landscape as part of the vista, although he did not reveal his own clever use of miniature sheep. This manipulation of the environment was deliberate and, through illusion, deceptively increased the acreage apparently belonging to an estate. Thomas Whately (1770), in an influential book on gardening, suggested the use of ridings, as distinguished from common roads, around a park "to extend the idea of a seat and appropriate a whole country to a mansion." Daniels (1988) notes, however, that picturesque landscaping also could be discreet and might include nothing more than trimming branches to disclose a view or adding plantings in the distance to improve a view.

Although most Americans did not adopt the radical advice of English gardening philosophers such as Horace Walpole, the colonists were aware of the new theories, and gentlemen farmers among the wealthy utilized the art of illusion to appropriate space. There was a difference, however, between American and English planting styles noted by Thomas Jefferson: "it [America] is the country of all others where the noblest gardens can be made without expense. We have only to cut out the superabundant plants" (quoted in Kimball 1917: 184). Improvements in farming techniques, a concern with agrarian change, and the corresponding literature were particularly popular in the colonies during the 18th century (Isaac 1987; Nygren and Robertson 1986). Working farms, such as the Stockton es-

tate, blended the profits and pleasures of life in a rural community.

This blend produces in part the tension between form and function under study at Morven. Barbara Paca (1987) first brought to the Museum's attention the fact that the 18th-century Morven estate should be considered as a *ferme ornée* (i.e., a fancy or model farm). How this could affect use of the land is best expressed by Thomas Whately (1770: 160): "Though a farm and a garden agree in many particulars connected with extent, yet in *style* they are the two extremes. Both indeed are subjects of cultivation, but cultivation in the one is *husbandry*; and in the other *decoration*: The former is appropriated to *profit*, the latter to *pleasure*: fields profusely ornamented do not retain the appearance of a farm, and an apparent attention to produce, obliterates the idea of a garden." Working outward from the house to define the use of land at Morven revealed its decorative or, in Whately's terms, pleasure gardens.

Topography and Richard Stockton's 18th-Century Vista

Although the present property is much smaller than the original Stockton estate, the most obvious feature on the original lot was and still is the house. Richard Stockton sited his home on a slight rise in the natural terrain. The surrounding land was then shaped to accommodate the household—to provide access to the yard, to establish proprietary and visual boundaries to the yard, to drain it, to provide a place for ornamental and edible plants, and to otherwise mold the land to suit its occupants.

How Richard Stockton created a northern vista for his home came to light as excavation revealed evidence of terracing in the soil profiles of the north yard. There were also decorative and functional features included in the design of Morven's south yard. The first clues concerning the ca. 1760 garden appeared in the 1987 trenches (FIG. 6). In the south yard, away from the house, the trenches revealed little, but in the far north yard Trench 3 picked up the edge of a wide set of 18th-century fieldstone steps (see cover illustration) that outlined a sharp drop in an earlier yard surface west of the

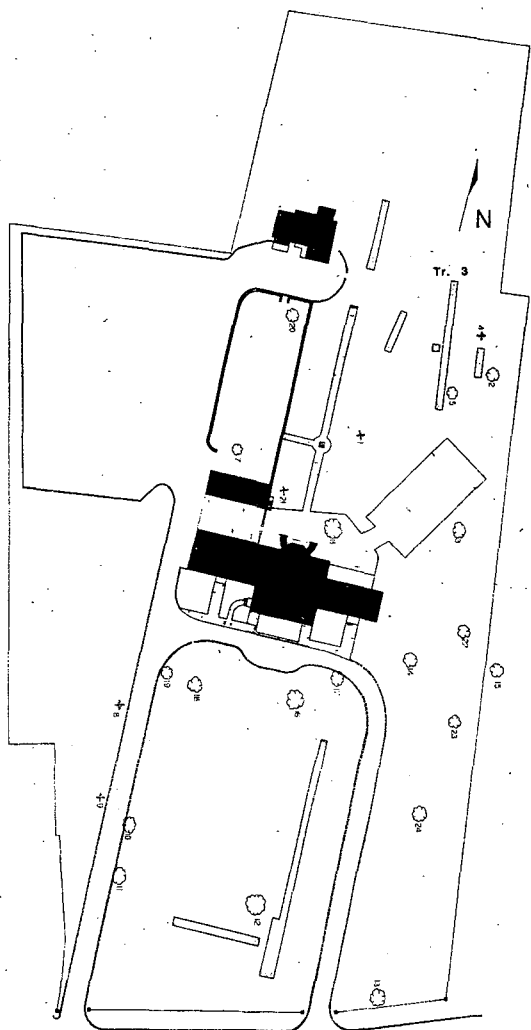


Figure 6. Map of the site showing location of the 1987 trenches. The terrace fall line was first located in Trench 3 in the back yard and later confirmed by an additional trench placed due west of the earlier trench. Drawing by Paula Dardaris.

trench. Test units located the eastern boundary of the terrace, which aligns with the end wall of the ca. 1760 east wing. Further excavation revealed that the terracing extended westward for 100 ft (30.4 m), ending at a point in line with the end wall of the ca. 1760 west wing.

Modern engineers' maps with topographic detail were provided to the Morven staff by Constance Greiff of Heritage Studies. Yentsch's analysis of these indicates that they suggest the

presence of other, lower terraces (on the north and also on the west side of the house where the service buildings were and are located) whose existence will be verified in future field seasons. The map analysis also suggests that the width of each terrace decreased as one moved away from the house, i.e., that the original terracing was widest near the house, gradually diminishing as the garden stepped out into the landscape. This type of perspective is in keeping with the 18th-century technique of making a garden appear larger by establishing a vista from the widest terrace along an axis out into the landscape. The vista from Morven, with its artificial terracing, was extensive, overlooking two or more winding streams and stretching across a valley towards the distant Sourland Mountains.

Such a sophisticated approach to planning followed British precedent and suggests that the designers of the garden gave careful thought to the proportions of the terraces comprising it. While there is some suggestion that the garden at Morven was more naturalistic than formal in character, it would also appear that a proportional system was used as the basis of the garden plan. In view of Barbara Paca's work on other gardens in the mid-Atlantic, this suggests that the mathematical ordering of gardens was of greater importance to the gentleman architect of the 18th century than has been hitherto recognized.

In studying the garden's design elements at Morven, other gardens are also used as a comparative base. Here, the careful and detailed archaeological study of the William Paca garden in Annapolis, Maryland, undertaken by Historic Annapolis, Inc., has been invaluable. William Paca's garden was contemporary with Richard Stockton's first garden at Morven; both were built in the early 1760s. As far as is known, the William Paca garden contained one of the first "wilderness" gardens built in America, yet this element was also terraced. At Morven, a particular concern is the manner in which the terraces were embellished to introduce naturalistic elements into the formal garden plan. These embellishments already are appearing as a series of garden features, but their analysis necessarily awaits more complete excavation of the entire garden, as the pattern visible at the moment is fragmentary (FIG. 2).

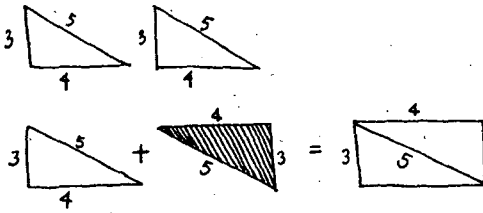


Figure 7. Illustration showing the construction of a 3:4:5 rectangle from a 3:4:5 triangle (from Paca 1988).

In a study begun in 1981, Paca-Steele and Wright carried out a geometric analysis of the William Paca garden based on a series of archaeological surveys by J. Glenn Little (1967). In re-examining the survey, they observed that the apparent loss of order in the garden expressed via the wilderness features was compensated for by an overall proportional grid based on a simple geometric form, that of the 3:4:5 rectangle (FIG. 7). The 3:4:5 rectangle consists of two triangles, each with an end of $3x$, a side of $4x$, and a hypotenuse of $5x$. After inverting and flipping one triangle, these two forms are joined at the hypotenuse, thus creating a rectangle that has an end of $3x$ and a side of $4x$. This particular type of rectangle has long been regarded as an ideal proportion by architects and architectural theoreticians. In Sebastian Serlio's *First Book of Architecture* (1551: 14-15), this proportion is illustrated as one that an architect should use in making plans and elevations of buildings (FIG. 8). In Andrea Palladio's *First Book of Architecture* (1693 English edn.), the reader is again provided with a diagram of this same proportion, but Palladio additionally suggests this as an ideal proportion for determining the height of a wall (FIG. 9). In other words, after laying out a plan that is based on a given set of proportions, a person can then construct walls by projecting vertical planes up from the plan, such as a 3:4:5 rectangle, or construct terraces using the horizontal points defined by the combination of the rectangles, as shown in Figure 10.

