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Anthropology

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ABSTRACT

This dissertation explores the world of early American botany and the transatlantic community of botanical enthusiasts from the perspective of William Hamilton, gentleman botanical collector in late eighteenth and early nineteenth century Philadelphia. Drawing on both existing documentary sources and three seasons of archaeological excavation at The Woodlands, Hamilton's country estate on the west bank of the Schuylkill River, I analyze both the physical requirements of botanical collecting as well as the more nuanced social, cultural, and economic elements of this trade and its early modern participants.

The personal experiences of individual participants in this exchange are often traced through the existing documentary evidence they leave behind, in the form of letters, plant orders, and published works. But this botanical exchange was not just intellectual; it was also physical and material, as both knowledge about plants and the plants themselves were shipped back and forth across the Atlantic Ocean. Exploring the physical and material elements of this trade adds immeasurably to our understanding of the experiences of individual participants by locating them and the items exchanged within the physical spaces of these exchanges themselves. The archaeological investigation of William Hamilton's greenhouse complex at The Woodlands explores the physical and material elements of this trade in one specific site of exchange – Hamilton's greenhouse complex – and the ways in which those physical and material elements reflect the experiences of the participants in this transatlantic botanical trade.
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This dissertation is dedicated to the past, present, and future visitors to The Woodlands. For over 200 years, this patch of ground along the Schuylkill River has been a retreat from the demands of urban life, a green space welcoming the curious to its grounds as explorers, naturalists, family members, history buffs, joggers, outdoor enthusiasts, and others reveling in the marvel of this place. I offer this dissertation as yet another way to explore The Woodlands, and am honored to have had a chance to create my own meaning in this space.
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CHAPTER ONE: Introduction

“The Woodlands was more than a static assemblage: it was a living nexus, a crossroads of plants and people, a node in a network of concrete and symbolic exchange” (HALS Wunsch 2004: 88; quoted in Kelleher 2009).

When the historical archaeological investigation of William Hamilton and his greenhouse complex at The Woodlands first began in 2009, the impetus was fairly simple and straightforward: based on initial research into the property and its owner, it seemed as though few people were even passingly familiar with William Hamilton, and all but a small group of architectural historians and a few botanists had any sense of the historical significance of The Woodlands. Thus the original thrust of this project was to figure out, first of all, if Hamilton and The Woodlands were especially important, both for historical and contemporary audiences, and second, to investigate, why, if they were important, that this individual and his estate “fell out” of the narrative of Philadelphia botanical history. There was even an implicit undercurrent in the original proposal to perhaps put Hamilton back into these narratives, returning this gentleman and his botanical collection to Philadelphia and botanical history.

As often happens in dissertation projects, however, the naïve understanding that propels the beginning of a project changes as the researcher becomes more acquainted with the larger body of existing material, tackling not only the documentary sources but also the sizeable archaeological collection discovered over three seasons of excavation. It became abundantly clear in the course of this project that however little-known William Hamilton and his botanical activities might have
seemed to be outside of those circles that specialize in Philadelphia or early scientific history, quite a number of people had both heard of and written about the significant of Hamilton and The Woodlands (see for instance Betts 1979; Fry 1995; Heintzelman 1972; Jacobs 2005; 2006; Kelleher 2009; Leighton 1976; Long 1991; Madsen 1989; Stetson 1949a; Ward 1879; Wunsch 2004).

As daunting as it can be to realize how many previous scholars have explored Hamilton and The Woodlands, and anticipated my own ideas about the nature of the landscape, the previous work done by historians, architectural historians, preservationists, art historians, botanists, and archaeologists has provided me with a place to start thinking about Hamilton and his botanical legacy. Although Hamilton remains less familiar to many contemporary Philadelphians than his neighbor, John Bartram, Hamilton's influence was felt during his lifetime among both his fellow Philadelphia botanical enthusiasts and among the larger international botanical network of the late eighteenth and early nineteenth centuries. Much of the previous work on Hamilton and The Woodlands explores his activities through the existing documentary record, and these analyses have for the most part been rooted in the historiographical context of botanical exchanges. But by approaching Hamilton's activities archaeologically through the excavation of his greenhouse complex at The Woodlands, this dissertation provides the physical and material contexts for these interactions, adding a new dimension to Hamilton's legacy at The Woodlands, and new insights into how various participants experienced this botanical exchange.
Locating Hamilton’s botanical activities at The Woodlands within the actual physical space where they occurred – within the archaeologically-discovered greenhouse complex not only reveals the decisions that Hamilton made about the display and maintenance of these plants, but it also grounds the experience of other participants in this trade by providing a physical reminder of the material elements of botanical exchange. The documentary sources reveal only a part of this story since it is the actual, physical specimens that provided the information in these documents, and the basis for the entire botanical trade. Investigating the physical and material aspects of the transatlantic botanical exchange brings the world of early American botany back to life, repopulating this exchange with both its participants and the objects of the trade themselves. In the space of Hamilton’s greenhouse, the ephemeral life cycles of exotic plants and the wider world of international botanical exchange become tangible again, in the space in which they were exchanged, studied, and maintained.

Through the historical archaeological investigation of an early Federal period greenhouse complex on a private estate, this project examines the physical and material realities of participation in the international botanical network of the late eighteenth and early nineteenth centuries. Although this greenhouse was ostensibly private and owned by a single individual, William Hamilton, during its heyday, the structure served as a physical location – “a node in the network of concrete and symbolic exchange” (Wunsch 2004: 88) that made it a public space for the business of early botany, thereby investing it and the surrounding landscape with
multiple, layered meanings for Hamilton and for the Philadelphia and international botanical community.

Although the original research questions in this project focused on the actions and experiences of a single individual, the systematic archaeological and historical investigation of Hamilton himself, his country estate of The Woodlands, and the international botanical community in which Hamilton and his fellow Philadelphia botanists participated led to insights on multiple scales of community and individual experience. Hamilton’s greenhouse complex at The Woodlands was a physical, “concrete” structure in which the various transient strands of the international botanical exchange came together – the people, ideas, and plants that made up this trade and became the foundation of modern American botany. This project weaves these individual strands back together by relocating them in the physical space of exchange.

The subsequent chapters follow one another in a decreasing scale of analysis, moving from an outline of multinational historical and cultural developments through community analysis, and finally to the specific individual level of biography and site-specific archaeological investigation. Chapter Two sets the scene for the following discussion of the transatlantic botanical community by delving into the theoretical context of the overall study. This chapter delves into the vast field of landscape studies by looking at some of the ways in which archaeologists have approached the study of past landscapes. Landscape archaeology, spatial archaeology, and the archaeology of place are reviewed in this chapter, along with some of the main theoretical and methodological tenets that sets
these subfields apart from other archaeological investigations. These theoretical concepts of space and landscape contextualize the overview of British landscape design that follows. This chapter ends with an overview of landscape and garden studies in American historical archaeology, and the theoretical tenets present in the investigation of Anglo-American pleasure gardens by historical archaeologists Mark Leone (1984; 1987; 1988) and Dan Hicks (2005), along with my own application of these ideas at The Woodlands.

Chapter Three parallels the first chapter’s discussion of theoretical and methodological contexts for this study by laying out some of the most relevant cultural and historical developments that impacted the transatlantic botanical exchange. The age of Enlightenment in Western Europe, particularly Britain, laid the foundation for many modern day scientific theories with its emphasis on experimentation and classification of the natural world, but many tenets of the eighteenth and nineteenth century plant trade have deeper roots in the earliest days of European exploration of the New World. The interest in exotic botanicals was driven not only by collectors but also medical professionals and entrepreneurs hoping to make their fortunes in the plant trade. All of these aspects — scientific, aesthetic, medical, and economic — continued to influence the transatlantic botanical exchange into the eighteenth and nineteenth centuries. The establishment of intellectual groups and clubs, such as the Royal Society of London for Improving Natural Knowledge, chartered in 1660, and the creation of botanic gardens across Europe and the Caribbean epitomize the growing trend toward experimentation and
collection of natural knowledge that was invariably linked to medical and commercial concerns.

In Chapter Four, the discussion of the makeup of the international botanical community itself begins. This chapter examines the ways in which previous scholars have characterized and divided early scientific practitioners using a variety of criteria that raises questions about the nature of early scientific participation. Rather than employ older classification schemes, I offer an alternative model for understanding the various participants in the international botanical community as producers and consumers of both plants and knowledge. Drawing on the rich documentary evidence of the transatlantic botanical community, this chapter teases out the different ways in which individuals could participate in the international botanical network of the late eighteenth and early nineteenth centuries, and helps to form a picture of what such participation might have looked like for different individuals.

Chapter Five, "William Hamilton and The Woodlands," explores the life of William Hamilton and his development of The Woodlands estate from country retreat to international botanical paradise through the existing documentary records. The first part of this chapter focuses on Hamilton specifically, teasing out his experiences as a participant in the international botanical network of the eighteenth and nineteenth centuries by looking at his early life and his activities at The Woodlands. Through extant documentary records, we get a sense of multiple meanings and views of Hamilton and his landscape as both a public botanical space and a private botanical collection. This chapter then draws an extended comparison
between two large-scale participants in the transatlantic botanical exchange, John Bartram and William Hamilton, and explores the similarities and differences in their participation and experiences as part of the Philadelphia and transatlantic botanical networks.

The sixth chapter, “The archaeological search for Hamilton’s greenhouse” focuses on the archaeological excavation of the area in and around Hamilton’s greenhouse complex and the interpretation of the physical and material remains revealed through archaeological excavation. From 2009 through 2011, three summer fieldwork seasons concentrated on locating Hamilton’s original greenhouse complex and associated landscape features. By the time the fieldwork portion of this project came to an end in October 2011, a three-foot section of the greenhouse foundation had been discovered, along with a brick cistern, two brick drains, and a large midden dating to the destruction of the greenhouse complex in the mid-nineteenth century. The discovery of these physical elements of the greenhouse complex and surrounding area sheds light on the daily requirements of managing a 140-foot long structure full of thousands of exotic plants, but their significance extends beyond the mere fact of their discovery. The relationship of these features to one another on the landscape suggests that Hamilton’s continuing negotiation between public and private, and practical and aesthetic elements of this collection played out both within the greenhouse as a locus of botanical exchange, and outside it, in the design and use of the surrounding landscape.

The seventh and final chapter brings together elements from the preceding five chapters to tease out the multiple meanings of Hamilton’s greenhouse complex
as it existed on the landscape of The Woodlands, and how it was experienced by members of the transatlantic botanical community. The physical and material remains of this structure help to ground the experience of individual participants in Philadelphia and beyond, and combining these with the documentary evidence of first-hand descriptions of Hamilton’s greenhouse complex provides new insights into the experience of these individuals. Through it all, the greenhouse complex itself stood as a physical symbol of both the tangible and intangible elements of this botanical network; as the physical setting where continents and climates met one another through their natural products, and botanical enthusiasts formed physical or intellectual connections with their colleagues across oceans and continents, Hamilton’s greenhouse reintroduces the physical and material elements of this exchange to the history of early American botany.

Figure 1: The Woodlands, from William Birch’s Country Estates of North America, 1808. Courtesy of the Historical Society of Pennsylvania.
CHAPTER TWO: Landscape and Space

Archaeologists have long been interested in people's use and manipulation of the surrounding landscape for symbolic reasons, from protohistoric creations of burial sites and large-scale monuments such as Stonehenge (Childe 1955) to the landscaped villas of the Roman elite (Jashemski et al 1995; Wallace-Hadrill 1994), and the parks and formal gardens in early modern Europe and America (Hobhouse 1997; Laird 1999; Laird and Harvey 1990). These studies though ranging in time, place, and culture, all explore the idea of symbolic meaning in the landscape, both for the individuals who created and/or manipulated such spaces, and for those who experienced them. In particular, the interest of historical archaeologists in the landscaped gardens and grounds of elite country estates in eighteenth and nineteenth century Europe and America has focused on issues of power, inequality, status, and control and how these ideas are played out physically in the gardens and landscaped grounds constructed on eighteenth and early nineteenth century country estates (Hicks 2005; Hodder 2003; Kelso and Most 1990; Leone 1984; 1987; 1988; Orser 1996; Pogue 2003).

The historical archaeological investigation of William Hamilton's greenhouse complex at The Woodlands is no exception. Although the range of studies that can be considered to fall within the scope of "landscape studies" is vast, stretching across time, space, culture, and discipline, the approaches most often used by archaeologists focus on material, spatial, and conceptual definitions of a particular site. Beginning with a brief discussion of the field of landscape
archaeology, this chapter summarizes some of the main approaches of landscape archaeology, in order to place this study of The Woodlands in its broadest conceptual context, and then ends with a discussion of the specific theoretical approaches most relevant to exploring Hamilton and his botanical activities at The Woodlands.

Many current scholars draw on definitions of landscape introduced by cultural geographers beginning in the early twentieth century, especially the one offered by Carl Sauer in 1931, in which he distinguished between the “cultural landscape” (environments which have been modified by humans in some way), and the “natural landscape” (environments which have remained unaltered by human activities) (Ashmore and Knapp 1999; Johnson 2005; Stine 1997; Winberry 1997). Although there are many qualifications and objections to this division, practitioners of cultural geography have mostly reached a consensus on a definition of landscape, while archaeologists and anthropologists have devised a series of methodological and theoretical approaches to the study of various landscapes, but not a consistent definition of the concept (Ashmore and Knapp 1999; Johnson 2005; 2007; Winberry 1997).

Although there seems to be little consensus among archaeologists on what a “landscape” is specifically, the general trend in the field from those who have offered definitions have overwhelmingly been pulled from the ranks of postprocessual theory and practice (Ashmore and Knapp 1999; Johnson 2007; 2012; Stine 1997). Not agreeing on the specifics of a particular definition has not greatly affected the widespread use of both “landscape” and “landscape archaeology” in the
discipline, however. Rather, it has simply allowed archaeologists to play with the
term, and redefine it as necessary. Whatever the current differences in approach and
interpretation, the recent revival of interest in the concept of landscape and its
appeal to archaeologists as an appropriate focus for study marks a distinct shift from
the ways in which earlier archaeological approaches have categorized the physical
surroundings.

It is the expansive and vague nature of the concept of landscape and
landscape archaeology that allows archaeologists to draw distinctions between
“landscape archaeology”, “settlement archaeology” and “environmental
archaeology.” Although both settlement archaeology and environmental
archaeology do focus heavily on the interactions between past peoples and the
physical world in which they lived, these subdisciplines tend to be primarily
concerned with the ecological elements of such human-nonhuman interactions, such
as resource exploitation, subsistence strategies, and settlement patterns. While many
of these questions can be components of landscape archaeology investigations the
focus of landscape archaeology generally seeks to go beyond the limited and
somewhat passive concept of the physical environment that structures many of the
older studies in settlement and environmental archaeology (Ashmore and Knapp

This is not to say, however, that elements of settlement and environmental
archaeology are dissimilar or useless to those interested in a more expansive and
dynamic conception of past human interactions with the surrounding world. In much
the same way that self-identifying landscape archaeologists draw on outside
disciplines for methods, techniques, and theoretical constructs in their approaches, they also draw from within the discipline. The work done by earlier generations of archaeologists in revealing certain patterns of human settlement and environment interaction, while sometimes hovering near the edge of environmental determinism, are no less useful for that. After all, the gathering and deployment of resources by past human groups is an important element of landscape archaeologists' understanding of the dynamic interaction of human interaction with the outside world – the difference is in where landscape (as opposed to settlement and environmental) archaeologists look for explanations for such behavior, which tend to be layered an multicausal, involving a variety of factors outside the realm of strictly ecological explanations (Ashmore and Knapp 1999; Branton 2009; Deetz 1990; Green 1997; Johnson 2007; 2012; Miller, Yentsch, Piperno, and Paca 1990).

Such a wide-ranging concept of “landscape” and, by extension, “landscape archaeology” and its multidisciplinary underpinnings necessitates a correspondingly broad range of techniques and approaches for the actual performance of landscape archaeology. Many of the methods for exploring the concept of landscape from an archaeological perspective involve the analysis of particular “spaces” and “places,” variously defined. Like “landscape,” the concept of “space” and “place” and the practice of what has come to be known as the “archaeology of place” covers a broad range of ideas and theoretical constructs, with the added conceptual dimension of the need to variously define different kinds or types of spaces and places, such as “indoor” or “outdoor,” “domestic” or “urban,” or “industrial,” or “sacred,” or “religious”, and so on, and to differentiate between “space” and “place” (Ashmore
Archaeologists who are interested in the ideas of "landscape," "space," and "place" tend to overlap in their use and adaptation of method, theory and technique. "Spatial archaeology" is not a new approach (see Ashmore 2002), as the concept of space and its organization within, around, and between sites is of paramount importance in archaeological excavation, analysis, and interpretation. But in the last two decades especially, some archaeologists have begun to push the boundaries of earlier spatial theory and technique, to expand beyond the concept of physical or organized space into exploring the concept of "place" (see Ashmore 2002; Bowser 2004; Feld and Basso 1996).

Although "rooted partially in landscape archaeology" the "archaeology of place" is seen by its proponents as "more attendant to understanding the ways in which people impart meaning to their cultural and physical surroundings at multiple scales" (Bowser 2004:1), which is closely related to the modern take on landscape archaeology, although perhaps with a slightly different focus. As the archaeological study of "place" in this definition necessarily focuses on the more subjective elements of the human experience, its proponents must find a way to balance inquiries into the subjective realm with the more empirically-based theories and methods that characterize (and, to a certain extent, define) archaeological investigations (Bowser 2004: 1-2; Johnson 2012).

The concepts of space, place, and landscape, even though they are variously defined in archaeology are all intimately related; one cannot not fully explore the
interactions of past people with the non-human world around them without defining and discussing spatial organization. A past group's or individual's concept of "place" as some kind of "meaningful location" necessarily informs their perception and interaction with the "landscape" (Bowser 2004: 1 quoting Whitridge 2002). Often such ideas of "place" among past people also inform their overall spatial organization, which suggests these researchers are all interested in different aspects of the same larger question: how did people in the past think about the world around them, and what does it mean?