In Paca-Steele and Wright's study of the William Paca garden (Paca-Steele and Wright 1983, 1985, 1987), this proportion comprises the main block of the house; its exact dimensions are derived from the basic units of measurement

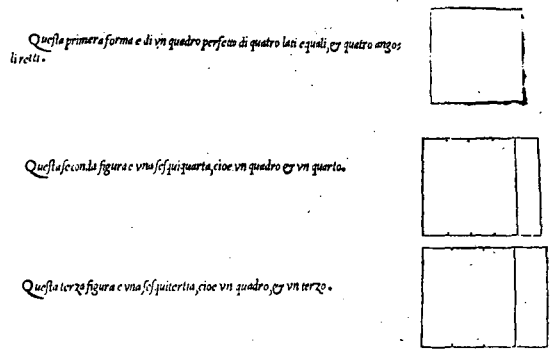


Figure 8. Drawing by Sebastian Serlio (1551: 15) of squares and rectangles to be used in the design of buildings. The figure at the bottom is a 3:4:5 rectangle.

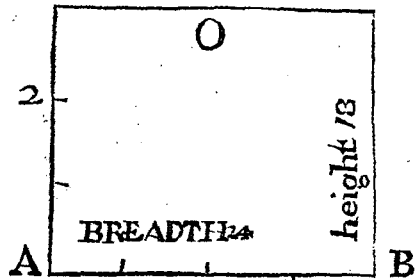


Figure 9. Illustration from Palladio (1693: 118) showing the manner in which a 3:4:5 rectangle is used to determine the height of a wall, given the breadth of a room.

employed in 18th-century surveying: the 66-ft (20.1-m) Gunter chain and its unit of division, a rod or pole, $16\frac{1}{2}$ ft (5 m) in length. The idealized proportions of the house are generated out into the landscape garden to create a powerful illusion of magnificent scale (i.e., the image of a property that rises above its boundaries—defined by a perimeter brick wall—to view out over the rivers and Chesapeake Bay into a “borrowed” landscape). The geometric grid imposed on the William Paca garden determined placement of features such as the garden wall, buildings (an octagonal pavilion, a bath house, and a spring house), pond, terrace falls, and the main axis of the garden (FIG. 11). Possibly Palladio's ad-

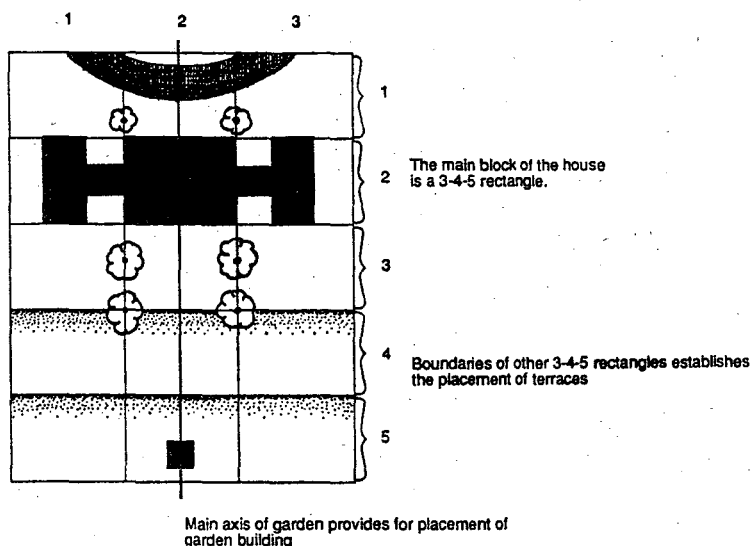


Figure 10. Illustration by Barbara Paca showing how a 3:4:5 rectangle is used to construct a net of rectangles that then becomes a grid used to design a garden and landscape surrounding a home.

vice to use a 3:4:5 rectangle in designing elevations was also applied to the vertical ordering of this garden as well as used in its plan. In this manner, the wilderness style of gardening then fashionable in Great Britain was integrated into the William Paca garden with the restraint and control necessary to the taming of the disorderly Annapolis marshland/tidal estuary and brackish pond interface that constituted the lower reaches of Paca's garden site.

The research team has reasoned that if Stockton used the same type of proportional measurements that William Paca used, the dimensions of the original foundations for the main block and its wings will serve as signposts directing them to the locations of other garden elements. The use of perspective and illusion already known to exist in the garden plan suggests the likelihood of such a proportional system, and Barbara Paca has worked out a tentative scheme for using it to locate major garden features during the 1989 field season. The Stocktons may also have used an iconographic program to organize their garden. In this literary approach to gardening, features such as statuary, planting, and/or garden buildings are arranged to represent themes such as the Golden Age. Until foundations of ca. 1760

garden structures are located and their overall pattern on the land delineated, iconographic analysis must be postponed.

The work related to the garden's topography, its design, and its vista is similar to analysis done at many historic sites, and the findings at Morven are in accord with what colleagues in Annapolis have found at Paca Garden (Paca 1981; Paca-Steele and Wright 1983, 1985, 1987), Ridout Garden (Hopkins 1986), Tulip Hill (Barbara Paca, personal communication, 1988), Wye Island (Paca 1988; Coggin and Paca 1988), Bordley-Randall (Yentsch 1988c), and the Carroll House in Annapolis (Shackel 1987; Leone and Shackel 1989), and at the Carroll Mansion, Mount Clare, in Baltimore, Maryland (Weber 1986, 1988; Weber et al. 1989). This is not surprising, as wealthy families formed a distinctive set in colonial society, one in which there was much written communication, social contact, and discourse among members (Bushman 1984). Illustrated garden books such as those by d'Argenville (1712), Hale (1759), Hill (1759), Langley (1726), Miller (1724), and Switzer (1742) were in many libraries, and knowledge of garden design and plant growth was augmented by visits to well known gardens and by conversations with their owners