As with landscape, the study of space and place in archaeology is necessarily multidisciplinary, drawing on techniques and methods from other fields that prioritize the same concept, such as geography, architecture, and history. Although methods and techniques are often borrowed and shared across these related subdisciplines the distinct ways in which such methods and techniques are used and adapted tend to differ. Such differences depend primarily on the questions being asked by the researchers and also by the kind of evidence available. For instance, archaeologists who focus on multicomponent sites with standing structures have found methods and techniques from architecture to be useful in understanding spatial organization and layout (see for instance, Dawson 2002; Stockett 2005).

Some of the more widely applied methodologies for the archaeological analysis of space and spatial organization (especially when dealing with standing structures or substantial foundations) within a site or sites come from architectural theorists. Originally developed by architects at University College London exploring "the influence of the spatial layout of buildings and cities upon the
"economic, social, and environmental outcomes of human movement and social interaction," (Dawson 2002:465; Hillier and Hanson 1984) "space syntax" is an analytical approach to the built environment applied by archaeologists who are interested in "how social structure is reflected in the spatial configuration of public and domestic architecture" (Dawson 2002:464).

Known as "access analysis" in some archaeological applications, the basic premise of space syntax is that individual buildings, as well as towns, cities, and other settlements "have particular spatial properties that translate into sociological rules which affect how people relate to one another...the spatial configuration of a dwelling or a settlement is believed to present a fairly precise map of the economic, social, and ideological relations of its inhabitants" (Dawson 2002: 471; Stockett 2005: 385). For the purposes of archaeological investigation, such theory can help explore how "busy" or "quiet" a particular space might have been, based on how it is laid out, and how accessible it was for people moving in and around it. The location of access points such as doors and hallways, and the number and variety of paths that an individual could take to reach a particular space or room also determines the relative busyness of a particular area (Dawson 2002: 471-472).

The application of space syntax principles to site and building analysis is "relatively straightforward" (Dawson 2002:466), but as Dawson goes on to point out in his study of Central Inuit snow houses, "the interpretation of results is often not [straightforward]... because space syntax assumes that relationships between spaces translate directly into relationships between people" (Dawson 2002: 466). Few
modern archaeologists would accept such an unqualified assumption of the meaning of spatial organization.

Miranda Stockett agrees; in her application of access analysis to the Late to Terminal Classic Maya site of Los Canoas, Honduras she suggests that if archaeologists employed access analysis as "a tool [emphasis in original], not a theory," they "may then use the access diagram as a simple means of representing space and identifying subtle patterns within it" (Stockett 2005: 386). This application of space syntax (or access analysis) can lead to new or more nuanced interpretations of the use and organization of space and its cultural significance than might be available from other sources of evidence. Archaeologists who apply the methods and techniques of space syntax must balance those results with evidence from other sources, including ethnographic and/or enthnohistorical information, primary source documents, and other archaeologically recovered evidence.

Other approaches to the exploration of landscape and space by archaeologists move away from the more rigid reliance on diagrams and statistical models of space syntax by focusing on the more subjective and often-intangible elements of past peoples' actual lived experience in a particular site or landscape. Although such questions that deal with lived experience and past people's perception of the world around them can be frustratingly elusive in archaeological fieldwork, a number of scholars have explored them by adapting theoretical and methodological approaches from linguistic anthropology and philosophy. The application of "proxemics," a concept derived from cultural anthropology and cross-cultural studies of communication has proved fruitful for understanding certain
landsapes (see Bowser and Patton 2004; Orser 1988; 1990). Other scholars have adapted the philosophical concept of “phenomenology,” to explore the experience of moving through past landscapes (see for instance, Bender 1998; Johnson 2007; 2012; Tilley 1994; 1996).

Originally proposed by anthropologist Edward T. Hall in the mid-20th century, “proxemics” is the study of nonverbal communication between individuals that provides glimpses into specific cultural ways of thinking about and structuring the world around them (Baldassare and Feller 1975; Hall 2003; Watson and Hall 1969). Although Hall’s study of proxemics has been criticized on both methodological and theoretical levels, the basic premise of proxemics – that individuals communicate cultural and social ideas about space, place, and social rules through a wide variety of nonverbal techniques offers some intriguing possibilities for archaeological applications (Baldassare and Feller 1975; Birdwhistell 1972; Gillespie and Leffler 1983; Orser 1988; Watson and Hall 1969).

One of the most fruitful areas for the application of proxemics is in the realm of social archaeology, which “emphasize[s] how material culture mediates experience, how social identity, meaning, and practice intersect, and the inseparability of cognition and social experience” (Bowser and Patton 2004: 158). In their ethnoarchaeological study of houses, gender, and politics in the village of Conambo in the Ecuadorian Amazon (2004), Brenda Bowser and John Patton combine the statistical rigidity of space syntax methodology with the more fluid situational analysis of cross-cultural proxemics to break down the traditional scholarly division between domestic/political, public/private, and male/female
binaries. Working on multiple scales of analysis, Bowser and Patton combine ethnographic, material, and cartographic evidence to show that such binaries are at the very least, patently misleading, and that the actual experience of past individuals within domestic and non-domestic space was likely more nuanced and less distinct than researchers have allowed for in the past (Bowser and Patton 2004).

Charles Orser, Jr. is another scholar who has applied proxemics to archaeological inquiry in useful and compelling ways. In his study of Millwood plantation in the South Carolina piedmont region, Orser draws on Henri Lefebvre’s reworking of Hall’s ideas to apply them to physical space and material remains (Orser 1988; 1990). Known as “social proxemics,” Orser applies this “study of social space in cultural contexts” to examine the changes in settlement patterns over time by using both archaeologically-recovered evidence of space and materials along with written records (Orser 1988:83; 1990).

Although Edward Hall’s initial investigations into nonverbal communication involved a variety of staged scenarios with multiple individuals and somewhat questionable ethical practices,¹ the basic conclusions about the ways in which variables like spatial arrangement, room size, and furniture placement affect social interaction and individual comfort levels have important implications for archaeological research. As Bowser, Patton, and Orser demonstrate, ethnographic, historical, and material evidence can be combined to illuminate not only the

¹ One of the main criticisms of Hall’s work was the lack of controlled-for variables: so many different elements were present in these set scenarios that Hall’s conclusions were suspect by other scholars. A number of these social experiments were also done without the subjects always being aware that they were under study or surveillance, a situation that raised some ethical concerns from critics and other scholars (Baldassare and Feller 1975; Gillespie and Leffler 1983).
physical organization of given spaces, but also the cultural and social structures that are communicated by this organization as individuals and groups interact within them (Bowser and Patton 2004; Orser 1988; 1990). Although the access to ethnographic evidence makes Bowser and Patton’s study more easily applicable to the combination of space syntax and proxemics methodology than other studies that do not have access to similar lines of evidence, their work and that of Orser illustrates the potential of such methods for future archaeological studies of the ways in which past people experienced and conceived of space, place, and landscape.

Of all the more “fluid” and “subjective” approaches to the interpretation and analysis of archaeological landscapes that have arisen in the last few decades perhaps none is as fluid or subjective than the phenomenological approach adapted from the discipline of philosophy. The basic premise of phenomenology derives from a considerably dense body of philosophical writing, and according to Matthew Johnson, one of the main sources for the strident arguments over the validity of phenomenology as a method of archaeological analysis is due to the somewhat inaccessible nature of the literature on which it is based (Johnson 2012: 273). At its very core, however, phenomenology is fairly simple: it is the study of the human experience of “being in the world” (Johnson 2012: 273, quoting Heidegger 1971). As Johnson states in his summary article of phenomenology in archaeological practice, “the end result is an understanding of human experience that makes the claim to be material rather than textual, mediated through the body rather than through language, and which claims also to have moved beyond dualisms of mind
and body with its emphasis on the senses and everyday activity” (Johnson 2012: 273).

With its emphasis on materiality, the subjectivity of human experience, and the varieties of meaning that past individuals and groups developed about the world around them, the adaptation of phenomenology would seem to be highly attractive to today’s self-styled landscape archaeologists in their approach to understanding the past. As Johnson points out,

“Few archaeologists would now deny that it is necessary to consider issues of meaning and subjectivity to achieve a full understanding of archaeological landscapes, and further that they would accept the starting point of phenomenological tradition, namely, that understanding human experience is necessary but is not a commonsense undertaking” (Johnson 2012: 279).

But phenomenological approaches to archaeological investigations have been fraught with controversy since their first appearance in the literature in the late twentieth century (Johnson 2012).

Many of the main proponents and adaptors of phenomenological ideas into archaeological investigations have been British prehistorians who focus on the monumental stone structures of ancient Wessex, such as Stonehenge (Bender 1998) and Avebury (Tilley 1994) – an interesting correlation that Johnson attributes to various geographical and theoretical influences (Johnson 2012: 271-272) – but which should not suggest potential limits for its application in landscape archaeology or more broadly in other archaeological investigations. Some of the most widely cited works on phenomenological analysis of landscape come from archaeologist Christopher Tilley (1994; 1996; 2004; 2008), whose books and articles focus on his interpretation of stone megaliths and other monumental
architecture of the British Neolithic as they might have appeared to the individuals and groups who constructed them. For Tilley, there is little need for excavation, as many of these megaliths are visible on the landscape from a considerable distance, and he offers his interpretation of their meaning and significance for Neolithic peoples based on a combination of what is currently visible and as well as a deep knowledge of Neolithic culture (Tilley 1996).

Tilley and other British postprocessualists who have adapted phenomenological concepts to the interpretation of archaeological landscapes such as Barbara Bender (1998) and Christopher Gosden (1994) as well as those from other regions and traditions have come under fire for their use of such interpretive methods. One of the main criticisms of the phenomenological approach in archaeology is the lack of evidence for the offered interpretations (Johnson 2012: 276). Part of the problem, of course, lies in the fact that the subjectivity so crucial to the application of phenomenology to archaeological interpretation means both the subjectivity of the past observer as well as the present observer – the archaeologist who is doing the interpreting. While the explicit acknowledgement of subjectivity of the researcher is not a new idea in archaeological studies, it does lend itself to easy criticism by those already inclined to disparage a particular interpretation or analysis. Scholars who apply phenomenological interpretation to archaeological evidence are only a more recent example of researchers receiving criticism for their application of postprocessual theories (Johnson 2012; Hodder 2003; Renfrew and Bahn 2000).
Other critiques that have been leveled at phenomenology in archaeology run the gamut from those retreating behind “a commonsense epistemological yardstick of evidential criteria” that has been resurrected from the debate over the so-called New Archaeology some sixty years earlier (Johnson 2012: 276) to the simple but damning claim of “incompleteness,” as critics claim that the phenomenological approach has come to dominate the interpretation of archaeological sites over other approaches (Johnson 2012: 278). This last criticism is particularly focused on the unofficial domination of British landscape archaeology by many of the main proponents of phenomenology in archaeology (Johnson 2012: 278).

In the end, however, those who have adapted the concepts of phenomenology and applied them to archaeological investigations are not very different from those who favor another theoretical approach to past human interaction with the world around them: both groups of archaeologists are interested in the ways in which past humans experienced the landscape as they lived in it, moved through it, and created social and cultural meanings for it (Ashmore 2002; Johnson 2012; Bowser 2004; Tilley 1994; 1996). As Johnson, being deliberately provocative, states, “we [archaeologists] are all phenomenologists” (Johnson 2012: 279).

* * *

Whether or not one agrees with Johnson and his assertion of the importance of phenomenological ideas to archaeological studies of landscapes, his attempt to unite the varied strands of landscape interpretation into a coherent fabric is
admirable, especially given the vastly different forms that these landscape studies can take. Nowhere is this variety more evident than in the study of the deliberate construction of pleasure gardens by Anglo-American elites in the eighteenth and nineteenth centuries. Coming out of the larger tradition of landscape studies, historical archaeologists have explored the creation and meaning of early modern elite pleasure gardens in Europe and America, seeking to understand the meaning behind such large-scale projects for their owners, viewers, and creators.

Although the study of British gardens in Europe dates primarily to the years following the Second World War, the archaeological investigation of historic gardens in the United States begins in the 1930s with the excavations of the Governor's Palace at Colonial Williamsburg (Fowler 1972; Taylor 1983; Yentsch, Miller, Paca, and Piperno 1987). Over the next forty years, improved techniques and methods in garden archaeology led to a slew of studies of elite gardens in the Chesapeake, including the gardens of John Custis, Carter's Grove, and Monticello in Virginia, and the first of many studies of the William Paca garden in Annapolis, MD (Yentsch, Miller, Paca, and Piperno 1987).

Many of these early studies focused on the recovery of garden designs, with an eye to restoring some of the colonial-era plantings and layouts, and "[fell] more within the domain of historic preservation than within the domain of anthropological inquiry" (Yentsch et al 1987:3; Miller et al 1990). There were of course exceptions to this tendency, including Mark Leone's "materialist" (Yentsch et al 1987:3) study of the gardens of colonial Maryland (Leone 1987), where the consideration of the ethnographic context of the garden, its builders, owners, and
viewers is taken into account, but the majority of the early studies of American gardens were limited in scope and larger interpretation (Yentsch et al 1987).

Beginning in the 1980s, however, there was another shift in garden archaeology among American historical archaeologists who not only brought larger ethnographic inquiries to bear on the study of early American gardens but also made use of chemical and botanical studies to aid in the recovery of plant materials and other evidence. The work done by Naomi Miller, Anne Yentsch, Barbara Paca, and Delores Piperno at Morven, the family home of the Stocktons in Princeton, New Jersey, brings together both of these trends (Miller et al 1990; Yentsch et al 1987). Although the primary goal of the garden archaeology project at Morven was to learn enough about the earlier landscapes in order to reconstruct the grounds as part of the larger museum complex (Miller et al 1990; Yentsch et al 1987), the project leaders were committed to a multidisciplinary, ethnographic research strategy from the beginning, and thus engaged archaeologists, ethnobotanists, architectural historians, and others as consultants and principle investigators (Miller et al 1990; Yentsch et al 1987). Over the course of the project, the team discovered distinct archaeological, botanical, and documentary evidence of five generations of Stockton family residents, allowing them not only to reconstruct areas of the garden, but also to trace out the changes in the landscape from one generation to the next (Miller 1989; Miller et al 1990; Yentsch et al 1987).

The multidisciplinary thrust of the garden archaeology project at Morven makes it an important touchstone in the development of American garden archaeology, but it is not the only important work to come out of this period. The
1980s were productive years for theoretical as well as methodological development in American garden archaeology, in which postprocessual and materialist understandings of the past came to the forefront of early American garden interpretation and continue to color the field today. The thrust of this work, exemplified by scholars such as Mark Leone (1984; 1987; 1988), and Dan Hicks (2005) has focused primarily on the meanings and messages that owning and displaying exotic plants in pleasure gardens and landscaped grounds sent to various viewers. Their contributions to the exploration of the Paca garden have important implications for the future of landscape archaeology and the interpretation of elite landscapes in the early modern Atlantic world (Hicks 2005; Leone 1984; 1988; Pogue 2003).

In Mark Leone’s landmark study of William Paca’s garden in eighteenth-century Annapolis, Maryland he argued that Paca designed his garden as a physical representation of his social status and the ability conferred on him by right of his birth and wealth to control nature by imposing order on it, and by extension, to control those close to nature: his social inferiors (Beaudry, Cook and Mrozowski 1991; Chesney 2009; Hall 1992; 2000; Hicks 2005; Hodder 2003; Leone 1984; 1988; Orser 1996). Leone is primarily interested in the message that Paca intended his garden to send to viewers from his own social circle, who would understand the particular symbolism employed by its design, and what such messages suggest about the nature of power and control in eighteenth-century Chesapeake society (Leone 1984; Chesney 2009; Rozbicki 2006).
Although Leone's original interpretation of Paca's garden has received a fair amount of criticism in the years since it was first published (see for example, Beaudry, Cook, and Mrozowski 1991; Hall 1992; 2000; Hicks 2005; and Hodder 2003) it is still considered a "classic study" on the historical archaeology of gardens and landscapes, and serves as the model for other scholars focusing on similar sites and time periods (Chesney 2009; Hicks 2005; Orser 1996: 143; 166). One of the more recent examples of this type of study by Dan Hicks uses Leone's work at the Paca garden as a starting point for his own investigation and discussion of an "eclectic" style garden at Goldney in Bristol, England (Hicks 2005). As with many other scholars returning to Leone's original interpretation of the Paca Garden, Hicks is critical of Leone's all-encompassing use of critical theory to read the "messages" that Paca was trying to send with his garden design (2005: 375-379; 385-387). But rather than follow Leone's other critics toward equally large, all-encompassing theories of the past, Hicks proposes to reinterpret the Paca Garden using what he calls "situational and symmetrical" historical archaeology (2005: 373-375; 387-388).

Hicks' situational and symmetrical approach works on a number of levels, simultaneously involving symmetries between the archaeologist and the material culture he or she examines, and symmetries within the specific site itself that gives it a uniqueness when understood within larger social and historical contexts. The specifics of a particular site – its "situation" – and the symmetries that can be traced both within the site itself and between it and the researcher outside it emphasize the inherent complexities and diversities of particular sites. The complex nature of this
approach demands that archaeologists analyze and interpret individual sites on their own terms rather than using broad theoretical approaches that exclude such complexity and diversity in favor of general interpretive power (2005: 385-388).

Hicks suggests that the interpretive approach such as the one Leone and his critics have applied to the Paca Garden “has encouraged historical archaeologists to hold the material at a distance, ‘defamiliarizing’ the past” (2005: 386), and that the exclusion of site-specific details inhibits, rather than encourages the development of multiple and inclusive world historical archaeologies that “acknowledge and celebrate the archaeological complexities that are encountered in the past and the disciplinary present” (2005: 373; 385-387). Hicks applies his situational and symmetrical archaeologies both to his own investigation of the eclectic-style garden at Goldney and back to the Paca garden, arguing that both gardens are “hybrids” of sorts, reflecting their owners’ relationships with the larger Atlantic world in a mix of tightly-controlled (ordered) and looser, more natural styles that mimic the complexities of their participation in this world (2005: 385).