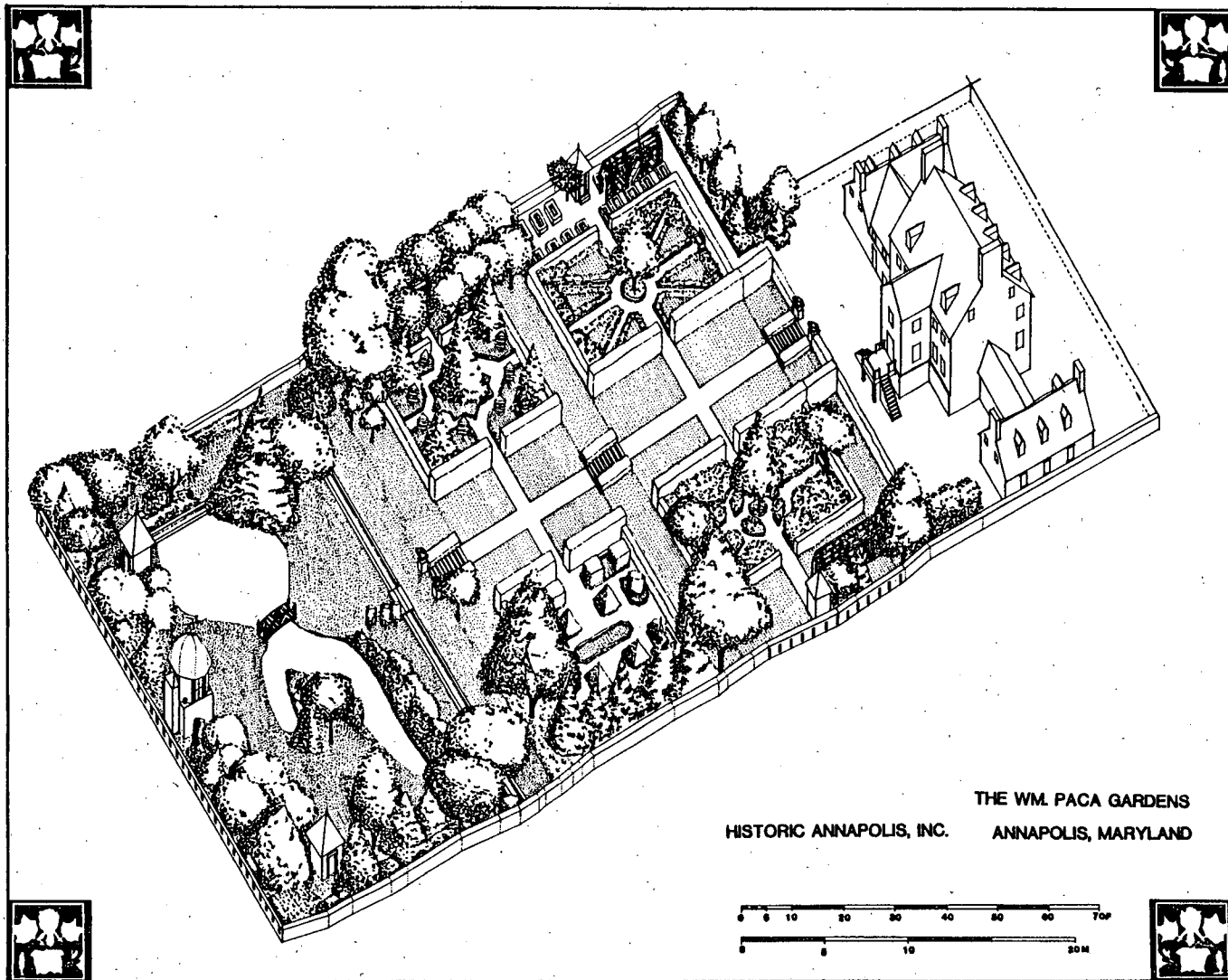


Figure 11. View of the William Paca garden showing disposition of garden features in accordance with the grid based on the 3:4:5 triangle. Drawing by Barbara Paca. Reproduced courtesy Historic Annapolis, Inc.

or gardeners. Plants were often the topic of the day, and gentlemen "spent hours discussing the shape and beauty of individual trees, as if they were statues or horses" (Thomas 1983: 213). Given the focus of attention that garden plants held, their usefulness in directing attention towards particular aesthetic elements of a garden, or in creating a symbolic atmosphere for a garden, an important research question has been whether or not any of the plants now alive at Morven were old enough to have been part of the 18th- or 19th-century gardens.

Trees as Clues to Change in the Garden

Miller's 1987 plant survey located trees that might have been alive in the 19th century. As even large trees can be transplanted, knowing the age of a tree does not establish when it was planted in its present location at Morven. Still, it was felt age estimates would be helpful. The most accurate way to determine the age of a tree is to cut it down and then count its rings—the use of cores is less accurate but does not destroy the tree. Nonetheless, the results of the coring are suggestive.

Laurence Lockwood of Lockwood Associates cored a selected group of 25 of the largest trees to estimate their life spans from tree-ring counts. One or two trees in any one grouping of a single species (e.g., the Norway spruces, *Picea abies*) were cored. It is assumed that the other trees in the group, being of similar height and girth, were planted around the same time. Lockwood estimated the age of the trees by inserting a 12-in (30.5-cm) coring device as far into each tree as it would go. For many trees, only the outer rings were reachable. The number of rings per inch on the outer cores was counted and calculation of the estimated life span of the tree made based on the radius of the tree. Since most of the trees that were cored are species that tend to have wider rings when they are young, the age estimates (TAB. 2) are, if anything, too high, perhaps by as many as 10 to 50 years (Henry Michael, Museum Applied Science Center for Archaeology, personal communication, 1988). Further, the range of error increases with the age of the tree (i.e., a tree estimated at 75 years of age could be 65-75 years

old; a tree estimated at 205 years could be as young as 155 years old).

Despite the relative quality of tree-ring dates, the study of the trees has been extremely useful because it directed attention toward areas of the yard that are not given prominence in the modern Morven landscape. Lockwood's results were unexpected and indicate the deceptive way in which past and present blend together on a continuously occupied site. Some of Morven's trees, of course, look old and contribute significantly to the aura of antiquity that has captivated the imaginations of people visiting the house. Other trees looked much younger, but, like people, trees grow at different rates and age in as varied a manner as humans do.

Trees with Deceptive Appearances

Among the old-looking trees on the property is a grove of Norway spruces as tall as 80-100 ft (24.3-30.4 m; represented by Sample No. 21 in TAB. 2). These, however, are actually quite young. Helen Hamilton Shields Stockton planted them around the turn of this century when she attempted to bring the old garden back to life through artful planting, the use of a 17th-century pattern of brickwork, and landscape alteration. What she hoped to hide was a partial use of the yard as farmland by Samuel W. Stockton, a cousin who obtained the property from Commodore Stockton's children. The spruce trees were not part of the original garden and separate the house from its vista. They represent a modern way of linking status to dwellings through seclusion (or distancing from the community). In today's world, a secluded, private house is more prestigious than a highly visible (i.e., public) house. The spruce trees bear no relation to the early garden features found below the surface, such as the slope of the first terrace, and actually intrude upon earlier buried features: the 18th-century terrace slope, a mid-19th-century access road, and an unidentified building.

Trees in Oral Tradition

Historical Precedent

Traditionally, old trees on family estates have been associated with earlier generations, and

Table 2. Approximate ages of selected trees at Morven based on cores obtained and analyzed by Lockwood Associates.

Sample	Common Name	Circumference of Trunk	Approx. Age	Household Association*
1	Norway Spruce	30"	85	Helen H.S. Stockton
2	Tulip Tree	24"	52	Robert Wood Johnson
3	Sycamore	26"	78	Helen H.S. Stockton
4	Hemlock	15"	64	Helen H.S. Stockton
6	Magnolia	26"	89	Helen H.S. Stockton
8	White Pine	30"	94	Samuel W. Stockton or Helen H.S. Stockton
9	White Pine	21"	65	Helen H.S. Stockton
10	Sycamore	37"	124	Samuel W. Stockton Helen H.S. Stockton
11	Pin Oak	28"	81	Helen H.S. Stockton
12	Tulip Tree	54"	130	Commodore Robert Field Stockton or Samuel W. Stockton
13	Catalpa	36"	98	Samuel W. Stockton or Helen H.S. Stockton
14	Sugar Maple	30"	95	Samuel W. Stockton or Helen H.S. Stockton
15	Horse Chestnut	33"	202	Richard & Annis Stockton or Richard Stockton ("The Duke")
16	Tulip Tree	32"	111	Samuel W. Stockton or Helen H.S. Stockton
17	Sweet Buckeye	29"	183	Richard Stockton ("The Duke")
18	Paulownia	34"	139	Commodore Robert Field Stockton
19	English Walnut	27"	91	Samuel W. Stockton or Helen H.S. Stockton
20	Mulberry	38"	112	Samuel W. Stockton or Helen H.S. Stockton
21	Norway Spruce	30"	75-85	Helen H.S. Stockton
22	Tulip Tree	30"	84	Helen H.S. Stockton
23	Sycamore	28"	70	Helen H.S. Stockton
24	Tulip Tree	29"	42?	Governor Walter Edge
25	Hemlock	17"	56	Robert Wood Johnson or Governor Walter Edge

*The household associations shown take into account the possible error range of ca. 50 years for life span estimates of trees obtained from cores. The household associations are considered to be probable associations, although given the large number of trees linked with Helen Hamilton Shields Stockton it is likely that some of the trees shown as planted by either Samuel W. Stockton or Helen H.S. Stockton were most likely also planted by Helen (for example, Sample 8). Locations of trees are shown in Figure 6. Source: Miller and Yentsch 1988.

trees have been used as metaphors to describe individuals. Thomas (1983: 218) in his essay on "The Worship of Trees" notes that in 1673 the English Earl of Warwick was spoken of as a "princely cedar," a "spreading oak," and a "great tree cut down," and that a Mrs. Hemans wrote in the 19th century of England's stately homes as standing amidst "tall ancestral trees." The use of trees as evocative symbols of the past can be seen in this country especially with reference to trees in various communities denoted as "Liberty Trees." Davies (1988: 34) writes that a tree is an apt historical marker because it stands, "both literally and metaphorically, as a living entity spanning many human generations." At Morven trees have also become historical markers, among them a horse chestnut known in the 19th century as the "patriarch tree" (Faris 1932: 257).