Within the broader approach taken by Leone and Hicks to understand entire landscaped grounds a number of historical archaeologists have focused more specifically on garden-related structures found across eighteenth and nineteenth-century elite landscapes. Structures such as greenhouses, they argue, embody the meanings and messages of these gardens in imposing, permanent architecture. Greenhouses have been investigated archaeologically at Mount Clare (Pogue, White, and Leeson 2002; Weber 1996), Mount Vernon (Chesney 2009; Pogue 2003), Annapolis (Yentsch 1990; 1994), Gore Place (Beranek and Smith 2010;
Beranek, Smith, and Steinberg 2011), Rosedown (Mann 2011), and Wye House (Chesney 2009; Pruitt 2012; Skolnik 2012). The focus of these studies range from explorations of female gender roles and power negotiation in the realm of exotic plants and gardens (Beranek and Smith 2010; Mann 2011; Weber 1996) to the creation and maintenance of “indigenous” knowledge brought by enslaved Africans and African Americans to the propagation of plants unfamiliar to Europeans and their descendants (Pruitt 2012). No matter how varied the range of specific interpretations of these greenhouses have been they all tend to privilege larger theoretical interpretation based on power and control of nature in ways similar to Leone, while also taking the unique historical contexts of each site into consideration, as Hicks proposes.

The historical and archaeological investigation of William Hamilton’s experience as a participant in the transatlantic plant trade and his activities in his greenhouse complex at The Woodlands – the subject of this dissertation – compliment these other archaeological studies of early American greenhouses, This study also draws on precedent set by Leone and Hicks, and looks to the basic tenets of phenomenological interpretation – experience of physical and material elements – to tell the unique story of Hamilton and his participation in the transatlantic botanical exchange of the eighteenth and nineteenth centuries. This study focuses on the experience within and around Hamilton’s greenhouse as the way into Hicks’ “situational and symmetrical” approach. Both documentary and archaeological evidence from this structure speak to the ways in which individuals experienced it, and through it, the ways in which they – including Hamilton, his visitors, workers,
and later generations—experienced the transatlantic botanical trade. This involves not only examining the physical, material, and textual records left by individual participants (see Chapters 4 and 5), but also contextualizing these experiences within the larger social, historical, and cultural worlds in which they took place. One of the most important contexts for understanding both Hamilton’s landscape at The Woodlands and the historical archaeological approach to early American gardens is the historical development of early modern European landscape design, discussed in the next section.

* * * *

Hicks’ conclusion about the “hybrid” nature of garden design at Goldney and the Paca house is based partly on the complex development of European landscape design and the emergence of the so-called “English landscape garden”, but he glosses over the importance of this development and its influence on garden and landscape design throughout the eighteenth-century Atlantic world in his actual analysis. Landscaped formal gardens, of course, have a long history in Europe and elsewhere among well-to-do individuals going back to the famous examples found at the ancient villas of Roman emperors and other elites (Hobhouse 1997; Jashemski et al. 1995; Wallace-Hadrill 1994). Beginning in the Renaissance, however, garden and landscape design began to take on new importance for elite Europeans desirous of showing off their taste and sophistication as well as their knowledge and command of current fashion trends (Chesney 2009; Hobhouse 1997; Yokota 2011). The resulting landscape trends that emerged over the next two centuries were some
of the most obvious examples of transatlantic cultural exchange, and the influence
of these designs can still be seen today in archaeological and contemporary
contexts.

For much of the Renaissance and early modern period in western Europe,
garden and landscape trends were set by nobles and other elites in Italy and France,
where formal, terraced style gardens filled with sculpted hedges, topiaries and
statues, arranged in intricate geometric shapes predominated (Hobhouse 1997; Laird
1999; Mukeiji 1993; Ross 2001). The landscaped grounds of the most affluent and
highest-ranking individuals were often extremely elaborate, sometimes involving
complicated water displays and fountains, mazes, and other elements designed to
delight and surprise any and all unsuspecting visitors (Hobhouse 1997; Hunt and
Willis 1975; Laird 1999; Laird and Harvey 1990; Ross 2001). One of the most
famous formal gardens from this period is the one designed for Louis XIV’s palace
at Versailles by the architect Le Nôtre, whose arrangements of plants, statues and
other elements into terraces and parterres based on geometric principles set the
standard for elaborate garden design in Europe for the next half century (Drayton

The garden design standards set in France and Italy in the late sixteenth and
early seventeenth centuries were adapted and applied across Europe, especially in
England, which became a melting pot of garden design in the early modern period.
“What the seventeenth century added to English garden design was a certain
intricacy and a delight in waterworks, derived mainly from Italy, a sense of
grandeur and vast scale from France, and more ideas of how to embroider flower
beds and embellish shrubs and trees from the Netherlands” write garden historians John Dixon Hunt and Peter Willis in their introduction to their collection of theory and art of the English landscape garden (Hunt and Willis 1975:7). Tudor gardeners across the English countryside took pride in their ability to create intricate geometric designs with carefully arranged flowers, shrubs, and trees, displaying not only their understanding of continental fashion but also their implicit acknowledgement of the primacy of French garden design (Hobhouse 1997; Hunt 1996; Hunt and Willis 1975; Laird 1999; Mukerji 1993).

Beginning around 1700 however, English garden design began to come into its own, as English architects, draughtsman, and artists developed distinctive styles that stood in stark contrast to the formal design of French and Italianate trends. The explicit rejection of the formality of French garden design echoed a similar rejection of the excesses of French court life and political trends, which was seen by many Englishmen as needlessly opulent and morally degenerate (Drayton 2000; Hobhouse 1997; Hunt and Willis 1975:7-8; Laird 1999; Mukerji 1993; Ross 2001).

Although the theoretical rejection of the formal style of French gardens was echoed in other areas of artistic expression dominated by French influence, the actual practice of gardening in England changed more gradually over the course of the first half of the eighteenth century. It was in fact a combination of gardeners, painters, and others who together ushered in a so-called “golden age” of English landscape gardening. Early pioneers of the English style gardens such as Alexander Pope and Stephen Switzer promoted the “new” style of naturalistic gardening to their English audiences through print and practice (Hunt and Willis 1975: 8-9; Laird 1999; Mukerji 1993; Ross 2001).
1999; 2003; Laird and Harvey 1990; Ross 2001). While Switzer expounded on the aesthetics of more “naturalistic” landscape styles in a series of published works that included instructions on how to arrange and create them, Pope waxed eloquent on virtues of such designs, which he saw as harkening back to the ideals of the Classical era. Pope put his ideals into practice at his own estate at Twickenham, which became one of the model landscapes for the early stage of English landscape design that combined aesthetic and functional elements (Drayton 2000; Hunt and Willis 1975; Laird 1999; Mukeiji 1993; Ross 2001; Wulf 2009). Many others actively encouraged the move towards more naturalistic landscape design, including landscape painters who captured the essence of the naturalistic trend with their depictions of “wild nature” as observed and imagined on various estates (Drayton 2000; Hunt and Willis 1975; Laird 1999; Ross 2001; Wulf 2009).

Eschewing the intricate geometric designs and carefully controlled garden elements of their continental neighbors, English gardeners in the eighteenth century began to experiment with a more “naturalistic” style. These innovations in garden and landscape design varied from one interpreter to another, but the underlying premise was the creation of “natural” looking spaces and vistas, where trees, shrubs and other plantings were arranged in approximations of what might be seen in the wild (Drayton 2000; Hunt and Willis 1975; Laird 1999; 2003; Ross 2001; Wulf 2009). Over time this naturalistic trend in English landscape gardening came to include a variety of elements invoking the wilderness, such as winding “serpentine” walks that meandered through the landscape, and the addition of elements that were more reminiscent of a Romantic’s idea of nature, than what one might reasonably
expect to find in uncultivated English countryside, such as grottos, crumbling ruins (built for the occasion), and even hermit cabins with resident hermits (Drayton 2000; Hobhouse 1997; Hunt 1996; Hunt and Willis 1975; Laird 1999; 2003; Ross 2001; Woods and Warren 1988; Wulf 2009).

The epitome of the English country landscaped estate that comes to mind when one thinks of the golden age of English naturalistic-style garden did not burst forth fully-formed at the turn of the eighteenth century, but rather emerged gradually, developing over time as its various proponents and practitioners experimented and consulted with one another. It is the story of not only a movement, but also of the new collaboration between “landscapists” (Hunt and Willis 1975:23) and architects who worked together to create a unified landscape scene that incorporated living elements, connecting pathways, and solid buildings meant to blend seamlessly with the landscape in which they stood. “When you first begin to build and make Gardens, the Gardener and Builder ought to go Hand in Hand, and to consult together,” Switzer advised his readers (quoted in Hunt and Willis 1975: 23). Such consultation allowed for the creation of a complete landscape scene, one in which there was not only aesthetic consistency in the relationship between the main house and surrounding grounds, but also one in which entire buildings formed crucial aspects of the overall design (Drayton 2000; Hunt and Willis 1975; Laird 1999; Lemmon 1963; Hix 1981; Woods and Warren 1988).

These garden buildings could include anything from the aforementioned ruins and hermit cabins to summer and tea houses, Chinese-style pagodas, model
temples, and a variety of buildings for the care of rare and/or sensitive plants, such as green- and hothouses, graperies, and so on. Many of these structures served both practical and ornamental purposes, often providing convenient seating or shaded rest areas for garden visitors at strategic viewpoints (Drayton 2000; Laird 1999; Woods and Warren 1988). Even purposefully built greenhouses whose main function was to protect specific plants from harsh weather were often turned into outdoor entertaining spaces during the warmer months, when visitors could enjoy garden views embellished by exotic plants in careful arrangements (Hix 1981; Kohlmaier and von Sartory 1986; Laird 1999; Vleeschouwer 2001; Woods and Warren 1988).

Of all the English country estates (re)designed in the new style in the first half of the eighteenth century perhaps one of the most significant in the history and development of English landscape design is Stowe. Long the family retreat of the Temples, Stowe was one of the earliest staging grounds for experimental developments in English landscape garden design. Under Richard Temple, Viscount Cobham (1675-1749) an enthusiastic patron of garden and landscape design, a series of architects and garden designers spent decades creating a comprehensive picture of controlled English wilderness meant to convey to the visitor the feelings and virtues found in the pastoral poetry of Virgil, and Horace (Drayton 2000; Hunt and Willis 1975; Laird 1999; Laird and Harvey 1990; Muckerji 1993; Ross 2001; Wulf 2009). Over the course of the eighteenth century, Stowe became the proving ground for English landscape theory, playing host first to Charles Bridgeman, who helped create the basic arrangement, and then followed by John Vanbrugh, James Gibbs,
and William Kent, who added a variety of temples and other features in the first half of the eighteenth century (Drayton 2000; Hunt and Willis 1975; Laird 1999; Woods and Warren 1988).

One of the most famous elements of the Stowe landscape was the series of allegorical temples created to evoke Classical ideals as interpreted by Cobham and his employees. The Temple of Ancient Virtues (containing statues of famous Classical heroes) and the Temple of British Worthies (containing statues of British heroes) likely did not raise too many eyebrows among the numerous visitors who came to view the estate from all over Europe, but the Temple of Modern Virtue was a different story. Created as a ruin and containing a headless statue of Cobham’s political rival, Robert Walpole, this garden structure would become a symbol of the political potential of English landscape gardening in its most overt form (Drayton 2000; Laird 1999; 2003; Mukeji 1993; Ross 2001; Wulf 2009).

It was at Stowe, in fact, that one of the main figures of the Golden Age of English landscape gardening got his start, working under William Kent, the painter-turned-landscape designer, and Charles Bridgeman, Cobham’s head garden designer. Lancelot “Capability” Brown (1716-1783) began his career as a gardener at Stowe in 1740, working first for Bridgeman and Kent, and then rising to replace Kent in 1748. While at Stowe, Brown learned the principles of early English garden design as envisioned by his mentors in the first half of the eighteenth century, coming to embrace the ideals of “naturalistic” styles of beauty, continuing to refine and adapt these earlier ideas while branching out in new and interesting ways from his forbears (Drayton 2000; Hunt and Willis 1975; Laird 1999).
It was not until the second half of the eighteenth century that what modern scholars think of as the “English style of landscape gardening” came to realize its full potential, bursting upon the scene with a seeming suddenness that belied the earlier tenets on which it drew, and influencing landscape design across Europe and the Atlantic. In a reversal from a century before, English styles of the late eighteenth century became models for French gardeners to emulate as well as the elites in North America, who were exposed to these ideas through published volumes and personal correspondence (Drayton 2000; Hunt and Willis 1975; Laird 1999; Mukeji 1993; Ross 2001; Wulf 2009). Although evolving from the trends and tastes found in earlier eighteenth century English landscapes, the trends popularized in the second half of the century marked a distinct shift from the principles and aesthetics of their predecessors. The “radical” new ideas of perhaps the most famous English landscape designer of this period, Lancelot “Capability” Brown, the subsequent critique of Brown’s ideas and the growing debate over the “picturesque” movement in landscape design, and the increasing interest in all things Oriental helped to define this era of English landscape design (Hunt and Willis 1975: 30-31; Laird 1999; Ross 2001; Wulf 2009).

Building on the early successes and experiments of Kent, Bridgeman, and others, Capability Brown, and his successor, Humphry Repton (1752-1818) (along with Richard Payne Knight and Uvedale Price) pushed the boundaries of their predecessors, creating landscapes that became increasingly more complicated as the century progressed. Unlike Kent and Bridgeman who sought to meld classical architecture and virtue with carefully planned and sometimes intricately designed
terraces, walks, and lawns, Capability Brown became known for his lack of such consciously created elements, preferring instead to work within the natural confines of a site. Over the course of his career, Brown designed more than a hundred gardens in which he brought the idea of a “natural” landscape to its most extreme extent, working only with what lay before him, and utilizing very few artificial elements outside of the aesthetic damming of streams, or the extension of rolling lawns carried right up to the main house (Drayton 2000; Hunt and Willis 1975; Laird 1999; Ross 2001; Woods and Warren 1988). Some of the most iconic English landscapes from the mid-eighteenth century owe their appearance to Brown’s streamlined approach, including Chatsworth, in Derbyshire, and the redesign of Blenheim Palace in Oxfordshire (Drayton 2000; Laird 1999; Ross 2001 Wulf 2009).

As with any departure from an established style, Brown received his share of criticism, with the most vocal critiques coming ten years after his death from landscape theorists Richard Payne Knight and Uvedale Price. Both men felt strongly that Brown’s strictly formalistic manipulation of natural elements was boring and lacked any real sense of excitement or interest that could result from, say, landscape paintings. Instead, Knight and Price argued for and designed landscapes that captured the essence of the “picturesque” style of landscape painting, where actual landscapes were modeled upon this artistic genre, with a foreground, middle ground, and background displaying wild, untamed nature to its fullest – and most Romantic – extent (Drayton 2000; Laird 1993; Mukerji 1993; Ross 2001; Wulf 2009).

By the time that Humphry Repton entered the world of landscape design in the late eighteenth century, the debate over the merits of the “picturesque” aesthetic
in landscape design was at its height. Although he began by vigorously defending the less constructed elements of Brown's designs, Repton gradually came to find his own place in the history of English landscape design by negotiating a kind of middle ground between Brown's ideas and those of his pro-picturesque detractors, Knight and Price. Accordingly, Repton began to design landscapes and gardens with some elements of picturesque principles, creating vistas that moved from formally constructed spaces to wilderness along a single sightline – very similar, in fact, to the transition noted by Hicks (2005) in the Paca garden. Taking the picturesque organizing principle of foreground, middle ground, and background, Repton reintroduced intricate, geometric terraces and parterres near the house, which transitioned to the rolling acres of parkland characteristic of Brown's taste, and finally transitioned again to a kind of wilderness of forest and unconstructed nature so appealing to the romantic tastes of those advocates of the picturesque (Courtney 1896; Drayton 2000; Hunt and Willis 1975; Laird 1999; Ross 2001; Wulf 2009).

The effect of this was, essentially, to "reclaim gardens for social use and relate them again to the houses they served" (Hunt and Willis 1975: 31). According to Hunt and Willis, Repton "pushed back the park and reintroduced regular and architectural forms – terraces, raised flowerbeds, trelliswork, conservatories – which were a logical extension of the social spaces of the house and more convenient for his clients who could use them more readily" (Hunt and Willis 1975: 31). Extending the social space of the house into the landscape would also extend the social relationships within the house to those spaces in the landscape, which provides another dimension to the landscape interpretation put forward by Leone and Hicks.
Brown's landscapes, by contrast, had a kind of one-dimensional quality to them, as the pristine aesthetic on which they relied had no place for the people for whom such vistas were constructed. Nor did the picturesque landscapes have any very usable social space. Conceived and constructed on the same principles of landscape painting, these actual landscapes had the same qualities as the paintings on which they were modeled: however mesmerizing they might be to those romantically-inclined, they remained a view only – such wildness was by its very nature undisturbed by human presence or construction (Drayton 2000; Hunt and Willis 1975). Repton therefore found a niche in which to establish his own reputation as a landscape gardener as the creator of outdoor social space; and indeed, his later career involved the design of several urban squares in the city of London (Courtney 1896; Drayton 2000; Hunt and Willis 1975; Wulf 2009).

The controversy over the implementation of picturesque principles to landscape design and their adaptation by various designers was not the only trend to assert itself over the course of the second half of the eighteenth and into the nineteenth century in English landscape design. At the same time that Repton was adapting Brown's principles to his own use, (and Knight and Price were on the rise), other individuals were capitalizing on the emerging demand for Chinese- and Gothic-style architecture and furnishings that was sweeping Western Europe. Although a Chinese temple had been erected as part of the landscape at Stowe as early as 1738, it was not until William Chambers constructed an entire Chinese-style garden at Kew in 1761 after the publication of his book on Chinese material culture that the Oriental trend in garden buildings became popular more broadly.
From the mid-century onward, ambitious estate owners eager to redesign their country estates and populate them with evidence of their own cultural sophistication and evoke appropriate responses through carefully-calculated vistas could choose from a number of different styles, not only in the overall garden design, but also in the design of smaller constructed elements. The taste for Classical architecture from Greece and Rome remained a viable option for temples, bridges, and other landscape elements, as did designs that evoked the European fascination for the Far East, and for the romanticized Gothic past (Chang 2010; Drayton 2000; Laird 1999; Ross 2001; Woods and Warren 1988).