Morven's Ancestral Tulip Tree

Today, the tree that looks most stately and old is a tall, wide-girthed tulip tree (*Liriodendron tulipifera*, Sample No. 12 in TAB. 2). Its symbolism in the oral tradition surrounding Morven also evokes the past. According to local history, the tulip tree is one of two that Richard Stockton and his wife Annis planted at the entrance to their lot when they were married (Bill 1954: 21; see also Bill et al. 1978). Oral tradition elsewhere throughout the mid-Atlantic and New England regions records that in colonial times newlyweds planted tulip trees near major entranceways to their homes. Certainly some couples did so, modifying the English custom of planting a tree at the birth of a child or death of a man.

Whether or not trees were actually planted in association with these major social events in 18th-century American family life cycles, the oral tradition that local people attach to old trees is a way of collapsing generational distance, pulling townspeople closer to an earlier point in their history. Looking at the tulip tree at Morven and touching it, the Stocktons and their Princeton neighbors felt a connection between pre-Revolutionary Princeton and their own eras. The tree bridges time. Yet, although the Morven tulip tree is old, the coring revealed that it was planted in the mid-19th century by someone in Commodore Stockton's household and not earlier. Its

life span began with the third generation of Stocktons rather than with the first family that inhabited Morven.

Trees as Clues to Garden Features

The Horse Chestnuts and Chestnut Walk

In contrast to Helen Hamilton Shields Stockton's spruce trees, some trees do *not* show their age. These include one horse chestnut in the west yard (behind the outbuildings) and two in the east yard originally within the property bounds, but now outside the fenced yard on land owned by the State and Borough of Princeton. In her plant survey, Miller noted that the horse chestnuts on the Borough property were aligned with the front of the house, and added them to the list of trees to be cored.

Oral tradition, retold by Lathrop, states that two French Huguenot emigrés, Samuel and Lewis Pintard, "brought with them chestnuts from a famous tree in the courtyard of the old fortress chateau of Loches-sur-Inde, Touraine" (Lathrop 1927: 367) and gave them to Richard and Annis Stockton while the brothers were courting Stockton's two younger sisters. Samuel and Lewis Pintard married Abigail and Susanna Stockton on May 23, 1770. Bill (1954: 21) writes that the Pintards' gift provided the stock for a chestnut walk planted by Richard and Annis Stockton that ran from Bayard Lane to Library Place "like the road from London to Hampton Court, which separated Pope's villa from his garden." Undoubtedly much of this is fanciful conjecture; the Pintard brothers were born in New Rochelle and were of French descent, not recent emigrés (Wanda Gunning, personal communication, 1988).

By the early 17th century, long avenues of trees such as limes, elms, or horse chestnuts leading to a great house were a means of creating and controlling a vista that had "become a recognized aristocratic symbol" (Thomas 1983: 207). Throughout the 18th century trees were used to disguise lot boundaries or to display the extent of one's land holdings. They were an essential part of the architectural setting for a home. The Stockton house faced the King's Highway (now known as Stockton Street) on the



Figure 12. Detail from an 1852 survey of Princeton by John Bevan. Redrawn from an original lithograph on file at the Firestone Library, Princeton University.

western side of the town of Princeton; its lands were bounded on the east by Patterson Street (now known as Bayard Lane), and people approached the house from the town via Nassau Street, which intersected with both Stockton Street and Bayard Lane. A reasonably accurate 1852 town map (FIG. 12) and an 1881 sketch-map of the garden give the location of the horse chestnut walk, supposedly copied from a tree-lined walk in Alexander Pope's landscape garden at Twickenham. The distance from Bayard Lane to the front door of the house along its route was 600 ft (182.4 m), whereas the distance from the house to Stockton Street used by the modern access route is only 250 ft (76 m). Hence, if old, the walk might be said to have been designed with the intent to enhance social distance by extending the length of the Stockton property that one traversed before reaching the entrance as well as by marking the distance with lofty, imposing trees.

It was unexpected to find that the age of the three horse chestnuts at Morven falls in the range of 200 years old. The experts who did the coring

knew nothing of the purported age of the horse chestnut walk in oral tradition. They did not even know what the archaeologists knew—namely that the walk appeared on 19th-century maps in a line with two of the trees. Yet even 200-year-old trees would not have been alive in 1770 when the Pintard brothers married the Stockton sisters. Instead the trees are evidence of gardening by the second generation of Stocktons.

Still, the age of the horse chestnuts caused the archaeological team to place an excavation unit in line with the trees as soon as the 1988 field season opened. This unit revealed two substantial garden walkways. The first was an early 20th-century brick walk from Stockton Street that cut into a wider, older walk. The 20th-century walk was 1-2 in (2.5-5.1 cm) below the surface; the surface of the older walk lay at a depth of 6-8 in (15.2-20.3 cm) below grade (216.29 ft [65.8 m] ASL). It was flanked by garden beds measuring 1½ ft (.5 m) wide. Both walks directed people to the library entrance in the East Wing, where Commodore Stockton had his office. Composed

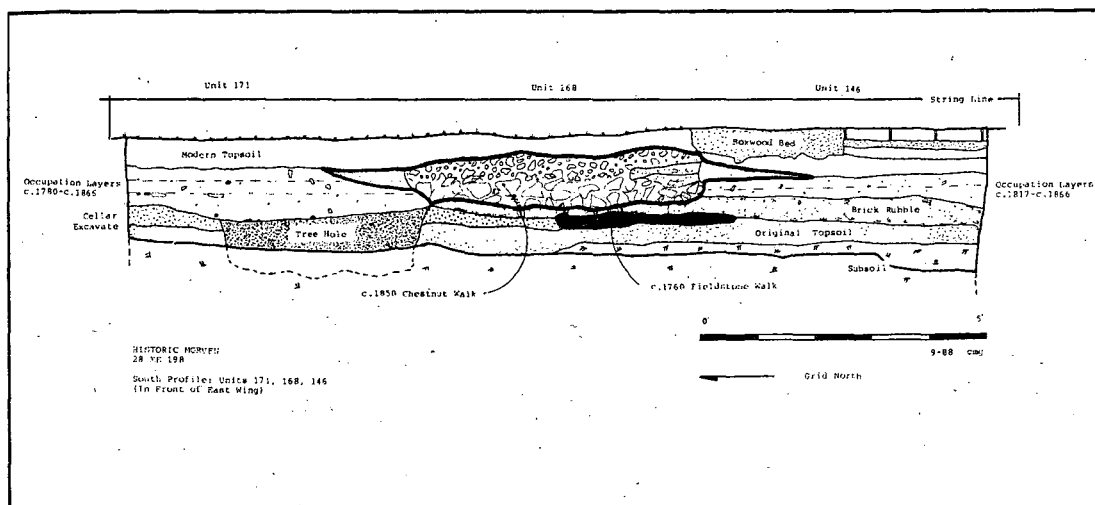


Figure 13. Stratigraphic sequence for units 146, 168, and 171 in front of the East Wing at Morven showing Commodore Robert Field Stockton's chestnut walk (ca. 1850) and adjacent garden beds overlying the earlier fieldstone walk associated with Richard and Annis Stockton (ca. 1770-80). A tree hole to the north abuts the earliest walkway. Drawing by Conrad M. Goodwin.

of a layer of finely crushed gravel, with mica chips for sparkle, and laid on a bed of broken chunks of recycled cut stone (the matrix of the bedding material also produced small quantities of 19th-century white wares), the second walk was a major garden feature in the mid-19th century.

Buried underneath the 19th-century walk, at a level of $215\frac{1}{2}$ ft (65.5 m) ASL, was an even older, slightly curving walk that lay on the 18th-century yard surface (FIG. 13). The oldest walk is not as grand as its 19th-century replacement: it is narrow and made of local fieldstone. It does not direct visitors to the East Wing, but instead curves southward towards a larger, broader fieldstone feature whose form and function are still unknown. As shown in Figure 13, the walk was abutted by at least one deep planting hole for a tree or shrub. This plant was either already alive when Richard and Annis built their home, or it was planted shortly thereafter. Its planting date is established by the surrounding stratigraphy and by refuse containing bits of creamware plates placed in its planting hole ca. 1780. Whether the planting hole and the associated walk are the remains of the earliest horse chestnut walk may never be known, but it should be

noted that their existence does span the years (ca. 1768-70) when the Pintard brothers were courting Richard Stockton's sisters.

Thus far the archaeological evidence that has been presented has focused on the analysis of space and on physical features that divided space within the garden. Broadly speaking, the concern has been with large elements that would help define the garden's design. The analysis has enabled the New Jersey State Museum to recover fragmentary sections of Morven's earlier gardens and will provide a basis for deciding what to restore and what to emphasize when Morven opens as a full-fledged museum in the 1990s. To have an equally valid basis for recreating the 18th- and 19th-century garden beds, more information about Morven's floral history is required. Phytoliths hold the most potential for providing information on the plants that once grew at Morven.