As the demand for these new, comprehensive designs for estate landscapes spread across Britain and the Atlantic, other Europeans began to take notice. Thomas Whately’s 1770 volume *Observations on Modern Gardening* was translated into French a year after its publication in London, and many Europeans and Americans visited these grandly designed estates while in England for other reasons (Laird 1999; 2003; Ross 2001; Wulf 2009; 2011; Wunsch 2004). Gradually, characteristics and ideas that dominated the English landscape gardens began to be adapted and implemented across other parts of Europe, first in France, and later in areas of Germany, the Netherlands, and even as far east as Russia, where Catherine the Great had an English-style garden constructed at Tsarskoe Selo in 1774 (Drayton 2000; Hunt and Willis 1975; Mukerji 1993; Vleeschouwer 2001; Woods and Warren 1988).

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2 *The Drawings, buildings, furniture, habits, machines and utensils of the Chinese* (1757).
The ideas and elements of English garden design also spread across the Atlantic to the colonial and post-colonial settlements along the North American and Caribbean coasts. Incorporating both design principles from English landscape designers who published their designs, such as Repton, as well as others who gathered a variety of ideas in a single publication, such as Whately, estate owners across Europe and the Americas could emulate the sweeping vistas, manicured lawns, and allegorical architecture on their own properties. On both sides of the Atlantic, individuals could pick and choose which elements best suited the messages they wished to send to their visitors while still following the overall principles of the established English designers, thereby creating individual “hybrid” landscapes such as those at Goldney and the Paca house. For those living in the Americas, the construction and arrangement of an English-style landscape garden had perhaps a special resonance, as it indicated both the owner’s familiarity with European (and especially English) culture, and also their ability to implement sophisticated European cultural trends on an as yet untamed America wilderness (Laird 2003; Leone 1984; Ross 2001; Yokota 2011).

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Hicks’ conclusion that the complexity of garden design at Goldney and the Paca house mirrors the complexity of the individual owners’ participation in the larger Atlantic world suggests new ways of thinking about the gardens of early American elites more generally, and about William Hamilton and his landscape at The Woodlands in particular. The influence of English landscape design and other
related developments in the seventeenth, eighteenth, and early nineteenth centuries which heralded the explosion of interest in plants and botany across the Atlantic had direct and indirect impacts on Hamilton and the rest of the transatlantic community of botanists.

Hamilton's connection to this community, his access to resources (both material and immaterial), and his own personal history not only color his own activities and experience at The Woodlands, but also influence the ways in which other visitors to the estate experienced it for themselves, both during Hamilton's lifetime and after his death. The "situation" of The Woodlands, and its particular history as a rural retreat in the past, and an urban landmark in the present also adds to its unique story. Exploring and evaluating Hamilton and his estate using Hicks' "situational and symmetrical" approach, combined with ideas drawn from phenomenological approaches to archaeology leads to an even richer exploration of the past. Peopling the landscape with individual experience gathered from documents and combining this with archaeological discoveries only underscores the advantages of Hicks' situational and symmetrical approach, allowing for multiple levels of engagement with past experience, "familiarizing" it for a variety of different audiences (Hicks 2005: 386).

As this chapter has outlined, the study and interpretation of past landscapes can be approached in a myriad of ways, depending on the variables of the study and the kinds of questions posed by the researcher. The differing conceptions of "space", "place", and "landscape", as defined by the archaeologists who focus on them, have allowed for the development and adaptation of a variety of
methodological and interpretive models. Archaeologists' application of access analysis, proxemics, and phenomenological approaches to understanding how past people conceived of and moved through physical space has only deepened our understanding of the complexities of the past.

For those landscape archaeologists interested in the meaning of early American gardens, the materialist approach adopted by Mark Leone has provided yet another potential avenue for exploring the constructed landscapes of early American elites. Despite the criticism that his approach to the interpretation of Anglo-American pleasure gardens has generated, Leone's push for understanding the larger ethnographic context of these gardens, and the multiple ways in which they could be viewed and experienced by different individuals and groups has continued to influence contemporary studies of American gardens. But Leone’s interpretation of elite colonial gardens is only one way of viewing these deliberate landscape manipulations; as Hicks demonstrates at Goldney, and again at Paca's garden, these Anglo-American pleasure gardens were often confusing, multi-faceted constructions illustrating the complexities of their owners’ participation in a transatlantic cultural exchange.

The next three chapters will begin to “situate” both Hamilton and his landscape within the various historical and social contexts in which they developed. Beginning with the transatlantic trends that collectively contributed to the so-called “botanic revolution” of the early modern era, through the community that participated in this phenomenon, to the development of Hamilton as a specific individual botanical collector. The layers of “situation” and experience will come
together in the final two chapters, grounded by the material remains of Hamilton’s greenhouse and its meaning and place on the landscape of the The Woodlands estate.
CHAPTER THREE: The "Botanic Revolution"

Exploring the role of William Hamilton and his greenhouse complex at The Woodlands in the development of American botany requires a general understanding of the state of the field in the late eighteenth and early nineteenth centuries, how it developed, and the antecedents both general and specific that brought botany to the attention of scientific and popular audiences in America and abroad. Many of these developments can be traced directly or indirectly back to the social, cultural, and intellectual ideas coming out of the European Enlightenment beginning in the mid-seventeenth century. As the impact of this movement widened, these ideas quickly spread outward from Europe and across the Atlantic to the young colonial settlements in the Americas, influencing the ways in which individuals on both sides of the ocean conceived of and understood the so-called "New World."

However, many other elements of the international botanical trade in which Hamilton and his fellows participated reach back even farther than the Enlightenment, continuing an interest in plants and their products that extends back to the earliest European exploratory expeditions in the Atlantic. This chapter will discuss some of the major strands that made up and influenced the transatlantic botanical trade in which Hamilton participated, which together ushered in the so-called "botanic revolution" of the seventeenth, eighteenth, and nineteenth centuries (Brockway 1979; Schiebinger 2004; Wulf 2009).

The intellectual and social developments arising out of the Enlightenment have been a popular subject for scholars across a wide variety of disciplines, and
will likely continue to fascinate scholars of future generations seeking the antecedents of western cultural models still relevant today. For scholars exploring the development of modern scientific fields and methods of inquiry generally, and particularly for those interested in the fields arising out of the Enlightenment focus on natural history, the general starting point reaches further back in time to the first days of European expansion and exploration of the lands west of the Atlantic ocean.

For several decades now, scholars from a variety of disciplines have explored the consequences of the introduction of an entirely new natural world on European social and intellectual thought. Some have investigated the impact of these discoveries on the field of natural history and Enlightenment scientific development, and the creation of modern museums (see Bleichmar and Mancall 2011; Daston 1991; Findlen 1994; 1998; Greene 1966), while others have looked at some of the longer-term social impacts (Brigham 1998; Brockway 1979; Crosby 1972; 1986; Drayton 2000; Parrish 2002; 2006; Schiebinger 2004; Schiebinger and Swan 2005). Although their specific subjects vary widely, what many of these studies have in common is their allusion to the international exchange of information and physical goods that fueled these larger developments.

Few of the collections could have been built without an established exchange network between Europe and its contacts across the globe. As Europeans pushed farther and farther afield into unknown lands, they established contacts, trade routes and often colonies in strategic locations, which made an increasing number of exotics available back home. Often these exotics were items of natural history, brought back to display the widely different array of plants, animals, and
even peoples encountered in distant lands, especially from the newly discovered Americas (Burnard 2011; Crosby 1986; Findlen 1994; Mancall 2011; Meyers and Pritchard 1998; Parrish 1997; Schnapp 2011).

Scholars in a variety of disciplines have traced part of the interest in the natural history of the New World to the growing popularity of collecting and displaying items of curiosity, beauty, or rarity, as well as to the constant search for new sources of medicinal plants and elixirs. Popularized by European rulers as part of a conscious attempt to showcase their power and wealth through the acquisition and display of rare and precious objects – not to mention the control of valuable plant products – the increasing trade in these items and the growing interest in the natural world led to the widespread appearance of “cabinets of curiosity” (often referred to by the German “wunderkammen”) across much of northern and western Europe (Batchelor 2011; Bleichmar and Mancall 2011; Findlen 1994; 1998). These cabinets of curiosity represented a wide range of interests, often containing both natural and manufactured items from across the globe in a dizzying mishmash meant to amaze the viewer. Often, these collection were stored in multi-compartment “cabinets,” but some individuals devoted entire rooms or wings of a building to the display of collected material, arranging items on and under tables, hung on walls, or even suspended from the ceiling, and set out to best advantage on every available surface.
In the early years of the natural history trade the items displayed in these rooms and cabinets were arranged simply for greatest effect, but the advent of the Enlightenment in the seventeenth and eighteenth centuries brought a different organizing principle to the fore. With its emphasis on rational inquiry and organization, proponents of Enlightenment thought in Europe sought to systematically understand and organize the world around them. This approach had two major impacts on the trans-Atlantic natural history exchange: 1) it allowed Enlightenment thinkers to break free of the reliance on classical authors for understanding natural phenomena, which meant that new systematic interpretations were possible that included New World flora and fauna in their taxonomic
organization, and 2) thereby increased the demand for New World specimens for study and collection (Drayton 2000; Wulf 2009).

Of course, getting access to these specimens and exchanging insights and other information with fellow naturalists was not always easy. Communication between individuals in Europe and elsewhere could be complicated by the continually shifting political landscape in Europe that frequently disrupted communications between scholars in various locales, and sometimes limited contact based on nationalistic (or other) loyalties (Findlen 1998; Mayhew 2004; 2005; Secord 1994; Wulf 2009). However, the Enlightenment emphasis on rational assessment of the natural world extended to communication with others, and scholars in far-flung locations began to take advantage of the benefits of correspondence with their colleagues in other countries and continents. These far-flung informal correspondence connections came to be thought of as an unofficial “republic of letters.” The ultimate goal of this so-called “republic” was to unite all learned men across the known world whose loyalty would be to the pursuit and advancement of natural history and other fields of knowledge through communication with other like-minded enthusiasts regardless of potential (or actual) political and national divisions (Dierks 1998; Kronick 2001; Mayhew 2004; 2005; Secord 1994).

Individuals who considered themselves “citizens” of this “republic of letters” promoted this idealized society of scholars who could and would discuss the great and small scientific questions of the day in a “safe zone” of sorts, without any fear of scorn or rancor based on national, religious, social, political, or other
divisions prevalent in other social interactions (Mayhew 2004: 251). A number of scholars have examined the distance between this ideal and the actual practice of early modern communication between learned individuals (see, for example Daston 1991) with approaches ranging from a geographic network based on bibliographies of two Enlightenment scholars (Mayhew 2004; 2005), to network mapping based on correspondence (Mayhew 2005) and techniques applied to the analysis of modern scientific communication in the twentieth century (Kronick 2001).

Although the reality of such open, egalitarian, and (relatively) non-judgmental communication may have fallen short of the ideal, the impetus to create a wide ranging network of scholars linked by their shared intellectual curiosity had far-reaching consequences for the advancement of natural history and the transatlantic exchange of specimens. This communication network variously referred to as a “correspondence community” (Parrish 2006), an “invisible college” (Kronick 2001), “the natural history circle” (Keeney 1992:25), and simply as part of the “republic of letters” (Dierks 1998; Secord 1994), allowed distant individuals to exchange both physical specimens and information. The great botanical exchange in which Hamilton and other participated in the eighteenth and nineteenth centuries was in many ways an extension of the European republic of letters on a larger transcontinental scale in a world made smaller by the extension of European empires. Naturalists from Bombay to Boston could provide each other with encouragement, instruction or advice, as well as seeds and skeletons – and they did, thereby creating a global exchange network based around natural history.
The world for Europe and its colonies was in a state of flux throughout the eighteenth century. The known world had been expanding rapidly for the last three centuries, and with it the curiosity of Europeans about these newly discovered places. One of the most fascinating aspects of this expansion of the known world for Europeans was the vast array of new and exotic flora and fauna thus exposed (Brockway 1979; Coats 1970; Crosby 1972; Hobhouse 1997; Leighton 1976; Long 1991; Wulf 2009). These new lands and seas had new climates, new plants and animals, and unfamiliar people inhabiting them, and the stories told by the explorers to those at home only increased the atmosphere of curiosity and desire to see such exotic specimens for themselves.

Curiosity surrounding these new discoveries was only part of the motivation for their collection, however. European explorers were also interested in the practical and economic impact of new botanicals for use as medicines and as new sources for coveted spices. Although Christopher Columbus’s official letters to his sponsors prioritize the discovery and acquisition of gold more than botanical specimens, he was actively aware of the importance of potential new sources of precious spices and medicines (Estes 1995; Griffenhagen 1992). Writing to the Spanish monarchs from Hispaniola during his first voyage Columbus laments, “there are trees of a thousand types, all with their various fruits and all scented. I am the saddest man in the world because I do not recognize them, for I am sure they are of great value in Spain for dyes and as medicinal spices” (quoted in Griffenhagen 1992: 131). Columbus’s ignorance was certainly regrettable from an economic perspective; explorers could earn both lasting fame and cash rewards for
discovering and retrieving prized medicinal plants such as mastic (Griffenhagen 1992).

The demand for new botanicals, and especially for new sources of Old World botanicals grew exponentially after the European entry into the Atlantic. Travelers to these new lands were asked – and sometimes explicitly commanded – to bring back specimens for economic, scientific, and medicinal purposes. Materials began arriving in Europe almost immediately, brought first by explorers, and then more regularly brought or delivered by cargo ships as they established regular trade routes to these new lands and colonies (Brockway 1979; Coats 1970; Crosby 1972; Drayton 2000; Leighton 1976; Sarudy 1998; Wulf 2009). One of the first places to be systematically explored for exotic specimens was the continent of North America, due in part to the early establishment of European colonies along its eastern coast (Wulf 2009).

The interest in and demand from American-derived botanical products – and the botanicals themselves – had existed in one form or another from the earliest days of European exploration in the Atlantic. The success of Columbus’ first expedition in 1492 led to the Spanish Crown sending a royal physician (Diego Alvarez Chanca) along on the second journey in the hopes that his education and experience would allow him to identify and supply Spain with even more botanical treasures than had come from the initial trip (Estes 1995; Griffenhagen 1992). Although Chanca seems to have misidentified a number of new American plants as Old World varieties (Columbus had erred in many of his identifications as well), the idea of the New World as a source of both wealth and medicine derived from local flora took hold.
With the publication of John Frampton’s *Joyfull Newes Out of the Newe Found Worlde* in 1577\(^3\) and the inclusion of a variety of American botanicals in European herbals in the late sixteenth and early seventeenth centuries, a growing number of Europeans were investing their time, money, and interest in the promise of New World plants. Several apothecaries and physicians left Spain to set up establishments in the New World and reap the benefits of this new drug trade as far as they were able, and they were not the only ones to see economic promise across the Atlantic. Four years prior to the establishment of a colony at Jamestown, the English sent expeditions to what is now New England to collect sassafras for private investors, and Jamestown itself was first established as an economic investment (Estes 1995).

The establishment of the first permanent English colony at Jamestown in 1607 and the existence of other earlier colonial outposts of Spain, France, and the Netherlands in the New World cemented the trade in and experiment with American botanicals. Archaeological and documentary evidence from Jamestown suggests that English apothecaries and physicians were experimenting with local plants, including wax myrtle, for medicinal purposes, and the colony’s successful export of tobacco to Europe set a cultural and agricultural precedent that dominated Chesapeake regional development for the next two centuries (Horning et al 1998; Isaac 1999; Kulikoff 1986; Morgan 2003; Mrozowski 1999).

\(^3\) Frampton’s treatise was not an original work, but an English translation of a book on American medicines by Spanish physician Nicolas Monardes, first published in Spain in 1569, and translated by a variety of others (Estes 1995; Griffenhagen 1992).
Although trade routes were regularly established for botanicals and other goods across the Atlantic by the mid-seventeenth century, transportation and preservation of this material was never guaranteed. Tobacco, dry-packed in hogsheads, might remain viable during its potential three-month journey across the Atlantic, but other botanical products presented problems, and successful deliveries of North American flora and fauna to Europe were few and far between before 1730 (Brockway 1979; Leighton 1976; Long 1991; Meyers and Pritchard 1998; Sarudy 1998; Woods and Warren 1988; Wulf 2009). Gradually, however, the demand for more examples of New World plants and animals grew, and the growth of permanent colonies along the eastern coast of North America made meeting this demand much easier. By the mid-eighteenth century it had become much more feasible not only to send plants and animals across the Atlantic from the American colonies to their European contacts, but also to mount entire expeditions for the sole purpose of collecting such exotic specimens (Meyers and Pritchard 1998; Wulf 2009).

Plant-hunting expeditions to the New World in order to bring back exotics for display and sale to Europeans other than as medicines or spices were not new ideas in the eighteenth century, but they had not garnered much notice beyond a small circle of enthusiasts until after Mark Catesby’s publication of his *Natural History of Carolina, Florida, and the Bahama Islands* (1731-1743). Catesby actually mounted two separate expeditions for the purpose of collecting and studying New World plants and animals, the first trip arising out of a visit to his sister in Virginia and consisting of a prolonged sojourn in that colony and those
immediately surrounding from 1712-1719, while the second trip was shorter and more narrowly focused on southern North America and the Caribbean islands from 1722-1726 (Meyers and Pritchard 1998). During both of these expeditions Catesby established important relationships with other botanically-minded men of the day, including William Byrd II, John Custis, and Thomas Jones of Virginia, as well as the former lieutenant-governor of Virginia – and then lieutenant-governor of South Carolina – Francis Nicholson, who lent financial support to Catesby for his return expedition in 1722 (Brigham 1998; Meyers and Pritchard 1998). It was through the support of this group of men in the colonies and others, such as Sir Hans Sloane, in London, that allowed Catesby to focus solely on the collection and recording of North American flora and fauna during his trip, and later, to publish his records and illustrations in a multi-volume set for interested subscribers (Brigham 1998; Meyers and Pritchard 1998; Stetson 1946; Wulf 2009).

While Catesby’s expeditions in the early eighteenth century were not the first trips made by naturalists across the Atlantic, they were a significant departure from the usual ways of collecting specimens and information about the natural history of the New World. Prior to Catesby’s two expeditions in the early eighteenth century, plant-hunting trips had often been part of larger exploratory adventures, such as the Columbian voyages mentioned earlier, or motivated by economic gain or the hunt for medicines and legendary elixirs rather than expressly for scientific interest (Coats 1970; Daisey 1996; Estes 1995; Griffenhagen 1992; King 1972). However, as Europeans entered their second century of colonial involvement in the Atlantic, the interest in New World plants as scientific and collectors’ items
increased. This is not to say though, that economic and medicinal incentives lessened; such motivations never really disappeared from the botanical trade, and continued to influence it through the modern era (Brockway 1979; Daisey 1996; Desmond 1995; Schiebinger 2004). Eighty years prior to Catesby’s first trip across the Atlantic, John Tradescant the Younger mounted a natural history expedition to the New World and helped to popularize various North American plants by promoting and displaying his treasures at his family nursery in south London. Unlike Catesby, however, Tradescant did not have an explicit scientific agenda nor was he able to draw on the same kind of outside funding for his expedition (Coats 1970; Drayton 2000; Harvey 1998; Hunt 1996; Meyers and Pritchard 1998; O’Malley 1998’ Wulf 2009).

The desire for North American botanicals seemed particularly pronounced in Britain, perhaps because Britain had a number of thriving colonies in North America by the third decade of the eighteenth century and therefore had ready access to North American exotics. Certainly Catesby’s expeditions and subsequent subscribers to his Natural History were primarily English – and American (Brigham 1998; Meyers and Pritchard 1998; O’Malley 1998; Wulf 2009). These subscribers included a number of Royal Society Fellows, and while the Royal Society of London did not officially contribute any funds for Catesby’s expeditions, a number of Society members including Hans Sloane, Francis Nicholson, and Peter Collinson went to great lengths to ensure that Catesby’s trips and later publications were successful (Brigham 1998; Meyers and Pritchard 1998; Wulf 2009).
Further evidence of Britain's growing interest in North American flora and fauna can be seen in the list of subscribers for Catesby's *Natural History* volumes, which included Thomas Fairchild, a nurseryman and importer of exotic plants in Chelsea (Meyers and Pritchard 1998; Wulf 2009). The mere fact that Fairchild, Tradescant, and others like them existed shows that there was already a latent interest in exotic plants for English gardens, and after Catesby brought more specimens back in 1726 the exotic plant business in and around London exploded. Britain became aware of the great richness of North America, the possibilities of nature that could climates vastly different than that of Europe, and joined their European neighbors in the hunt for new plant products.

The demand for North American exotics, existing in some small form since John Tradescant the Younger brought the first American blooms back to England in the 1630s, skyrocketed with the return of Catesby in the 1720s and the subsequent availability and knowledge of a much wider abundance of flora and fauna than had previously been thought (Harvey 1974; Olver 1976; Woods and Warren 1988; Wulf 2009). Now, suddenly, English gardens could shine with color year-round rather than being limited to colorful blooms only in certain seasons – but only if one had the time and resources to devote to their care. In the seventeenth and early eighteenth centuries, such exotics could be found in a handful gardens belonging to royalty and the extreme upper echelon of European society or in botanic gardens connected to universities and medical societies (Chesney 2009; Hunt 1996; Scora 1975; Woods and Warren 1988; Wulf 2009). The relative rarity of these plants gave
them an aura of fashion and status above and beyond the interest created by their unique appearance and physical properties.

Nor did the desire for these plants diminish much as they became more readily available in the eighteenth century; expert care and special structures such as greenhouses were essential elements in the propagation and preservation of flora not native to European climates. The increasing trade in foreign botanicals in the eighteenth and nineteenth centuries along with new technologies and better understanding of plant biology led to a veritable explosion of construction of specialized areas for botanical display. These structures became such common sights in Britain by the second decade of the nineteenth century that J. C. Loudon not only published a book specifically on greenhouses, but described such structures as "an appendage to every villa and to many town residences" in The Green-House Companion (1825; quoted in Beranek and Krofft 2011: 33).

Although not every botanically inclined individual could afford to construct a special building for exotic plants, a number of them on both sides of the Atlantic did so, with endless varieties in form, function, and language. Eighteenth and nineteenth-century authors of gardening and horticulture books were not always consistent in their employment of terms or their distinction between the various types of garden structures built for the propagation of exotic and delicate botanicals. The various definitions of "greenhouse", "conservatory", and "orangery" differ from author to author and vary in popularity over time, and continue to be used with abandon by modern authors. Some authors are not even consistent in their employment of these terms within the same publication (Beranek and Krofft 2011;
Britz 1996; Hix 1981; Pogue 2003). Such inconsistency only adds to the general confusion for both nineteenth-century and modern audiences.

There are, however, some distinctions between these terms that can be drawn based on their use and frequency among various eighteenth and nineteenth-century authors. The term “greenhouse” was often applied as a generic term to refer to the entire category of specialized plant buildings found across large estates in both published garden and horticultural treatises as well as by late eighteenth and early nineteenth century visitors to estates containing such buildings (Beranek, Smith and Steinberg 2011; L. G. to Eliza June 15, [1794]; Long 1991; Notes and Queries 1884).

Both nineteenth-century authors and modern scholars often draw distinctions between these various structures based on the heating systems and requirements for different kinds of plants, as well as the seasonal quality of use. Bernard McMahon, author of the first American publication of a gardener’s calendar specifically for American audiences, defines a greenhouse as “‘a garden-building fronted with glass, serving as a winter residence for tender plants... which require no more artificial heat than what is barely sufficient to keep off frost...’” (McMahon 1806: 78; quoted in Beranek, Smith, and Steinberg 2011: 35), and were, moreover, buildings designed to hold plants in tubs and pots, which would then be moved outside during the warmer summer months (Beranek, Smith, and Steinberg 2011; Britz 1996; Hix 1981; Kohlmaier and von Sartory 1986; Lemmon 1963; Mann 2011; Vleeschouwer 2001; Woods and Warren 1988). In the eighteenth century buildings of this type were often referred to as “orangeries” from the French
"orangerie" because such structures were originally constructed for the protection of citrus trees over the cold winter months, with thick walls and large windows to let in light (Beranek, Smith, and Steinberg 2011; Britz 1996; Hix 1981; Lemmon 1963; Pogue 2003; Sarudy 1998; Vleeschouwer 2001; Woods and Warren 1988; Yentsch 1990; 1994). During the summer months the citrus plants were removed and the buildings were opened up for use as social spaces for entertaining, while tubs of orange, lemon, and lime trees lined garden paths at massive estates, such as Versailles (Beranek, Smith, and Steinberg 2011; Chesney 2009; Mann 2011; Pogue, White and Leeson 2002; Vleeschouwer 2001; Woods and Warren 1988).

In contrast to “orangeries” and “greenhouses,” “conservatories” were often defined as year-round, semi-permanent, houses for plants complete with dirt beds (either raised or dug into the floor) where plants would be raised from seeds or cuttings (Beranek, Smith, and Steinberg 2011; Loudon 1813; 1817; Mann 2011). Due to the more permanent nature of the conservatory’s arrangements, these structures often had ingenious mechanisms for allowing fresh air and sunlight inside, such as removable panels or windows, making them akin to so-called “forcing-houses” (sometimes also called “succession houses”) for starting plants prior to their permanent growth in an outside terrace or orchard (Beranek and Krofft 2011; Loudon 1817; Switzer 1763; Woods and Warren 1988). The term “conservatory” also takes on a particular social element in the later nineteenth century, where it often indicates an attached room of a house filled with plants and furniture and used for entertaining (Chesney 2009; Hix 1981; Vleeschouwer 2001; Woods and Warren 1988).
Other structures for protecting and caring for exotic plants had more involved heating systems designed to protect the most delicate botanical specimens by constantly supplying heat through a wide variety of means. Based on extant examples and the recommendations of eighteenth and nineteenth century authors, the most common systems included subterranean ones based on Roman hypocausts, fires kept in corners of the room, and even systems of flues that brought hot air or steam through the back walls to provide constant ambient heat to the interior (Beranek and Krofft 2011; Britz 1996; Chesney 2009; Hix 1981; Mann 2011; Pogue 2003; Weber 1996; Woods and Warren 1988 Yentsch 1990). These structures were often referred as “stove-houses” (or simply “stoves”) or “hothouses”, and on the estates of particular botanical enthusiasts, could (and often did) exist in addition to non-heated “greenhouses.”

In North America, one of the best-known examples of this design is the eighteenth century orangery at Wye House (figure 3). There were also many buildings constructed for raising specific kinds of plants, such “graperies” and “pineries” (for pineapples), but such specific terms were less common among the greenhouses constructed by eighteenth and nineteenth century Anglo-American elites, who tended to refer to their “greenhouses”, “orangeries,” and “conservatories” (Beranek, Smith, and Steinberg 2011; Britz 1996; Chesney 2009; Mann 2011; Pogue 2003).
Although varying significantly in size, description, and actual use, there are a number of common elements of these specialized plant buildings in both extant examples and recommendations from period authors. Greenhouses were usually long, narrow buildings constructed of durable brick or stone, with a series of large windows along the south-facing or "front" wall to allow for maximum sunlight during the winter months. Often these windows could be opened to allow for easy access to plants as well as to let in fresh air in milder weather. Greenhouse floors were often paved to easily move plants back and forth, and some examples were constructed with risers or shelves along the walls to maximize sun exposure and
storage space (Beranek and Krofft 2011; Britz 1996; Chesney 209; Hix 1981; Loudon 1817; 1825; Switzer 1763; Vleeschouwer 2001; Woods and Warren 1988).

The north, or back, wall of a greenhouse was usually thicker than the front, especially if the building was heated by means of flues that ran up the back wall and/or under the floor, bringing heat in from a furnace or other source outside the main room. A number of eighteenth and early nineteenth century examples from North America consisted of “complexes” made up of a central 1 ½ or 2-story greenhouse flanked by single-story wings on the east and west ends. These wings were often used as hothouses for more tender plants, but could be put to other use as well, depending on the desire of the owner. At Mount Vernon, the single-story wings on either side of Washington’s greenhouse were used as slave quarters and storage areas, while many other European examples included rooms for gardeners and other purposes (Beranek, Smith, and Steinberg 2011; Britz 1996; Chesney 2009; Pogue 2003; Woods and Warren 1988).

Of course, an individual would only need to construct a greenhouse if he or she had or was planning to acquire a large enough number of fragile plants to justify the effort and expense. The desire for North American plants on the part of British and European collectors could only be fulfilled if one had a relationship or connection with American colonist who was both willing and able to gather the requested materials and ship them back to Europe. Prior to the explosion of interest in and demand for North American plants, most botanical enthusiasts were limited to begging their business or personal contacts to include a selection of plants or seeds tucked into a larger shipment of other goods (Harvey 1998; Leighton 1976;
Long 1991; Sarudy 1998; Woods and Warren 1988; Wulf 2009). Such exchanges were naturally sporadic and unreliable, depending on any number of factors from the ability of the individual to procure and safely package the desired specimens to the care of said materials during the often treacherous transatlantic crossing (Hobhouse 1997; Leighton 1976; Sarudy 1998; Woods and Warren 1988; Wulf 2009). Before the mid-eighteenth century only one seed in five hundred was likely to survive the six-week journey across the Atlantic, and even then there was no guarantee that the surviving specimen would grow or bloom in English soil (Hobhouse 1997; Leighton 1976; Long 1991; Sarudy 1998; Woods and Warren 1988; Wulf 2009).

The exchange of physical specimens as well as knowledge and information among early modern Europeans and their transatlantic counterparts was not simply limited to one-on-one interactions or small parcels of seeds tucked into other transatlantic shipments, however. At the same time that the Enlightenment was gaining momentum across Europe through the exchange of letters and other material, individuals in Britain sought more immediate ways of exchanging scientific ideas and material through regular meetings of like-minded enthusiasts. Such meetings were given official approval in 1660, when King Charles II granted a charter to the Royal Society of London for Improving Natural Knowledge. Royal Society members pledged to meet regularly in order to further the pursuit of knowledge in science, natural history, and related disciplines through the presentation, discussion and publication of their ideas and experiments (Drayton 2000; Johns 2000; Reingold 1976; Wulf 2009).
The creation of the Royal Society complimented the republic of letters, and from the first it was an organization with an international impact far beyond its English charter. Prior to its establishment, scientific enthusiasts relied on personal contacts in a somewhat piecemeal fashion to gather knowledge and specimens, but the creation of organizations such as the Royal Society provided their members with larger circles of correspondence and more resources to pursue scientific inquiry. In fact, it was a mutually beneficial situation, as the societies themselves gained access to wider spheres of knowledge through their members, and enhanced the reputations of both the society and their individual members in the process (Chambers 2007; Johns 2000; Mukerji 1993; Wulf 2009; 2011).

Royal Society Fellows such as James Petiver, for instance, drew on their circle of correspondents across the globe to add to the growing collection of scientific treatises in the society’s library. Petiver’s particular interest was botany, and it was through his efforts, and those of his de facto successors, Peter Collinson and John Fothergill, that the Royal Society became an important clearinghouse for all kinds of natural history information and specimens from British North America and beyond (Drayton 2000; Greene 1958; 1968; Meyers and Pritchard 1998; O’Neill and McLean 2008; Wulf 2009). Members of the Royal Society backed Mark Catesby’s expedition to the New World, and received a number of specimens and information from Sir Hans Sloane and many others who sent in specimens and reports on natural history from all over the world (Brigham 1998; Drayton 2000; Parrish 2006; Schiebinger 2004; Wulf 2009).
While the Royal Society of London was the most well known and prestigious of the Enlightenment-era improvement societies for the English-speaking world – it was often simply referred to as “the Royal Society” even though many others had similar names – it was by no means the only example. Societies with similar aims sprung up across Europe, in the late seventeenth and early eighteenth centuries, including the Royal Society of Edinburgh, the Académie des Sciences (Paris) the Academia Naturae Curiosorum (today known as the German Academy of Sciences Leopoldina) and many others (Chambers 2007; Dierks 1998; Desmond 1995; Drayton 2000; Johns 2000; Mukeji 1993; Schiebinger and Swan 2005; Wulf 2009). Other societies dedicated to the improvement of and pursuit of knowledge were founded across the Atlantic, with some of the first American societies founded in the city of Philadelphia, the center of culture and learning for the American colonies in the eighteenth century. Benjamin Franklin, that well-known virtuoso, was at the center of many of these Philadelphia societies, including the American Philosophical Society, which still exists today (Bell, Jr. 1997; Hindle 1955; Parrish 2006; PHS 1976; Wulf 2009; 2011).

Many of these societies modeled themselves on the original Royal Society of London and often the most scientifically curious were members of several societies at the same time, participating as full members of their home institutions, and as “corresponding” or “foreign” members of other local, regional, or international groups (Drayton 2000; Ewan 1952; Graustein 1961; Parrish 2006; Wulf 2009; 2011). By the early Federal period in America, there were intellectual and scientific societies in many American cities, some associations drawing members and interest
from a wide variety of scientific and intellectual pursuits, while others, particularly the newer ones founded in the late eighteenth and early nineteenth centuries, focused more narrowly on agriculture, for instance, or natural history or art (Goldstein 1994; Greene 1958; Keeney 1992; Wulf 2011).

* * *

Another Enlightenment-era cultural development that encouraged the transatlantic trade in natural history material and the specific interest in botanical specimens was the growing popularity of “natural theology” across the European and Atlantic worlds. Along with the growing interest in the natural world from both social and scientific circles, “botanizing” and other natural history pursuits came to take on a spiritual cast for some participants. Botanically inclined Protestant clergy as well as lay people began to talk, write, and explicitly conceive of the study of the natural world as a way of learning more about the Divine Creator responsible for its existence (Dierks 1998; Drayton 2000; Keeney 1992; Parrish 2006; Wulf 2009). Collecting, preserving, identifying, and organizing plants, animals, and other specimens could lead not only to a better understanding of the natural world, these proponents argued, but also to a better understanding of and a deeper connection to the Creator of such bounty (Daston and Park 1998; Dierks 1998; Drayton 2000; Keeney 1992; Wilson 2008; Wulf 2009).

Finding spiritual satisfaction in the collection and study of the natural world did not, of course, preclude other more mundane reasons for pursuing such studies; many of the same individuals who claimed religious rejuvenation also sought and
hoped for more material benefits from their pursuit of botanical knowledge. Dr. Alexander Garden of Charleston, South Carolina who once wrote to Carl Linnaeus of the "mental pleasure and rational enjoyment" he received from "examining, determining and admiring this wonderful part of the works and manifestations of the wisdom and power of the Great Author of Nature" (Garden to Linnaeus June 2, 1763, quoted in Dierks 1998: 175) also explicitly expressed his hope that advancement in botany would lead to recognition of his abilities by secular authorities, including the Royal Society and the elite of Charleston (Dierks 1998).

The often-explicit spiritual connection to nature espoused in this period helped to increase the popularity of natural history pursuits among certain groups, especially those who sought to encourage wider participation. Botany in particular became an increasingly socially acceptable activity for women and children, and its proponents often drew on the tenets of natural theology as well as the benefits of outdoor exercise and stirring drawing room conversation to convince their audiences to take up its study (Keeney 1992, Schteir 1997; Secord 2002). Throughout the nineteenth century in both Europe and America, authors of botanical treatises and books sought to reach new audiences; addressing their tomes to "Ladies" or children, and the inclusion of botany as a school subject at both elementary and secondary levels became the norm especially in the United States (Keeney 1992; Schteir 1990; 1997; Secord 2002). This surge of popularity in botany in these new groups changed somewhat in the latter part of the nineteenth century, however, as the field became increasingly split between the scientific and laboratory activities of full-time researchers and the field collecting emphasis of the "weekend botanizers"
who found themselves pushed to the margins of a field increasingly dominated by "professionals" (Daniels 1967; Keeney 1992; Reingold 1976).

In other quarters, however, the Enlightenment interest in natural history only renewed connections between nature and its study by humans, such as medicine, which like religion had a long shared history with investigations of the natural world. Since the Middle Ages, the study of plants had been integral to European medicine, and many of the most famous gardens in Europe, including Leiden, and the Chelsea Physic Garden in London were created for the sole purpose of housing plants for study by medical students (Hobhouse 1997; Sarudy 1998; Woods and Warren 1988; Wulf 2009). By the time that botany and other areas of natural history became intellectual pursuits in their own right the two fields were firmly linked in the prevailing medical wisdom of the day (Estes 1995; Graustein 1961; Griffenhagen 1992; Harvey 1998; King 1972; Reingold 1976).