Phytoliths and Morven's Floral History

The existence of phytoliths has been recognized since the mid-19th century. Ehrenberg (1854) first classified them from dust samples aboard Darwin's vessel, the HMS *Beagle*. They

are silica bodies (also known as plant opal) that are incorporated into many plant tissues. Rovner (1989) describes them as "decay-in-place plant residue." Although not universally formed in all higher plants, many families and genera of plants produce phytoliths in distinctive morphologies (Piperno 1987). Ecologists used phytoliths in studies of environmental history before archaeobotanists began their own systematic investigation of these plant remains in the 1970s. Over the last decade phytolith analysis has been established as an integral part of prehistoric studies, although much basic research on phytolith production, taxonomy, and interpretation is still required (Piperno 1987).

Phytolith analysis comes as a very recent addition to the paleoethnobotanical arsenal in historical archaeology. To date, work at historical sites has included the identification of field crops at Monticello in Virginia (Rovner 1988), the identification of Festucoid grass phytoliths at the Moravian gardens in Bethabara, North Carolina (Irwin Rovner, personal communication, 1988), and, through the analysis of phytolith degradation, the interpretation of land use history of the backlot of the Kirk Street Agents' House in Lowell, Massachusetts (Fisher 1987; Fisher and Kelso 1987). One other garden site where phytoliths have been studied is at Bacon's Castle on the lower James River in Tidewater, Virginia (Lucchetti 1989). Like Morven and Bethabara, the samples from Bacon's Castle contained heavy concentrations of phytoliths, and non-grass categories are well represented. Until a modern collection is made and species-specific phytoliths identified for Tidewater, Virginia (a study underway by Irwin Rovner and the Garden Clubs of Virginia), however, few identifications can be made.

Because phytoliths are identified based on the morphological form of comparative material procured from living plants, the thrust of the 1987-88 phytolith study at Morven was (1) to determine whether phytoliths were present in soil samples in sufficient quantities to warrant further analysis; and (2) to obtain the necessary comparative materials from modern plant sources in the mid-Atlantic region to build a comparative reference collection. This collection is now housed at the University of Pennsyl-

vania's Museum Applied Science Center for Archaeology in Philadelphia where it is available for use by scholars.

Soil samples for the phytolith study were taken in and around excavated planting holes and garden beds. In addition, a series of samples was taken from the sidewall of the excavation unit over the terrace slope. Finally, the staff routinely removed about a cup of soil from the flotation samples to provide general coverage and control samples for the site. The patterns of phytolith distribution indicate primary deposition of most plants rather than intrusive occurrences. For example, samples from garden beds and planting holes are phytolith rich, while soils taken adjacent to such contexts are phytolith poor or devoid of phytoliths.

Preliminary results indicate that phytoliths are present in abundance in many samples. Plant groups identified include the Gramineae (grasses), Cyperaceae (sedges), Compositae, ferns, squash (*Cucurbita* spp.), and a large number of arboreal and herbaceous forms that have not yet been identified (although analysis is underway now that the modern phytolith collection is complete). The vast majority (over 90%) of the grass phytoliths were from the Festucoid sub-family, which includes such genera as *Poa* and *Festuca*. These are common lawn grasses in the New Jersey region. Other Gramineae phytoliths belong to the Chloridoid and Panicoid sub-families, which include genera like *Panicum* and *Chloris*, and are likely to have been weeds as opposed to planted grasses. Festucoid phytoliths occurred in abundance both in planting holes and garden beds, and Piperno believes these can eventually be identified to the genus level.

Because phytoliths persist in the soil after the decay of contributing plants and have a narrow dispersal range, information from their analysis will help to distinguish different uses of space on the basis of variation in plant cover. Phytolith distribution could help differentiate former lawns from non-lawn areas, ornamental from kitchen gardens, orchards from vineyards, or service areas from decorative areas. For example, squash phytoliths were recovered near the north central entrance to the house from a garden bed that has been tentatively dated to the late 19th-century occupation of Colonel Samuel

W. Stockton, a Princeton farmer. Comments about the estate by descendants of Helen Hamilton Shields Stockton suggest that Samuel did not fully maintain the formal or decorative gardens—a state of affairs also suggested by the presence of squash phytoliths (i.e., kitchen-garden plants) in late 19th-century deposits in an area of the site that was originally part of the ornamental garden. The existence of a “plow zone” stratigraphic layer in nearby sectors of the ornamental garden also indicates a functional use of the north yard during the late 19th century.

Another illustration of how variation in phytolith distribution provides information about activity areas within the yard comes from the analysis of the 1987 samples from the kitchen courtyard area—an area of the site peripheral to the 19th-century garden. These samples contained the fewest lawn-type grasses of any from the site, indicating a heavy foot traffic in this area. At the same time, the plant remains from a feature sampled in the courtyard area included many diatoms (Bacillariophyta, or microscopic single-celled plants) and sponge spicules (siliceous skeletal material produced by organisms known as Porifera). These are characteristically found where the soil is well-watered and poorly drained. Since the feature was located less than 10 ft (3 m) east of a well and 5-7 ft (1.5-2.1 m) south of an ice house, there was ample opportunity for water to accumulate; drainage was inhibited by the presence of the brick well shaft and by the heavy clay concentration in the soil.

In the testing program, arboreal phytoliths occurred almost exclusively in planting holes whose depth and placement suggest they once contained trees. Only one set of elm phytoliths has been identified thus far, but it should be possible to make precise identifications of many more of the trees upon expansion of the modern comparative collection, providing a good picture of the kinds of trees that were planted and their locations in the yard. These data, combined with the inventory of extant trees and their ages, will permit the research team to map and chart the botanical changes to the yard over time. It is likely that the trees believed to line the various walkways located archaeologically will have left distinctive phytoliths in or around their

planting holes, and these should reveal whether a series of elms, catalpas, cherry trees, horse chestnuts, or other trees, lined a given walkway.

It should be noted that the removal of uprooted trees or dead tree stumps from a garden leaves large holes, often quite deep, which must be filled to maintain a level ground surface. At Morven, such holes were filled with a variety of inorganic and organic debris, including grass clippings. Thus it is not expected that any given planting hole will contain phytoliths from a single species; rather the relative proportions of the identified plants will provide the basis for associating a given species of plant with a tree-hole. In this the control samples and the depth samples within the feature provide crucial comparative data. With this information in hand, the New Jersey State Museum can decide whether or not to recreate some of the 18th-century plantings and to partially restore the original garden's plant holdings.

Because phytoliths are not uniformly produced throughout the plant kingdom, however, and because some are better silica accumulators than others (Piperno 1987: 19), the absence of phytoliths for some kinds of plants that may have been grown at Morven cannot be taken as across-the-board evidence that they were not. The use of phytolith evidence must still be interwoven with the information available from more traditional historical sources before Morven's floral history can be fully understood.

Conclusion

The first phase of excavation at Morven was designed to test the potential for archaeological study of the earlier landscape in all its guises. Included in this research was intensive botanical analysis using a variety of archaeobotanical techniques integrated within an ethnobotanical framework. The results to date are promising and suggest that intensive study of plant remains from historical sites has the potential to further refine our understanding of the different ways—technological and ideological—in which the natural world was utilized by people of the past.

The botanical information will be integrated with information on the garden's design obtained from plotting and dating the different gar-

den features. At present these features include one set of terrace steps, a terrace fall line, six garden walks, a brick carriageway, a cobblestone road, a cobblestone forecourt, half a dozen tree holes, several planting beds, and possibly a pond. None of these landscape elements by itself is particularly informative. Each still must be related to the others in time and in space before the garden plan will emerge. Still, there is direct evidence of these features below ground. Hence this phase of the study, like the botanical analysis, focuses on tangible cultural remains.

Evidence of the garden's vista is less tangible and has to be inferred from collateral information: USGS topographic maps depict the topography in a widespread area surrounding the site; present-day vistas of or toward the Sourland Mountains suggest the depth of visibility that once existed. Modern growth has obscured much of this from the vantage of present-day Princeton, for as late as the 1970s forests covered at least 15% more of the county's land than in 1899 (Robichaud and Buell 1983). But 18th-century pictorial information on rural countrysides and information on 18th-century agricultural tillage and grazing allows one to infer to a reasonable degree the earlier appearance of the land, especially when coupled with descriptions of farmsteads such as the 1787 one of Colonel George Morgan's Princeton farm which suggest well-cleared land: "His house . . . stands in a situation which commands a complete view of his whole farm, consisting of about 200 acres" (Cutler and Cutler 1888a: 246).