From a purely practical perspective the study of nature by medical professionals was essential to advancing their own science, since most of the remedies prescribed – and a significant number of the diseases encountered – were derived from plant and animal products. As the world opened up to Europeans in the fifteenth century and beyond, the medical necessity of studying exotic plants and animals became ever more important as new diseases and ailments were encountered that proved resistant to traditional European remedies. The reverse was also true, as European explorers encountered new groups of people unfamiliar with Old World diseases and their treatments, and sought to adapt their own remedies to new maladies (Brockway 1979; Crosby 1972; 1986; Desmond 1995; Drayton 2000;
Schiebinger 2004; Schiebinger and Swan 2005). Unlike the search for scientific or collection-appropriate botanicals, however, the search for medicines and elixirs in the New World was an early priority for European explorers, and continued to influence trade and exploration well into the nineteenth century.

Collection of New World plants thought to be the same as (or related to) Old World medical ingredients encouraged investors to offer incentives, such as the prize for the first of Columbus’ crew to identify and collect mastic, a particularly valuable botanical product used to treat a wide variety of Old World ailments (Estes 1995; Griffenhagen 1992). Other sought-after New World medicines in the first century of European colonization of the Atlantic included sassafras and guaiac, the latter widely used as a treatment for syphilis (Estes 1995; Griffenhagen 1992). According to the medical practice of the day, diseases and cures were linked; as it was widely believed that syphilis had been introduced to Europe from the New World, the cure for this debilitating disease must also originate there. The seeming effectiveness of guaiac against the outward symptoms of syphilis made it one of the most heavily imported drugs in sixteenth-century Europe (Estes 1995; King 1972).

Ironically, the most valuable and useful medical botanicals from the New World were not recognized until centuries after the first Europeans entered the western Atlantic. Columbus and his ilk were looking for medicinal plants they knew – or thought they knew – from European herbals and apothecaries, along with alternative sources of valuable spices, such as cinnamon, cloves, and pepper. Although Columbus, Cortés, and many others reported on the variety and effectiveness of medicines used by the native populations they encountered – Cortés
even wrote to Spain in 1522 that no European apothecaries were needed in the Spanish colonies because the Aztec medicine men were so proficient – few were adopted by Europeans (King 1972). The major exceptions were tobacco and chocolate – both of which became more popular as recreational substances than medicinal ones (Estes 1995; Griffenhagen 1992; King 1972).

In the later centuries of European colonization of the Americas, the emphasis on plant hunting for medicinal purposes shifted: instead of searching for New World variants of Old World staples, explorers were tasked with collecting as many varieties of new plants as possible for scientific and medicinal analysis back in Europe (Brockway 1979; Drayton 2000; Estes 1995; King 1972). The heyday of this medico-scientific exploration corresponded with the full-fledged entry of England into the European balance of power in the Atlantic, and the botanical arms race, which had a lasting impact on British colonial and imperial decisions for centuries to come (Brockway 1979; Drayton 2000; Schiebinger 2004). Through this shift in plant hunting, four of the longest-lasting American-derived drugs were adapted to European medical practice between the seventeenth and the twentieth centuries: cinchona (quinine), ipecac, cocaine, and curare (Brockway 1979; Drayton 2000; Estes 1995; King 1972).

As Europeans established permanent colonies in the New World, the study of the flora and fauna native to these regions aided the development of remedies on both sides of the Atlantic, and many medical professionals sought out both information and specimens from their far-flung colleagues scattered across the frontier. Benjamin Smith Barton, for instance, often wrote to his colleagues and
former students in the western American territories for news not only of the new plants and animals encountered in these locales, but also asked for and received detailed descriptions of the course of local diseases, and the methods used to treat them, and he was not alone. Medical professionals across the globe sought information from their colleagues, often through informal letters, which sometimes were considered important enough to be presented at the meetings of various societies if not published outright by these bodies as treatises and transactions (Bartram 1749-1750; Brigham 1998; Drayton 2000; Johns 2000; Wulf 2009).

* * *

Although many eighteenth and nineteenth century medical professionals relied on the informal network of colleagues and students for information about plant-based remedies and other botanical knowledge, they could also access the semi-official network of botanic gardens across the world, which became repositories of exotic plants and information. In fact, botanic gardens epitomize the woven whole of the international botanical trade, and the so-called “botanic revolution,” uniting all the threads discussed in this chapter in one cognitive and physical space. The earliest botanical gardens in Europe date to the sixteenth century, with the first one established at Pisa in 1543 (Hunt 1996). Much like the early Italian cabinets of curiosity, the botanic garden at Pisa contained a variety of natural and artificial curiosities from around the world, but displayed them in an

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4 Benjamin Smith Barton corresponded with a number of his medical colleagues about diseases and their treatment, which forms part of the material in the Delafield Collection at the American Philosophical Society.
outdoor space accessible to visitors. In addition to the natural curiosities, the gardens at Pisa also showcased “religious pictures, landscapes and portraits of European botanists” along with other depictions of animals and plants (Hunt 1996: 74).

Other botanic gardens were established soon after Pisa, including those associated with universities at Padua, Bologna, and Leyden by the mid-sixteenth century (Estes 1995). In the early days these gardens were “more for use than delight” as an early British botanist remarked (quoted in Hunt 1996: 74), and became the physical repositories for newly arrived plants from outside Europe. By the 1630s, botanic gardens had been established at Oxford and Paris, and the profusion of interest in not just the medicinal and curious aspects of foreign plants, but also the scientific aspects was increasing along with the visitor count to these enclaves (Estes 1995; Hunt 1996). These gardens became places in which the changing approaches to botany – mirrored in the changing approaches to New World plant collecting – played out in physical space. Although many of the early European botanic gardens were arranged in complex, formal designs, later examples emphasized scientific and medical uses of these plants. “The growing skepticism with what seemed a merely self-indulgent taste for collecting curiosities or rarities was paralleled by less tolerance of …the ‘conceits’ of an Italian [formal] garden” states garden historian John Dixon Hunt (Hunt 1996: 80). Much like the changing taste among Britons for less orchestrated landscape design, the interest in gardens for their curiosities was superseded by the interest in them as scientific and medical repositories.
This trend became even more pronounced in the British empire of the eighteenth and nineteenth centuries as botanic gardens took on a new, imperial dimension. In the heyday of British colonial expansion and empire in the eighteenth and nineteenth centuries, botanic gardens functioned primarily as arms of statewide economic development, where professional botanists and trained gardeners would experiment with exotic plants imported from colonial possessions around the globe in an effort to maximize their economic potential and enrich the mother country (Brockway 1979; Desmond 1995; Drayton 2000; Schiebinger and Swan 2005; Wulf 2009).

In the early years of British colonial rule in the Caribbean, botany was only just beginning to establish itself as a systematic science concerned with the classification and study of plants, thanks in large part to the Swedish botanist Carl Linnaeus (Brockway 1979; Schiebinger 2004). As the seventeenth century became the eighteenth and then the nineteenth century, the possible economic uses of particular plants brought the science of botany and the role of botanic gardens to the forefront in the imperial mindset (Brockway 1979; Schiebinger 2004). Botanical gardens began to sprout up all over Europe – by one estimate, there were sixteen hundred in that continent alone by the end of the eighteenth century – and the rise of this new "economic botany" meant that there was a new impetus to study the colonial environment and its native plants (Brockway 1979:74-75).

The exotic flora brought home by British traders was not just interesting and unusual, but also a potential source of great wealth and imperial dominance. Botanical enthusiasts in Britain began a renewed exchange with their international
acquaintances, arranging for shipments of trees, seeds, and plants as well as for the experts and the facilities needed to study them (Brockway 1979a; Howard 1954; Schiebinger 2004). Ships, both merchant and naval vessels, carried trained botanists with them to help identify foreign plants and to collect any that might prove to be economically or medically advantageous (Brockway 1979a; Brown 2003; Schiebinger 2004). Cargoes of ships carrying plant materials were even deemed valuable enough to be captured as prizes by the British navy and then sent on to various islands where their economic potential could be fully explored (Fawcett 1897).

Of course, the British Empire in the late eighteenth and early nineteenth centuries was a large expanse of territory covering a fair amount of the globe, and the sheer amount and diversity of the flora coming back to the British Isles necessitated the establishment of an organization to deal with it all. In the mid-nineteenth century the Royal Botanic Gardens at Kew, a few miles outside London, were established as the official repository and center for botanic research for the British Empire (Brockway 1979; Desmond 1995; Drayton 2000; Wulf 2009). The gardens at Kew had existed as a semi-private institution attached to the Royal Palace since 1769 and already contained many exotic specimens as well as the appropriate facilities, so the transition to an explicit arm of British botanical imperialism was relatively smooth (Brockway 1979; Desmond 1995). The role of the Kew Gardens, however, was not to replace the local botanic gardens existing in certain parts of the empire, but rather to coordinate their experiments into large-scale research agendas to further the economic interests of the crown (Brockway
1979; Desmond 1995; Drayton 2000; Howard 1954). From the first then, the Royal Gardens at Kew had dual responsibilities to encourage and experiment with exotic flora in Britain and her colonies, and to disseminate the results of those experiments so that all parts of the empire might benefit from them (Brockway 1979).

This experimentation and dissemination of knowledge had actually already been operating on a much smaller scale in the eighteenth century in certain parts of the British Empire, and with the establishment of Kew Gardens the practice took on epic proportions. The establishment of the botanic gardens on the islands of St. Vincent and St. Thomas in the mid-eighteenth century marked the first wave of this enthusiasm, although these particular botanic gardens began simply as holding stations for the plants gathered in the area before they were shipped off for more elaborate study and experiments to be performed in Europe (Howard 1954). Such was the primary role of most colonial botanic gardens through the early part of the nineteenth century until Kew Gardens began a systematic reorganization of British imperial botany (Brockway 1979). As the imperial fever grew in Britain, more and more emphasis was placed on the potential economic uses of the flora native to these colonies. Soon these botanical gardens in the colonies became centers of botanical research to rival those established in the mother country (Brockway 1979).

By the end of the nineteenth century, six more botanic gardens had been established just in the British Caribbean colonies, and these new stations not only served as collection stations for plants that would eventually be sent to Europe like their earlier counterparts, but some of them also became important centers for botanic research in their own right (Brockway 1979; Fawcett 1897; Howard 1954).
This research was performed by trained European scientists who were given the task to explore the economic potential of the available plants before they were shipped off to Europe or to other colonies in the far east, where they could be produced in large numbers by cheap colonial labor forces and through the balance of trade back in the favor of the mother country (Brockway 1979a).

Perhaps the most famous Caribbean example of this system of economic botany in the service of the British Empire involves the introduction of the breadfruit tree to Jamaica from Tahiti in the late eighteenth century. Captain Bligh, of the infamous H.M.S. *Bounty* brought the first breadfruit trees to Jamaica after a prize was announced for their introduction to this island in 1775 as a possible source of food for the enslaved labor force working the island’s sugar plantations (Fawcett 1897; Howard 1954). The introduction of the breadfruit to Jamaica – and from Jamaica to other islands – not only affected the health and diet of the island’s inhabitants on a local scale, but it also had consequences for the larger British economy.

The cheap source of food allowed planters to pour more capital into their plantations and increase the sugar output – and therefore increase the profit – for the British market. The impact of breadfruit in the British West Indies was also felt in the specific botanic circles, as the transportation of this tree inspired the then-agent for Dominica to write a treatise on the subject and suggest new designs for plant boxes to protect them on long ocean journeys (Fawcett 1897; Howard 1954). While this particular experiment predates the establishment of the large-scale organization of British economic botany through the Royal Gardens at Kew it does illustrate the
growing importance of these colonial botanic research centers to the British imperial regime and provides a clear motive for the wholesale encouragement of economic botany and the establishment of more botanic gardens in outlying colonies.

It was through this network of botanic gardens that knowledge about the uses of new plants was passed, including cinchona, and through them that the full force of the botanic revolution was felt. Prior to the discovery and collection of New World plants botanic gardens did not exist as such; collections of plants used by physicians and apothecaries were all that was needed. But as the world expanded for Europeans with their entrance into the Atlantic in the fifteenth century, so too did their need for natural history repositories. Begun as displays of curious nature alongside other items of curiosity and interest, botanic gardens came to reflect the changing emphasis of the botanical trade in the Atlantic.

As the interest in New World plants for medicinal, scientific, and economic applications increased in the late sixteenth century, these gardens became experimental laboratories with imperial, if not global repercussions. The “botanic revolution” with all its various strands – scientific, economic, aesthetic, medical – met each other in the imperial botanic gardens of the British Empire. Filled with foreign plants and individual botanists, these gardens were the locus of the botanical trade in the Atlantic, and the precursor to Hamilton’s greenhouse complex at The Woodlands.
CHAPTER FOUR: The Transatlantic Botanical Community

If botanic gardens were the physical manifestation of the transatlantic botanical exchange, it was the participants in this exchange that made this trade and its physical manifestations possible. People, after all, were the ones actually doing the exchanging: collecting specimens, studying them, experimenting, shipping them across the Atlantic, and consulting one another on their findings directly and indirectly. For William Hamilton and other North American residents who participated in this exchange in the eighteenth and nineteenth centuries this network had a distinctly imperial cast, in which many of the players and the places of exchange worked within established imperial networks that connected individuals in North America to their fellow enthusiasts in the Caribbean, Europe, and across the globe.

Although this project focuses on early American botany, participants in the natural history exchange of the eighteenth and nineteenth centuries often moved from one area of interest to another. There were some individuals who preferred to focus on one aspect of natural history, but many found pleasure in collecting, preserving, and identifying a wide range of plants, animals, minerals, and other elements of the natural world (Benson 1986a; Daston and Park 1998; Ewan 1952; Keeney 1992; Meyers and Pritchard 1998; [PHS] 1976; Wulf 2009). Benjamin Smith Barton, for example, collected a wide range of flora, fauna, and minerals, and wrote various treatises on North American botany, the American possum, and Native American languages, as well as variety of other subjects. Barton’s one-time protégé Thomas Nuttall also participated in multiple aspects of natural history,
becoming as well known for his edition of Michaux's book on North American trees as for his work on American ornithology\textsuperscript{5}, and many other naturalists had similarly wide-ranging interests (Boyd 1929; Ewan 1983; Ewan and Ewan 1963; 2007; Graustein 1954; 1961; [PHS] 1976; Wulf 2009).

Contemporary approaches to these fields – and their separation from each other – does not begin to happen until the second half of the nineteenth century, when the increasing professionalization of these areas of natural history in the United States creates a push for less observational and more experimental approaches to understanding the natural world. The call for more "professional" and "scientific" approaches to the subjects of natural history came primarily from those practitioners who were professionals: university professors such as Asa Gray and others who increasingly found full-time occupation in scientific fields through teaching and research. Prior to this, practitioners though experienced to varying degrees, did not often specialize in one particular field or subfield and could rarely support themselves with a full time research position in such a field (Daniels 1967; Goldstein 1994; Greene 1958; Keeney 1992; Parrish 1997; Reingold 1976).

The ways in which various participants in these fields defined themselves and each other has raised a number of questions about the professionalization of American science and the appropriate categorization of its members. Over the last few decades a number of scholars have attempted to tackle this issue, usually in the course of evaluating and attempting to pinpoint the emergence of "modern"

\textsuperscript{5} Nuttall, Thomas. (1832; 1834). \textit{Manual of the Ornithology of the United States and Canada}. Two Volumes: 1: Land Birds (1832); 2: Water Birds (1834). Hilliard and Brown, Cambridge.
scientific disciplines in America populated by “professional scientists” (see for example Daniels 1967; Greene 1958; Reingold 1976). The study of the “professionalization” of American science generally and of botany in particular has given rise to a number of different interpretations, but most scholars agree that it reached a head in the second half of the nineteenth century when post-Civil War America drew a line between the so-called amateur “botanizers” and the professional scientific “botanists” (Keeney 1992; Daniels 1967; Reingold 1976; Goldstein 1994).

The crucial issue in delimiting the professionalization of scientific disciplines in the United States is, of course, how one defines a “professional,” and what that definition stands in opposition to – often the word “amateur” is used (Goldstein 1994; Keeney 1992; Reingold 1976). One of the first problems in defining a professional is whether or not one chooses to use one or a combination of the modern conventional dictionary meanings: often the use of this word refers to “occupations that require special training in a particular body of knowledge or a particular technique or technology” (Reingold 1976: 35). However, there is another related use of the word that simply indicates that an individual receives some kind of financial compensation for work done in a particular area (Keeney 1992: 4; OED online “professional” II: 3a; b; Reingold 1976). “Professional” also suggests a certain level of competence in a particular field, and often implies a fulltime commitment on the part of the practitioner (Keeney 1992; Goldstein 1994; OED online “professional” II: 4b; Reingold 1976). By contrast, the definition of “amateur,” which originally signified “a lover of something,” today implies a less
than full-time commitment to a particular endeavor in both time and effort (Keeney 1992; OED online “amateur” 1; 2).

On the basis of the modern connotations of both “professional” and “amateur,” historian Nathan Reingold (1976) pointed out, quite correctly, that no one involved in the study of natural history or one of its areas in the early modern era can be considered a “professional” in the modern sense, as the various scientific fields and those individuals involved in them in no way resembled the modern version (Reingold 1976: 37). Natural history, and especially botany, was altogether a different beast in the eighteenth and early nineteenth centuries, made up of a large variety of participants whose training, skill, and devotion ranged from weekend hobbyists collecting and identifying the flora in their backyard to devotees collecting and exchanging specimens from all over the world, to conscientious scholars publishing treatises on their own time. The distinction between “amateur” and “professional” as we think of these categories today simply does not apply (Goldstein 1994; Keeney 1992; Reingold 1976).