Trying to retrieve information on the vista that surrounded the Stockton house leads directly to a consideration of the aesthetic qualities of the house and lands and to the way in which the Stocktons blended natural elements with cultural elements to create an estate for future generations. Despite its high cultural value, the future of the ornamental gardens was always uncertain. This point must be stressed, for it is possible, with much labor, to carve garden lands into a variety of forms in a relatively short period of time. It is much more difficult to grow and maintain the plants, shrubs, and trees whose existence gives a garden its aesthetic appearance, personality, and life. Constant care is required, and some plants, like the horse chestnut trees,

require the patience of Job. Likely some of the garden plants, especially the trees, planted by Richard Stockton in the 1760s had not reached maturity in 1781 when he died at the age of 50. Like the State House yard in Philadelphia, described by Manesseh Cutler in 1787, Stockton's garden in the last year of his life also awaited "that air of grandeur which time will give it" (Cutler and Cutler 1888a: 147).

Given the life expectancy of most 18th-century Americans, clearly the gardens that adult men created could not have been expected to reach their maturity within a single generation, and thus generational or familial continuity was built into the concept of any extensive ornamental garden and its associated kitchen gardens, vineyards, and orchards. Associated with the idea of family or generational continuity is the concept of family immortality. Families were immortalized through the presentation of the household's timeless "self" (i.e., its garden—an intrinsically beautiful framework for presentation that integrated cultural practice with natural material). John Worlidge (1669: 72) presents this point of view as a rhetorical question: "What can be more pleasant than to have the bounds and limits of your own property preserved and continued from age to age by the testimony of . . . living and growing witnesses?"

The quality and quantity of a family's plants and animals provided material testaments to the status of families living in the countryside. As living and growing witnesses, plants and beasts were encompassed within and defined each family's domains of production and consumption. An elite household's position in the rural society was derived from its ability to successfully combine husbandry and decoration, profit and pleasure. It organized its landscape based on aesthetic needs but also used its lands, plants, and animals as a source of income.

Without the care of a gardener, a garden disintegrates, returning to a wilder, more natural state. This occurs quickly no matter how long-lived the garden or how many years have passed since the first cultivation of its constituent plants. The nurture required to maintain a garden is constant, as are the duties and obligations of individual family members, male and female, who nurture a household. As an extended spatial do-

main of the home, or outdoor assembly room, an ornamental garden was an extension of a house and, as such, it symbolized the continued existence of the household in much the same manner as the fabric of a house itself suggested the strength and generational continuity of the family who lived within (Yentsch 1988b).

Preliminary results of the archaeological study at Morven indicate that the remains of its gardens still survive below ground. Landscape archaeology, when combined with sophisticated archaeobotanical analysis and ethnobotanical research, should be highly successful in recovering sufficient information about the gardens to permit restoration and recreation by the New Jersey State Museum of these different yet intertwined elements of the earlier landscape. The key is the labor-consuming process of integrating the slow and painstaking field techniques that produce detailed stratigraphic sequences concurrently with extensive open-area excavations required to reveal the horizontal patterning of a garden, and then meshing these results with ethnographic and botanical information.

The possibility of recovering the outlines of an ornamental garden as beautiful as those described by Rev. Manesseh Cutler adds impetus to the archaeological study of Morven. Cutler wrote evocatively of late 18th-century pleasure gardens in the mid-Atlantic, describing gardens with "pleasure grounds . . . formed into walks, in every direction, with borders of flowering shrubs and trees. Between are lawns of green grass, frequently mowed to make them convenient for walking, and at different distances numerous copses of native trees, interspersed with artificial groves, which are of trees collected from all parts of the world" (Cutler and Cutler 1888b: 145). Yet historical records, in less evocative language, also tell of the working gardens that provided households with sustenance and cash or credit incomes. Gardens for display and gardens of pleasure, working orchards, vegetable gardens, and fields of grain existed at Morven and were altered over time by successive generations of Stocktons, by their slaves, servants, and paid laborers. Each type of garden and each phase in its development has its own history and story to tell—all have relevance in presenting New Jersey's history. The tension over time be-

tween these two kinds of land use, situated side by side on a single plot of land, is what the museum seeks to recover, explore, and present to the public through the archaeological definition of Morven's earlier landscapes.

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References

- Akerson, Louise E., Cheryl Holt, and Eileen Williams
1986 Floral Flotation, Phosphorus, Potassium, and pH at Mount Clare: Techniques, Methods, Results. Paper presented at the Mid-Atlantic Archaeological Conference, Rehoboth Beach, DE.
- Albee, Peggy A.
1988 Historic Structures Report for Morven. Manuscript on file, New Jersey State Museum, Trenton.
- d'Argenville, Alexandre Dezallier
1712 *The Theory and Practice of Gardening*. John James, London.
- Beaudry, Mary C.
1984 Archaeology and the Historical Household. *Man in the Northeast* 28: 27-38.
1986 The Archaeology of Historical Land Use in Massachusetts. *Historical Archaeology* 20(2): 38-46.
1988 Comments on the Historical Archaeology of North American Households. Paper presented at the 21st Annual Meeting of the Society for Historical Archaeology, Reno, NV.
1989 The Lowell Boott Mills Complex and Its Housing: Material Expressions of Corporate Ideology. *Historical Archaeology* 23(1): 19-32.

- Beaudry, Mary C., and Stephen A. Mrozowski, eds.
 1987a *Interdisciplinary Investigations of the Boott Mills, Lowell, Massachusetts. Volume I: Life at the Boarding Houses: A Preliminary Report.* Cultural Resources Management Study 18. National Park Service, North Atlantic Regional Office, Boston.
 1987b *Interdisciplinary Investigations of the Boott Mills, Lowell, Massachusetts. Volume II: The Kirk Street Agents' House.* Cultural Resources Management Study 19. National Park Service, North Atlantic Regional Office, Boston.
- Betts, Edwin Morris, ed.
 1981 *Thomas Jefferson's Garden Book, 1766-1824.* American Philosophical Society, Philadelphia.
- Bevan, Bruce
 1987 Remote Sensing Survey of Morven Gardens. Manuscript on file, New Jersey State Museum, Trenton.
- Bill, Alfred Hoyt
 1954 *A House Called Morven.* Princeton University Press, Princeton.
- Bill, A. H., W. E. Edge, C. M. Greiff, and B. F. Schwartz
 1978 *A House Called Morven: Its Role in American History.* Rev. edn. Princeton University Press, Princeton.
- Brookes, John
 1984 *A Place in the Country.* Thames & Hudson, London.
- Bushman, Richard
 1984 *American High-Style and Vernacular Cultures. In Colonial British America: Essays in the New History of the Early Modern Era,* ed. by Jack P. Green and J. R. Pole, 345-383. Johns Hopkins University Press, Baltimore.
- Coggin, Lucy dos Passos, and Barbara Paca
 1988 Report on the 18th-century Paca Garden at Wye Island. Manuscript on file, Historic Annapolis, Inc., Annapolis, MD.
- Cosgrove, Denis
 1988 The Geometry of Landscape. In *The Iconography of Landscape: Essays on the Symbolic Representation, Design, and Use of Past Environments*, ed. by Denis Cosgrove and Stephen Daniels, 254-276. Cambridge University Press, Cambridge.
- Crook, J. Mordaunt
 1988 *The Dilemma of Style: Architectural Ideas from the Picturesque to the Post-Modern.* University of Chicago Press, Chicago.
- Cutler, W. P., and J. P. Cutler, eds.
 1888a *The Life, Journals, and Correspondence of Rev. Manesseh Cutler, LLD by his Grandchildren.* Vol. 1. Robert Clarke & Co., Cincinnati.
 1888b *The Life, Journals, and Correspondence of Rev. Manesseh Cutler, LLD by his Grandchildren.* Vol. 2. Robert Clarke & Co., Cincinnati.
- Daniels, Stephen
 1988 The Political Iconography of Woodland. In *The Iconography of Landscape: Essays on the Symbolic Representation, Design, and Use of Past Environments*, ed. by Denis Cosgrove and Stephen Daniels, 43-82. Cambridge University Press, Cambridge.
- Davies, Douglas
 1988 The Evocative Symbolism of Trees. In *The Iconography of Landscape: Essays on the Symbolic Representation, Design, and Use of Past Environments*, ed. by Denis Cosgrove and Stephen Daniels, 32-42. Cambridge University Press, Cambridge.
- Edwards, Andrew
 1986 Bottles and Bones and *Asparagus?* *Colonial Williamsburg* 8(4): 40-42.
- Ehrenberg, C. G.
 1854 *Mikrogeologie.* Leopold Voss, Leipzig.
- Faris, John T.
 1932 *Old Gardens In and About Philadelphia and Those Who Made Them.* Bobbs Merrill Co., Indianapolis.
- Faust, Joan Lee
 1987 A New Incentive for Restoration. *New York Times*, September 27, 1987: 69.
- Fisher, William F.
 1987 Report on the Analysis of Opal Phytoliths from Excavations at the Kirk Street Agents' House, Lowell, Massachusetts. In *Interdisciplinary Investigations of the Boott Mills, Lowell, Massachusetts. Volume II: The Kirk Street Agents' House*, ed. by Mary C. Beaudry and Stephen A. Mrozowski, 122-127. Cultural Resources Management Study 19. National Park Service, North Atlantic Regional Office, Boston.
- Fisher, William F., and Gerald K. Kelso
 1987 The Use of Opal Phytolith Analysis in a Comprehensive Environmental Study: An Example from 19th-Century Lowell, Massachusetts. *Northeast Historical Archaeology* 16: 30-48.
- Forman, H. Chandlee
 1968 *Maryland Architecture: A Short History from 1634 through the Civil War.* Tidewater Publishers, Cambridge, MD.
- Foucault, Michel
 1973 *The Order of Things: An Archaeology of the Human Sciences.* Random House, New York.
- Fowler, Peter J., ed.
 1972 *Archaeology and the Landscape.* John Baker, London.
- Goody, Jack P.
 1972 *The Developmental Cycle of the Domestic Group.* Cambridge University Press, New York.
- Greiff, Constance
 1988 Historic background information on Morven and its occupants. Report on file, New Jersey State Museum, Trenton.
- Hale, Thomas
 1759 *The Compleat Body of Husbandry.* T. Osborne, London.
- Hedrick, Ulysses P.
 1950 *A History of Horticulture in America to 1860.* Oxford University Press, New York.
- Hill, John
 1759 *The Gardener's New Kalendar.* T. Osborne, London.

- Hodder, Ian
1987 The Meaning of Discard: Ash and Domestic Space in Baringo. In *Method and Theory for Activity Area Research: An Ethnoarchaeological Approach*, ed. by Susan Kent, 424-448. Columbia University Press, New York.
- Hopkins, Joseph W., III
1986 A Map of the Ridout Garden, Annapolis, Maryland. Manuscript on file, Historic Annapolis, Inc., Annapolis, MD.
- Isaac, Rhys
1982 *The Transformation of Virginia, 1740-1790*. University of North Carolina Press, Chapel Hill.
1987 The Enlightenment and Everyday Life: Imagination and Practice on a Mid-century Plantation. Thomas Jefferson Memorial Lecture, University of Virginia, Charlottesville.
- Jacques, David
1983 *Georgian Gardens: The Reign of Nature*. Batsford, London.
- Kelso, Gerald
1988 Exploratory Pollen Analysis at Morven, Princeton, New Jersey. In *Archaeobotanical Results of the 1987 Excavation at Morven (Princeton, New Jersey)*, ed. by Naomi F. Miller and Anne Yentsch, 56-63. Morven Interim Report No. 2. New Jersey State Museum, Trenton.
- Kelso, William M.
1983 Landscape Archaeology: A Key To Virginia's Cultivated Past. *Eighteenth Century Life* 8(n.s. 2): 159-169.
1984 *Kingsmill Plantations 1619-1800: Archaeology of Country Life in Colonial Virginia*. Academic Press, Orlando.
1989 (editor) *Earth Patterns: Archaeology of Early American and Ancient Gardens and Landscapes*. University Press of Virginia, Charlottesville, forthcoming.
- Kimball, Fiske
1917 Beginnings of Landscape Architecture in America. *Landscape Architecture* 42: 184.
- Langley, Batty
1726 *Practical Geometry Applied to the Useful Arts of Building, Surveying, Gardening, and Mensuration*. W & J Innys, J. Osborn and others, London.
- Laslett, Peter
1972 Introduction. In *Household and Family in Past Time: Comparative Studies in the Size and Structure of the Domestic Group over the Last Three Centuries in England, France, Serbia, Japan and Colonial North America, with Further Materials from Western Europe*, ed. by Peter Laslett and Richard Wall, 1-89. Cambridge University Press, Cambridge.
- Lathrop, Elise
1927 *Historic Houses of Early America*. Tudor Publishing Co., New York.
- Leone, Mark P.
1983 The Role of Archaeology in Verifying American Identity: Giving a Tour Based on Archaeological Method. *Archaeological Review from Cambridge* 2(1): 44-50.
- 1987 Rule by Ostentation: The Relationship between Space and Sight in Eighteenth-Century Landscape Architecture in the Chesapeake Region of Maryland. In *Method and Theory for Activity Area Research: An Ethnoarchaeological Approach*, ed. by Susan Kent, 601-633. Columbia University Press, New York.
- Leone, Mark P., and Paul Shackel
1989 Plane and Solid Geometry in Colonial Gardens in Annapolis, Maryland. In *Earth Patterns: Archaeology of Early American and Ancient Gardens and Landscapes*, ed. by William M. Kelso. University Press of Virginia, Charlottesville, forthcoming.
- Little, J. Glenn, II
1967 1967-1968 letters on file, William Paca Garden Visitor's Center, Annapolis, MD.
- Lockwood, Alicia
1931 *Gardens of Colony and State: Gardens and Gardeners of the American Colonies and of the Republic before 1840*. Vol. 1. Charles Scribner's Sons, New York.
1934 *Gardens of Colony and State: Gardens and Gardeners of the American Colonies and of the Republic before 1840*. Vol. 2. Charles Scribner's Sons, New York.
- Lucchetti, Nicholas
1986a 1985 Bacon's Castle Garden Excavation Progress Report. Manuscript on file, Research Center for Archaeology, Virginia Division of Historic Landmarks, Richmond.
1986b Virginia's Oldest Garden. *Colonial Williamsburg* 8(4): 36-39.
1989 Archaeological Excavations at Bacon's Castle, Surry County, Virginia. In *Earth Patterns: Archaeology of Early American and Ancient Gardens and Landscapes*, ed. by William M. Kelso. University Press of Virginia, Charlottesville, forthcoming.
- Miller, Naomi F.
1988a *The Calvert Site, Annapolis, Maryland: The Seed Remains*. Calvert Interim Report No. 7. Historic Annapolis, Inc., Annapolis, MD.
1988b Vegetational Survey and Macroremains, 1987. In *Archaeobotanical Results from the 1987 Excavation at Morven (Princeton, New Jersey)*, ed. by Naomi F. Miller and Anne Yentsch, 27-45. Morven Interim Report No. 2. New Jersey State Museum, Trenton.
1989 What Mean These Seeds: A Comparative Approach to Archaeological Seed Analysis. *Historical Archaeology* 23(2), forthcoming.
- Miller, Naomi F., and Anne Yentsch, eds.
1988 *Archaeobotanical Results from the 1987 Excavation at Morven (Princeton, New Jersey)*. Morven Interim Report No. 2. New Jersey State Museum, Trenton.
- Miller, Philip
1724 *The Gardener's Dictionary*. (Subsequent edns. 1733, 1737, etc.). Printed for the author, London.
- Noël Hume, Audrey
1974 *Archaeology and the Colonial Gardener*. Colonial Williamsburg Archaeology Series 7. Colonial Williamsburg Foundation, Williamsburg, VA.