Agreeing on the need for more historically appropriate terms to describe the participants in early American natural history is one thing, however; agreeing on those terms, and on the rationalizations for the various divisions is quite another. Nathan Reingold was the first to propose a new system of classification of early American naturalists, which was presented at a special conference focusing on early American learned societies (Greene 1973). He offered a three-tier model consisting of “cultivators,” “practitioners,” and “researchers” (Reingold 1976). “Cultivators” were men for whom science was not their main interest or primary employment,
who rarely contributed "significantly" to scientific knowledge, but were educated
("possessed of learned culture") and kept abreast of the latest scientific
developments in their field of interest (Goldstein 1994: 592; Keeney 1992; Reingold

"Practitioners" formed the next level of participation; these individuals
"were wholly or largely employed in scientific or science-related occupations"
(Reingold 1976: 38-39), and defined in opposition to his last category,
"researchers." The distinction between these categories is based primarily on the
tendency of practitioners to contribute some to the advancement of science, but not
to the extent of the researchers, who were acknowledged leaders in their fields of
study. "Researchers" were characterized by their "single-minded devotion to
research, resulting in an expertise yielding an appreciable accomplishment by past
standards...most but not all, are in scientific occupations" (Reingold 1976: 38-39;
46-50).

Reingold's reevaluation of nineteenth-century science and its participants
allowed scholars to examine these individuals and their contributions in their
appropriate historical contexts, and opened up new paths for exploring the
contributions of these individuals to their various fields. It is a seminal work, but it
is not without its problems. As Daniel Goldstein (1994) points out, Reingold's
categories are defined based on hindsight, with individuals distinguished according
to their significance for later scientific development and the professionalization of
their respective fields rather than on any contemporary criteria (Goldstein 1994:
592; Reingold 1976).
Although such criteria was adequate to allow Reingold to explore the professionalization of scientific fields in the late nineteenth century, he seems not to have thought very highly of it as a general model, since he never again applied it to subsequent analyses of nineteenth-century scientific participants (Goldstein 1994). As general models go, Reingold's three-tier system does leave something to be desired, especially his decision to distinguish participants in part based on the significance of their contributions to science as determined by later generations. The positivistic element of this approach to American scientific advancement leaves out a considerable number of individuals from the historical record.

Sixteen years after Reingold outlined a new system and rationale for classifying participants in nineteenth-century American scientific fields, Elizabeth Barnaby Keeney took another stab at defining these participants, focusing primarily on those involved in botanical endeavors in her 1992 book *The Botanizers*. Choosing rather to redefine the traditional meanings of "amateur" and "professional," instead of creating new terms, Keeney eschews Reingold's classification system and rationalization for differentiation in favor of one based on the primary motivation for involvement. In her scheme, if an individual "botanized" for personal pleasure and satisfaction, Keeney classifies him or her (Keeney profiles a number of female participants) as an "amateur." If, however, an individual's primary motivation for participating in nineteenth-century botanical activities is to advance the field itself by contributing to the store of knowledge (primarily through publications) on either general botanical practice or specific specimens, then
Keeney defines that individual as "professional" botanist (Keeney 1992; Goldstein 1994).

Although Keeney proposes a different set of criteria for classifying nineteenth-century botanists (and, by extension, other participants in nineteenth-century natural history) which seems to more closely reflect the ways in which these participants thought of themselves (see Daniels 1967) rather than attempting to define them based on their significance to later generations of scientists, her system is also flawed. Keeney's decision to redefine weighted terms rather than create new ones is problematic. The connotations of "amateur" and "professional" are ambiguous and often conflated in contemporary usage as to make it incredibly hard to divorce one's modern understanding of the terms from the ways in which Keeney seeks to use them in her analysis. While one can appreciate her desire to reclaim the meanings of "professional" and "amateur" from modern (and in the case of "amateur," derogatory) connotations, she runs the risk of continually confusing her readers who may find it hard to reconcile Keeney's reuse of these terms with their current usage.

Aside from Keeney's awkward reinvention of terms, her classification of nineteenth-century botanical practitioners based on an individual's primary motive for participation presents another problem, also pointed out by Goldstein: considerable numbers of these participants could not be said to be wholly amateur or professional, but fell somewhere in between (Goldstein 1994: 593-594). Even Keeney acknowledges that many of the most devoted nineteenth-century professional botanists began simply as lovers of nature who yearned to know more,
and many of her “amateurs” had encyclopedic knowledge of certain plants and self-imposed, rigorous standards for the collection and preservation of specimens. In fact, the research performed by many of her “professionals” often relied on the exchange of specimens and information with amateurs, and the mutual dependence and understanding between professional and amateur botanists blurred the lines between the two until the second half of the nineteenth century (Goldstein 1994; Keeney 1992).

It is this blurred distinction between professionals and amateurs in Keeney’s classification system that Daniel Goldstein (1994) focuses on in his critique of her work, and which he attempts to address by offering an alternate solution to the problems presented by her system and that of Nathan Reingold. Rather than potentially leaving anyone out by defining categories based on general knowledge of the period and subject, Goldstein advocates for evaluating each and every individual active in nineteenth-century science separately and from a variety of angles using every scrap of evidence available. Such an analysis would allow the researcher to get at not just the individual’s historical significance but also to reach a deeper and more nuanced understanding of the larger scientific community in the United States as it existed between 1800 and 1900 (Goldstein 1994).

As such an analysis would be a monumental task, Goldstein suggests starting with an in-depth examination of the scientific correspondence between the Smithsonian Institution and the hundreds of individuals and groups that exchanged information and physical specimens during the second half of the nineteenth century.
(Goldstein 1994). However, even this approach to understanding nineteenth-century scientific participants has its limitations.

Aside from the constraints of time, education, region, and gender, which all played a part in the creation and limitation of this particular network (Goldstein 1994: 583-91; 595), there are a number of other caveats that considerably limit the all-encompassing utility of such a project. The Smithsonian Institution correspondence is by definition a self-selecting group composed of those who actively sought information or provided it, and does not necessarily take into account the numerous “amateurs” of Keeney, who might be content with the purchase of a field guide and not necessarily seek out further information from correspondents. It also, by definition, does not account for the earlier, pre-Smithsonian era of American scientific practice, nor does the Smithsonian correspondence form an unbiased record for the era it does represent: according to publication lists, contemporaries, and other scholars, botany was a particularly popular science in early America, but correspondence on this topic is underrepresented in some decades due to the disinterest of Smithsonian personnel (Goldstein 1994).

Although the Smithsonian Institution eventually became an important national scientific organization it never had an exclusive monopoly on scientific correspondence. A number of individuals continued to draw on personal connections with other enthusiasts for information and specimens throughout this period, including correspondents in Europe (Greene 1968). Tracking down these snippets of scientific communication in various historical societies and private
collections is feasible, but again, limits the researcher to what has been preserved for posterity.

But even given all of these limitations to the correspondence, the task that Goldstein proposes of sorting through all the individuals mentioned and examining each one thoroughly would take a coordinated effort by several dedicated scholars, perhaps over the course of an entire career. Such an approach has great historical merit and integrity, but it is nevertheless a daunting task. Goldstein’s suggestion of analyzing each and every individual from the Smithsonian correspondence, and then forming conclusions about the nature of participant division within various scientific fields is a good one in theory, but the time, money, and effort required to put it into practice may result in it only ever existing as a scholarly ideal, rather than being implemented by future researchers.

However unlikely Goldstein’s scheme for exploring the make up of the nineteenth-century American scientific community might be, there are other possible avenues into this world that can add to our understanding of early American science and its participants. In the next section I offer an alternative model for thinking about the early American scientific community that Goldstein leaves out: the late eighteenth/early nineteenth century (pre-Smithsonian Institution) American botanical community and the transatlantic botanical network of which they were a part. Although this network comprised individuals from across North America, the Caribbean, and Europe, it existed in the web of European empires, and the connections, exchanges, and rivalries between individual participants were
influenced by existing imperial ties. Both the individual participants and the trade itself must be understood within this European imperial context.

* * *

Putting the "commercial" back in the commerce of Nineteenth-Century Natural History Exchanges

Drawing any distinctions between individuals involved in a field while it is undergoing significant changes in participant makeup and codification will always be flawed, since the changing nature of the field itself will be reflected to some degree in the shifting ways in which individuals engaged in it. But perhaps the most striking oversight in both Reingold's and Keeney's analyses – and what Goldstein attempted to avoid – is the narrowness of their definition of participant. Reingold and Keeney both attempt to distinguish between levels of commitment to scientific discovery, but they focus almost exclusively on distinguishing those pursuing science in similar ways to modern academics (Reingold's "researchers" or Keeney's "professionals") and those who approached science more as a hobby (Reingold's "cultivators" and Keeney's "amateurs") (Keeney 1992; Reingold 1976). One of the problems with this division is that, once again, it asks readers to evaluate members of the early American scientific community in light of modern categories while also overlooking an important aspect of both modern and early American scientific practice: namely, the material and financial resources necessary to participation in these activities.
Neither author discusses the practical realities of scientific practice in terms of access to resources, nor the considerable number of individuals for whom natural history was a commercial endeavor. A number of early American participants in various scientific endeavors set themselves up in business to support "amateur" and "professional" practitioners alike through the sale and importation of books, specimens, equipment, and other material. Reingold mentions "commercial professionals" in passing very briefly, but does not include them in his classification scheme, nor does he designate them as a separate group, while Keeney ignores them almost completely (Keeney 1992; Reingold 1976).

For Keeney in particular, the lack of discussion of commercially oriented plant hunters, nurserymen, and others is a significant omission, as these individuals were the means by which many of the foreign plants and published materials made it into the hands of her amateurs and professionals. Such individuals helped to stimulate and encourage the growing popularity of botanical activities in nineteenth-century America, and are therefore a crucial element of motivation for both of Keeney's groups. Commercial participants provided plants and other instruments for use and study by both professionals and amateurs, patrons provided financial and other assistance to plant hunters and researchers, and so on. Although their impact on the development of modern botany in the United States may have been waning by the end of the nineteenth century, nurserymen, gardeners, and others who relied on the natural history exchange for their livelihood were a significant presence in the early part of the nineteenth century, especially in the original centers of botanical activity in America, such as the city of Philadelphia.
The presence of these commercial participants in the natural history exchange was an important part of its early success and popularity on both sides of the Atlantic beginning in the early eighteenth century; important enough, in fact, that rather than attempting to fit them into either Reingold’s or Keeney’s classification schemes it is worth reevaluating all of the participants in this exchange in terms of their commercial relationships to each other and to the items (both information as well as physical material) actually exchanged. To this end, I propose new criteria for distinguishing participants in the natural history exchange of the eighteenth and nineteenth centuries based on the degree and nature of their commercial involvement in terms of the production and consumption of exchangeable goods (which included knowledge in the form of published books and treatises).

From a commercial perspective the participants in this trade fall into two broad categories: those who can be considered “producers” of exchangeable material by actually producing or selling it (gardeners, plant hunters, nurseriesmen, botanical authors, and so on), and those whose primary involvement in this exchange were as “consumers” of these products. No classification of these early natural history enthusiasts is hard and fast, however, but must be thought of as a spectrum where the participation of a small number of individuals can be thought of as primarily “producer” or “consumer,” and the vast majority of participants fall somewhere in between these two poles. Indeed, many of the most familiar figures from early American botany fall in the middle of these two extremes, and should be considered both producers and consumers of botanical material. Botanical
enthusiasts who collected and identified the plants around them often published treatises on local flora, for example, and many plant sellers cultivated extensive private collections (Brigham 1998; Boyd 1929; Drayton 2000; Ewan and Ewan 1963; 2007; [PHS] 1976; Wulf 2009; 2011).

Individuals who can be categorized primarily as “producers” in terms of their participation in the eighteenth and nineteenth century transatlantic natural history exchange are often the easiest to identify from historical records because of their need for recognition. Commercial plant dealers, nurserymen, gardeners, and others who hoped to support themselves through the buying and selling of botanical material traded on their reputations and name recognition to win customers, and therefore show up repeatedly in newspapers, pamphlets, and other printed material used to advertise their inventory and services.

Men such as Bernard McMahon and David Landreth, both nurserymen in early nineteenth-century Philadelphia, sold plants, seeds, and associated tools and materials to botanical enthusiasts near and far, and issued multiple catalogues advertising their wares. McMahon even published a book (The American Gardener’s Calendar (1806)), which was the first gardener’s calendar specifically for propagating plants in American climates in 1806 (Boyd 1929; Harshberger 1899; [PHS] 1976; Stetson 1946; Wulf 2009; 2011). McMahon’s successful nursery and publications not only kept him in business, but also brought him to the attention of Thomas Jefferson, who helped secure some of seeds from the Lewis and Clark expedition for McMahon to raise and display (Cornett 2005; Greene 1968; Long 1991; [PHS] 1976). David Landreth was no slouch either: his nursery business
supplied plants to customers as far away as Virginia, and expanded to such an extent that the business moved outside the city for more space (Boyd 1929; [PHS] 1976; Wulf 2011).

Other commercial producers in the transatlantic botanical exchange included professional gardeners and plant hunters often hired by others to either take care of various plants in landscaped garden settings or sent on expeditions to collect new or non-local plants and other items of natural history. Philadelphian John McArann, hired to oversee the landscaped gardens and grounds at The Woodlands estate and later at Lemon Hill, falls into this category. Both McArann and John Lyon, another head gardener at The Woodlands, participated in plant-hunting expeditions for Hamilton’s private collection at The Woodlands, and later parlayed their success on Hamilton’s Schuylkill River estate into other botanical positions. McArann’s tenure at Lemon Hill helped to create a popular public garden setting enjoyed by large numbers of Philadelphia residents in the first half of the nineteenth century, while John Lyon took his experience collecting plants for Hamilton on the road, and supported himself by selling American plants to London buyers (Ewan 1952; 1983; Greene 1968; Jackson 1932a; Long 1991; Scharf and Westcott 1884; Wunsch 2004). Lyon was so successful, in fact, that one scholar estimates that he was responsible for over twenty percent of all the introductions of North American plants into Europe in the first decade of the nineteenth century (Ewan and Ewan 1963).

John Lyon was not the only individual to parlay his experience with North American plants into international success. Quite a number of individuals made a
place for themselves as producers and suppliers of American plants, including the
so-called father of American botany, John Bartram. But the prize for the most
lucrative success in this endeavor goes to German-born naturalist William Young,
Jr., a one-time protégé of Bartram’s. Like other ambitious naturalists, Young put
together a special box of American plants and sent it to a member of the British
royal family in the hopes of earning patronage; unlike many of his fellows, Young
succeeded. Trading on their shared German heritage, he sent his box to Queen
Charlotte, who was so pleased with his offer that she named him “Queen’s Botanist
to the Americas” and granted him a generous allowance and a place at her court for
several years (Kinch 1986).

Similar success stories of independent nurserymen harnessing their
commercial promise of the transatlantic plant trade to make a living come from the
other side of the Atlantic as well. The Tradescants’ nursery in Lambeth in what is
today south London was one of the earliest success stories of the transatlantic plant
trade. They catered to a wide variety people desirous of owning or simply viewing
the variety of natural objects for sale or on display in the Tradescants’ museum
(Coats 1970; Harvey 1974; 1998; Hunt 1996). A century later, Mark Catesby had
entered the transatlantic botanical scene, extending both the knowledge of and
desire for North American plants with his successful trips and subsequent
publications (Brigham 1998; Meyers and Pritchard 1998; Wulf 2009). Still others,
like Philip Miller, the head of the Chelsea Physic Garden in London, became
famous both for his management of this garden (a paid position), and for his
extremely popular gardening books reissued in multiple editions throughout the

One of the most famous producers involved in the transatlantic botanical trade of the eighteenth and nineteenth centuries was John Bartram, Quaker farmer-turned plant collector and nurseryman whose thirty-odd year correspondence and plant exchange with fellow Quaker botanical enthusiast Peter Collinson put Philadelphia on the botanical map. Originally put in touch with each other through mutual friends in 1731, by 1740 Bartram was collecting and shipping American plants to Britain so regularly that he became the go-to exporter in the eighteenth century, earning high praise from such acknowledged experts as Carl Linnaeus, and even King George himself (Berkeley and Berkeley 1982; Bloore 1935; Hoffmann and Van Horne 2004; Long 1991; O’Neill and McLean 2008; Wulf 2009).

Although Bartram’s own participation in the eighteenth and nineteenth-century botanical exchange ended with his death in 1777, his children and grandchildren continued his legacy through much of the nineteenth century. His son, John Jr. took over the original botanical garden and nursery business, continuing to publish catalogues and sell plants to customers far and near until his death when his daughter Anne Bartram Carr and her husband took over (Boyd 1929; Carr 1861; [PHS] 1976; Wulf 2009). Bartram’s fifth son, William is almost as well known as his father, although his talents lay in botanical illustration, which were first admired in William’s book *Travels Through North and South Carolina*... (1791), and later as

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6 Miller’s most popular publication was *The Gardener’s Dictionary, Containing the Methods of Cultivating and Improving the Kitchen, Fruit, and Flower Garden*, first published in 1731. Seven subsequent editions of this book were issued during Miller’s lifetime.
plates produced for other botanists Benjamin Smith Barton and John Fothergill (Boyd 1929; [PHS] 1976; Darlington 1849; Wulf 2009).