- Noël Hume, Ivor
1974 *Digging for Carter's Grove*. Colonial Williamsburg Archaeology Series 8. Colonial Williamsburg Foundation, Williamsburg, VA.
- Norman, Joseph Gary
1985a Restoration Archaeology Report: Archaeological Investigations in the Forecourt at Mount Clare Mansion, Baltimore, Maryland. Manuscript on file, Baltimore Center for Urban Archaeology, Baltimore, MD.
1985b Restoration Archaeology Report: Archaeological Investigations on the First Terrace, Mount Clare Mansion, Baltimore, Maryland. Manuscript on file, Baltimore Center for Urban Archaeology, Baltimore, MD.
1985c Restoration Archaeology Report: The Mount Clare Orchard/Vineyard Excavation. Manuscript on file, Baltimore Center for Urban Archaeology, Baltimore, MD.
- Nygren, Edward J., and Bruce Robertson
1986 *Views and Visions: American Landscape before 1830*. Corcoran Gallery of Art, Washington, DC.
- Paca, Barbara
1981 Maps of the William Paca Garden. Manuscripts on file, Historic Annapolis, Inc., Annapolis, MD.
1987 Morven Maps. Manuscripts on file, Historic Morven, Princeton, NJ.
1988 Map of the Paca Garden at Wye Island. Manuscript on file, Historic Annapolis, Inc., Annapolis, MD.
- Paca-Steele, Barbara, and St. Clair Wright
1983 The Geometry of an Eighteenth-Century Garden. Paper presented at a special symposium on the use of geometric principles in house and garden design, Annapolis, MD.
1985 The Use of Geometry in Designing the William Paca Garden. Paper presented at the Garden History Society Meetings, Annapolis, MD.
1987 The Mathematics of an Eighteenth-Century Wilderness Garden. *Journal of Garden History* 6(4): 299-320.
- Palladio, Andrea
1693 *First Book of Architecture*. Translated into English by Godfrey Richards for E. Midwinter, London.
- Paynter, Robert
1982 *Models of Spatial Inequality: Settlement Patterns in Historical Archeology*. Academic Press, New York.
- Piperno, Dolores
1987 *Phytolith Analysis: An Archaeological and Geological Perspective*. Academic Press, Orlando.
- Potter, Parker B., Jr., and Mark P. Leone
1987 Archeology in Public in Annapolis: Four Seasons, Six Sites, Seven Tours, and 32,000 Visitors. *American Archeology* 6(1): 51-61.
- Reinke, Marguerite, and Robert Paynter
1984 Archaeological Excavation of the Surroundings of the E. H. Williams House, Deerfield, Massachusetts. UMASS Archaeological Services, Amherst, MA.
- Repton, Humphrey
1816 *Fragments on the Theory and Practice of Landscape Gardening*. London.
- Robichaud, Beryl, and Murray F. Buell
1983 *Vegetation of New Jersey: A Study of Landscape Diversity*. Rutgers University Press, New Brunswick, NJ.
- Rovner, Irwin
1988 Macro- and Micro-ecological Reconstruction Using Plant Opal Phytolith Data from Archaeological Sediments. *Geoarchaeology* 3: 155-163.
1989 Fine-Tuning Floral History with Opal Phytolith Analysis. In *Earth Patterns: Archaeology of Early American and Ancient Gardens and Landscapes*, ed. by William M. Kelso. University Press of Virginia, Charlottesville, forthcoming.
- Serlio, Sebastian
1551 *First Book of Architecture*. Venice.
- Shackel, Paul
1987 The Garden at the Carroll House, Annapolis, MD. In *Perspectives on an 18th Century Garden*, ed. by Parker B. Potter, Jr. Brochure for Tourists at the Carroll House for the 250th Anniversary of the Birth of Charles Carroll of Carrollton, on file at Historic Annapolis, Inc., Annapolis, MD.
- Simmons, David, and Myron O. Stachiw
1988 The Use of the Harris Matrix in Architectural and Archaeological Interpretation: An Example from the Emerson Bixby Site. Paper presented at the 21st Annual Meeting of the Society for Historical Archaeology, Reno, NV.
- Small, Nora Pat, and Myron O. Stachiw
n.d. Tradition and Transformation: Rural Society and Architectural Change in Nineteenth-Century Central Massachusetts. In *Perspectives in Vernacular Architecture III*, ed. by Thomas Carter and Bernard L. Herman. University of Missouri Press, Columbia, forthcoming.
- Smolek, Michael, and Wayne Clark
1982 Spatial Patterning of Seventeenth-Century Plantations in the Chesapeake. Paper presented at the 15th Annual Meeting of the Society for Historical Archaeology, Philadelphia, PA.
- Stuart, David C.
1979 *Georgian Gardens*. Robert Hale, London.
- Switzer, Stephen
1742 *Ichnographia Rustica*. Printed for J and J Fox and B and B Barker, et al., London.
- Taylor, Christopher
1983 *The Archaeology of Gardens*. Shire Archaeology Series. Shire Publications, Aylesbury.
- Thacker, Christopher
1979 *The History of Gardens*. University of California Press, Berkeley.
- Thomas, Keith
1983 *Man and the Natural World: A History of the Modern Sensibility*. Allen Lane, London.
- Walpole, Horace
1827 *The History of the Modern Taste in Gardening, with Considerable Additions by the Rev. James Dallaway, 1827*. [1982 edn.; originally written in 1771] Garland Publications, New York.

- Waterman, Thomas T.
1950 *The Dwellings of Colonial America*. University of North Carolina Press, Chapel Hill.
- Weber, Carmen A.
1986 Mount Clare: The Georgian Landscape 1750-1780. Paper presented at the Mid-Atlantic Archaeological Conference, Rehoboth Beach, DE.
1988 A Comparison of Eighteenth-Century Gardens and Their Features in the Mid-Atlantic States. Paper presented at the 21st Annual Meeting of the Society for Historical Archaeology, Reno, NV.
- Weber, Carmen A., Elizabeth Comer, Louise Akerson, and Gary Norman
1989 Mount Clare: An Interdisciplinary Research Approach to the Restoration of a Georgian Landscape. In *Earth Patterns: Archaeology of Early American and Ancient Gardens and Landscapes*, ed. by William M. Kelso. University Press of Virginia, Charlottesville, forthcoming.
- Wilk, Robert R., and William L. Rathje
1982 Household Archaeology. *American Behavioral Scientist* 25: 617-640.
- Whately, Thomas
1770 *Observations on Modern Gardening*. London.
- Worlidge, John
1669 *Systema Agriculturae, the Mystery of Husbandry Discovered . . . to which is added Kalendarium Rusticum*. London.
- Worrell, John
1980 Scars Upon the Earth: Physical Evidence of Dramatic Change at the Stratton Tavern. In *Proceedings of the Conference on Northeastern Archaeology*, ed. by J. A. Moore, 133-145. Research Reports 19. Department of Anthropology, University of Massachusetts, Amherst.
1988 Getting From Here to Barre Four Corners or Plotting Trajectories through Space and Time. Paper presented at the 28th Annual Meeting of the Northeastern Anthropological Association, Albany, NY.
- Worrell, John, Myron Stachiw, and David Simmons
n.d. Archaeology from the Ground Up. Manuscript on file, Research Department, Old Sturbridge Village, Sturbridge, MA.
- Yamin, Rebecca
1988 To Restore or Not to Restore: Morven's Interpretive Question. Paper presented at the 22nd Annual Meeting of the Council for Northeast Historical Archaeology, Québec.
- Yentsch, Anne
1988a The Use of Land and Space on Lot 83, Annapolis, Maryland. In *New Perspectives on Maryland Archaeology*, ed. by R. J. Dent and B. J. Little. Special Publication of the Maryland Archaeology Society, forthcoming.
1988b Legends, Houses, Families, and Myths: Relationships between Material Culture and American Ideology. In *Documentary Archaeology in the New World*, ed. by Mary C. Beaudry, 5-19. Cambridge University Press, Cambridge.
1988c Report on Preliminary Archaeological Testing at the Boardley Randall Site in Annapolis, Maryland. Manuscript on file, Historic Annapolis, Inc., Annapolis, MD.
- 1988d Some Opinions on the Importance of Context. Paper presented at the 22nd Annual Meeting of the Council for Northeast Historical Archaeology, Québec.
- 1989 The Archaeological and Ethnographic Context of the Circa 1730 Orangery in Annapolis, Maryland. In *Earth Patterns: Archaeology of Early American and Ancient Gardens and Landscapes*, ed. by William M. Kelso. University Press of Virginia, Charlottesville, forthcoming.
- Yentsch, Anne, and Naomi F. Miller
1988 *Report on Fieldwork at Historic Morven 1987-88*. Morven Interim Report No. 1. New Jersey State Museum, Trenton.
- Yentsch, Anne, Conrad M. Goodwin, and Judson Kratzer
1988 The Archaeological Evidence of Morven's Earliest Structures. Manuscript on file, New Jersey State Museum, Trenton.

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