Frederick Pursh and Thomas Nuttall also fall into the “botanical virtuoso” category. Like the Spanish apothecaries who followed their conquistadors to the New World to make their fortunes in the transatlantic botanical trade three centuries earlier, Pursh, Nuttall, and many of their fellows in Europe saw opportunity in the botanical richness of North America, and their experiences underscore the imperial nature of the exchange. Like John McArann and John Lyon, German naturalist Frederick Pursh was hired to oversee Hamilton’s extensive botanical collection at The Woodlands, and although he did not last for more than a few years, his experience with the vast array of Hamilton’s collection set him up for future success. After leaving The Woodlands in 1805, Pursh was hired by Benjamin Smith Barton to catalog Barton’s own growing collection and sent on two extended plant-hunting expeditions to the north and south of Philadelphia where he honed his familiarity with American natural history. A few years later, Bernard McMahon hired Pursh to catalog some of the Lewis and Clark material, and he spent some time working for Dr. Hosack’s Elgin Botanic Gardens in New York before returning to Europe to publish his famous work on North American plants (Ewan 1952; Ewan and Ewan 1963; Graustein 1961; Greene 1968).7

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7 Pursh, Frederick. (1814). *Americae Septentrionalis; or, A systematic arrangement and description of the plants of North America. Containing, besides what have been described by preceding authors, many new and rare species, collecting during twelve years travels and residence in that country.* Printed for White, Cochrane, and Company, London.
Unlike Pursh, who had arrived in Philadelphia as a trained naturalist, Englishman Thomas Nuttall had nothing more than an interest in American natural history when he stepped off the boat in Philadelphia in the early nineteenth century. Soon after his arrival in America, however, Nuttall formed a relationship with Benjamin Smith Barton, who trained him in the rudimentary basics of botanical identification and classification, and then sent him on a variety of plant-hunting expeditions (Ewan 1983; Graustein 1954). These trips culminated in Nuttall accompanying John Bradbury on an extended expedition along the Missouri River in 1811 (Ewan 1983; Graustein 1954; Greene 1968). Like Pursh, Nuttall eventually returned to Europe, but not before publishing one of the earliest American natural history books in his adopted city of Philadelphia (Greene 1968; Graustein 1954).8

Although Nuttall’s permanent return to England in 1841 (after a brief exile due to the War of 1812) was a circumstance of his inheriting property, both he and Pursh epitomized the imperial nature of the transatlantic plant trade: raw products from the colonies (or former colonies) sent or taken to Europe to be turned into finished good and products (Ewan 1983; Graustein 1954; Greene 1968). This state of affairs did not sit well with American naturalists. “While American have neglected the botanical examination of this country...foreigners have immortalized themselves by doing it” wrote Jacob Green in 1814 (quoted in Greene 1968: 37). But the truth was that the infrastructure for publishing on American – or any – botany was hard to come by in America prior to the second and third decades of the

nineteenth century. Naturalists, Nuttall and Pursh among them, recognized that their best bet for international recognition was through the intellectual circles in Europe, rather than America, where there was an established system of public and private patronage for scientific activities, including publication (Greene 1968). Although the publication of Nuttall’s *Genera* in Philadelphia in 1818 marked a new era of American scientific publishing, a large number of botanical books and treatises continued to be published in Europe and imported by North American readers (Greene 1958; 1968; Stetson 1946).

Some of the most well known authors of botanical works have already been mentioned, but there were plenty of others, both male and female on both sides of the Atlantic Ocean. The growing popularity of botany in particular in the eighteenth and nineteenth centuries, and its acceptance as an appropriate activity for women as well as men led to the publication of books specifically aimed at female audiences, often by female authors such as Pricilla Wakefield’s *Introduction to Botany* (1796), Sarah and Elizabeth Fitton’s *Conversations on Botany* (1817), and Jane Loudon’s *Botany for Ladies* (1841) (Parrish 2002; Schteir 1990; 1997; Secord 2002).

Many other women also found the late eighteenth and nineteenth century scientific community to be a promising outlet for female authors, including Anne Pratt, Margaret Gatty, and Jane Marcet. The majority of the works produced by these women were general books on botany and other sciences designed to introduce their subjects to audiences unfamiliar with the topics, and their general appeal led to widespread popularity and multiple editions (Schteir 1990; 1997). Other female authors took a different approach by writing more technical and
specific books for those seeking a deeper knowledge of the subject, such as Maria Jacson, who authored a variety of technical botanical and horticultural volumes in the early years of the nineteenth century under the aegis of family friends such as Erasmus Darwin (Schteir 1990).

There were a number of female literary botanical producers on the western side of the Atlantic as well, including prolific author and teacher Almira Hart Lincoln Phelps, who published numerous botanical textbooks and treatises throughout the second half of the nineteenth century from her home in upstate New York. Lincoln Phelps’ books went through multiple editions during her lifetime, were widely read by botanical enthusiasts of all ages, and used across the country as textbooks for teaching beginning and intermediate botany in secondary schools (Keeney 1992). While perhaps not as widely known as Lincoln Phelps, other American female botanical authors such as found ways to participate as producers in the transatlantic botanical exchange in the late eighteenth and early nineteenth centuries, and given the not inconsiderable expense of publication, it is unlikely that such participation was done on a whim.

Although often overshadowed by the botanical authors of this period, those individuals who were employed as botanical illustrators should also be considered as producing participants in the transatlantic botanical exchange. Like the authors of the text itself, the artists hired to illustrate botanical works were of both sexes, and were considered indispensible to the successful production of any book on botany (Benson 1986a; Keeney 1992). However, these illustrators, with rare exceptions, are often harder to track down than the authors of such works, since they were rarely
credited as prominently (if at all) as the writers whose names appear on the title page (Stafleu 1966).

One individual who was credited often, however, and who became in some cases more famous than some of the authors for whom he worked, was Frenchman Pierre-Joseph Redouté, who dominated the European world of botanical illustration from about 1780-1830 (Stafleu 1966). Redouté, like most of the better-known illustrators, drew from life, and his fame was such that he was able to transition from simply providing illustrations for others to actually producing his own botanical works, the most famous of which feature the garden of Napoleon’s first wife, the Empress Joséphine, at Malmaison (Stafleu 1966).

Redouté was far from the only well known botanical illustrator in this period however. Many individuals participated in the transatlantic botanical exchange in this way, and quite a number of them were women. Maria Sibylla Merian, one of the better-known female naturalists of the late seventeenth and early eighteenth centuries, participated in a number of plant-hunting expeditions, and was highly regarded by her contemporaries as a naturalist and illustrator (Schiebinger 2004). Other female botanical illustrators of this period included women such as Elizabeth Blackwell, who wrote and illustrated a variety of botanical publications, and John Bartram’s granddaughter, Anne Bartram Carr, whose talent for natural history illustrations earned the praise of a number of nineteenth-century naturalists including William Baldwin, plant hunter David Douglas, and Scottish horticulturalist Alexander Gordon (Schteir 1997; Smith 2001).
As with the so-called “producer” participants in the eighteenth and nineteenth century plant trade, those who participated primarily as consumers of botanic knowledge and material are a vast, heterogeneous group ranging from casual hobbyists to dedicated botanical enthusiasts and patrons. The vast majority of these consumers fall into the low-end range of commercial participation, since botany as a casual hobby was remarkably affordable throughout most of the nineteenth century, requiring only the initial purchase of a field guide for identification and enough leisure time to wander outdoors (Goldstein 1994; Keeney 1992; Schteir 1997). The ease with which one could participate in botanical exploration and its status as an acceptable and encouraged social activity for men, women, and children no doubt accounted for its widespread appeal across the British Atlantic world in the eighteenth and nineteenth centuries (Benson 1986a; Daniels 1967; Goldstein 1994; Keeney 1992; Schteir 1990; 1997).

A much smaller percentage of these botanical consumers invested a considerable amount of money, as well as time and labor (often the labor of others) into their participation in the transatlantic botanical exchange. The motivations behind the choices of some to invest money and time into botanical consumption and display were rarely clear cut, but among some elites on both sides of the Atlantic, botanical investment often went hand-in-hand with a desire to participate in and display one’s familiarity with the fashion for landscaped gardens and grounds popular in Europe at this time. Some of these individuals, like their producer counterparts, saw financial opportunity in the financing and creation of public
gardens, whereas others chose to invest in private botanic collections or support other botanical endeavors through patronage of individuals or institutions.

Two of the more recognizable individuals in Philadelphia to have participated in the transatlantic natural history exchange were William Bingham and his wife Fanny, some of the wealthiest residents of the early Federal city. Unlike other Philadelphia elites who practiced their landscape design skills on country estates outside the city proper, the Binghams created a sizeable landscaped grounds on their Philadelphia townhouse lot at Third and Spruce Streets – in addition to the carefully-planned grounds at the Binghams' two country homes (Brown 1937; Nash 2002; Miller 1982). The labor costs for keeping up these grounds alone would have been out of reach of many of the Binghams' countrymen, and represent a considerable investment in the transatlantic natural history exchange, as the Binghams not only landscaped their town and country gardens in the latest mode, but also were known to have augmented their townhouse gardens with various exotic animals imported from India and elsewhere (Brown 1937; Miller 1982).

Another example of an individual in early Federal Philadelphia who participated in the transatlantic botanical exchange primarily as a consumer at a level that few of his contemporaries could equal was William Hamilton of The Woodlands. Hamilton's efforts to import new plants, materials, and expert labor for his gardens and grounds at The Woodlands, including fragile exotics for his impressive greenhouse complex, made him one of (if not the) biggest consumers in the Philadelphia area. His desire to create an English landscape garden on the west bank of the Schuylkill River with the most complete collection of exotic and native
flora possible led Hamilton to constantly seek out new exotics to bring to Philadelphia. His success in this endeavor led to the introduction of several foreign plants to America (Long 1991; Schlereth 2007; Wunsch 2004). Such botanical devotion was expensive, however. In one year, Hamilton spent £1500 on manure alone for his gardens at The Woodlands at a time when the city of Philadelphia was short of food, and the annual salary of a laborer averaged about £200 per year (Long 1991; Wunsch 2004).

Although individuals such as Bingham and Hamilton may have been the exception to the rule in terms of average amount of botanical consumption by those participating in the Philadelphia end of the transatlantic trade in botany in the late eighteenth and early nineteenth centuries they were in good company among botanical enthusiasts in Europe, particularly in Britain. Many Britons were avid botanical consumers who spent significant time and resources in their attempts to procure and display North American and other exotics on their private estates, and many also participated as patrons of producers. Even the highest ranks of British royalty were not immune. Kew Gardens, after all, was first the private garden complex of Prince Frederick of Wales, and Queen Charlotte was fond enough of botany – and impressed by the intrepid spirit of William Young, Jr. – to dip into the Royal Treasury for a tidy annual sum to support the Queen’s Botanist in lavish style at Court (Desmond 1995; Drayton 2000; Hobhouse 1997; Kinch 1986; Woods and Warren 1988; Wulf 2009).

Many other less illustrious Britons also delved wholeheartedly into botanical consumption via the transatlantic exchange network, including individuals such as
Lord Petre, one of John Bartram’s first British clients. Lord Petre’s enthusiasm for North American plants became legendary in his own time; Collinson described his visit to Lord Petre’s residence, Thomdon Hall, in a 1741 letter to Bartram, claiming that “one cannot well help thinking he is in North American thickets, there are such quantities [of American trees]” (quoted in Greene 1968: 23). It is no wonder that Lord Petre was credited with introducing several North American plants to Europe (Wulf 2009).

Sir Joseph Banks is another who falls into this “super-consumer” category, as his passion for botany was given full reign as the inaugural Director of Kew Gardens, which allowed him to not only import plants from across the British Empire, but also to finance botanical expeditions to remote areas of the globe for the sole purpose of discovery and recovery of exotic flora and fauna (Brockway 1979; Desmond 1995; Drayton 2000; Wulf 2009). Banks’ desires to promote botany on an imperial scale extended even into potential international incidents; after the death of Carl Linnaeus in 1778 Banks encouraged English botanist James Edward Smith to purchase Linnaeus’ collections from his widow and bring them to England. He was not the only one to put great value on the scientific and symbolic importance of Linnaeus’ collection, however; when the news that an English botanist was attempting to ship the collection to Britain, the King of Sweden sent out warships in an attempt to intercept the shipment (Daisey 1996).

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While not every botanical enthusiast could participate in the transatlantic plant trade with the financial backing and consumer power of an empire like Joseph Banks, a number of individuals, especially in Britain, made particular names for themselves as botanical consumers through the patronage of others. As historian of science John Greene has pointed out, "private enterprise, rather than royal patronage was the rule in Britain," especially when it came to scientific advancement (Greene 1968: 22). Notwithstanding certain notable exceptions, such as Queen Charlotte’s support of William Young, most scientific endeavors were supported by private individuals with specific interests in a particular subject. Lord Petre’s patronage of John Bartram has already been mentioned, but he was not the only well-heeled Briton willing to back Bartram’s botanical explorations or support him through the purchase of one of Bartram’s celebrated “five-guinea boxes.” High-ranking members of the British aristocracy also sought out botanical imports from North America and elsewhere, including members of Parliament and influential Royal Society fellows (Bartram 1992; Berkeley and Berkeley 1982; Hoffman and Van Horne 2004; Leighton 1976; [PHS] 1976; Wulf 2009).

A number of these and other botanical patrons participated in the transatlantic plant exchange through the purchase of botanical specimens to display on landscaped estates, thereby bridging the gap between producer, consumer, and patron. But not every patron-consumer of the eighteenth and nineteenth century plant trade was a wealthy consumer with time and money to spare. Nor were they all producers seeking their fortunes, or “scientific adventurer[s] who lived from hand to mouth while they prospected for scientific gold” in the New World (Greene 1968: 22).
39). Quite a number of participants in this botanic trade fell somewhere in between these two extremes, and should be considered both producers and consumers of botanic material.

Part of the reason for the ability for these participants to move back and forth was because botany, while engaging their time and attention, was more often than not a secondary interest because their primary occupation was in another field, or something that many turned to as a secondary pursuit in retirement. Many of these individuals were “professional” men (as defined by their contemporaries) (Reingold 1976) employed as lawyers, clergymen, or doctors, and participated in botanical and natural history exchanges through the collection, preservation, and identification of specimens, often becoming recognized experts on a particular genus or region.

One of the most recognized European participants of this type was Sir Hans Sloane, doctor to British monarchs and well-heeled British elites of the late seventeenth and early eighteenth centuries. During his tenure as a practicing physician, Sloane traveled to Jamaica as the personal physician of the Governor in 1687. While there, Sloane continued to collect botanical specimens and other items as he had done in Europe, amassing a herbarium and cabinet of curiosities that eventually became the basis for the natural history collection of the British Museum (Drayton 2000; Hobhouse 1997; Wulf 2009). Upon his return to England from the Caribbean, Sloane published a catalog of plants and animals in Jamaica, which did much to encourage the enthusiasm for exotic plants among his fellow Europeans.9

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9 Sloane, Hans. (1707-1725). A Voyage to the Islands of Madera, Barbadoes, Nieves, St. Christopher’s, and Jamaica; with the Natural History of the Herbs and Trees, Four-footed Beasts, 106
Two years after the publication of his book, Sloane succeeded Isaac Newton as President of the Royal Society, where he had been secretary since 1693. Sloane’s new position at the head of the Royal Society allowed him to continue to provide private financial patronage as well as Royal Society accolades to various botanical endeavors, including Catesby’s expedition and subsequent publications (Brigham 1998; Wulf 2009). He also kept up a wide-ranging correspondence with other naturalists, whom he patronized and encouraged from afar, including John Bartram (Brigham 1998; Darlington 1849; Greene 1968; Wulf 2009).

Others who followed in Sloane’s footsteps included Peter Collinson, Quaker cloth merchant and fellow of the Royal Society. Building on the precedent set by Sloane and James Petiver, Collinson extended his own correspondence with New World naturalists. Perhaps the most famous of Collinson’s natural history correspondents was with Philadelphian John Bartram, which led to the introduction of hundreds of exotic plants species to Europe over a span of four decades (Boyd 1929; Drayton 2000; O’Neill and McLean 2008; [PHS] 1976; Wulf 2009). Collinson corresponded with myriad other botanical enthusiasts as well, including Carl Linnaeus, Peter Kalm, Alexander Garden, Cadwallader and Jane Colden, and many others (Collinson 2002; O’Neill and McLean 2008). When not requesting plants or information from his correspondents or sending gifts and books in return, Collinson also found the time to present his own botanical research at meetings of

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*Fishes, Birds, Insects, Reptiles, &c. Of the last of those Islands...In Two Volumes.* Printed for the Author, London.

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the Royal Society, as well as that of other non-fellows, such as John Bartram’s observations on Pennsylvania black wasps (Bartram 1749-1750; Wulf 2009).

Peter Collinson’s extensive network of natural history correspondents did not end with his death in 1768; many connections that Collinson had formed were continued by other naturalists including fellow Quaker and Royal Society member Dr. John Fothergill. Picking up with Collinson had left off, Fothergill continued the unofficial Royal Society patronage of American botany via the Bartram family. Where Collinson had aided John Bartram in establishing a thriving plant export business to Europe, Fothergill focused on Bartram’s fifth son, William, promising to support his own forays into North American natural history. “I would not limit him, either in respect of time or expense...he may send me his demands to order,” Fothergill wrote to John Bartram about William (quoted in Greene 1968: 23). Fothergill’s patronage of William Bartram paid off; not only did he receive a variety of drawings and reports on New World nature, but also helped bring Bartram’s publication on his expedition to fruition in the late eighteenth century (Darlington 1849; Greene 1968; [PHS] 1976).10

But perhaps the most famous European producer/consumer participant in the transatlantic botanical exchange of the eighteenth and nineteenth centuries was Carl Linnaeus, the Swedish naturalist who revolutionized the study of the natural world by creating artificial systems for its organization. Although Linnaeus created

10 Bartram, William (1791). Travels Through North and South Carolina, Georgia, East and West Florida, the Cherokee Country, the extensive territories of the Muscogulges, or Creek Confederacy, and the Country of the Choctaws. Containing an Account of the Soil and Natural Productions of Those Region; Together with Observations on the Manners of the Indians. Printed by James & Johnson, Philadelphia.
classification systems for all types of living things – he even classified his fellow naturalists – he is particularly well-known for the creation of the sexual system of botanical classification, which provided a series of simple, straight-forward rules for identifying and classifying both known and unknown botanical specimens (Lindroth 1966). Linnaeus promoted his system in a dizzying variety of publications through the middle decades of the eighteenth century and through his own extensive correspondence with naturalists in Europe and the Americas. There was some initial resistance to his system by some botanists particularly in England, where Philip Miller spoke against it, and many others favored the system created by John Ray, as well as other competing systems offered throughout the century (Drayton 2000; Harvey 1998; Hobhouse 1997; Wulf 2009).

Eventually, however, botanical enthusiasts adopted Linnaeus’ system of botanical classification across the Atlantic (Drayton 2000; Wulf 2009). Of course, in order for Linnaeus to even contemplate creating such a system, he had to have access to an extensive network of colleagues who could furnish him with new and unknown plants for classification. He solicited and was sent plants from Bartram, Collinson, Alexander Garden, Cadwallader Colden, and numerous other botanical enthusiasts across the globe (Lindroth 1966; Wulf 2009). In return, Linnaeus sent books (often copies of his own works), and sometimes acknowledged the importance of his correspondents’ contributions to his own system by naming new species or a genus in their honor – once again implicitly confirming the imperial nature of this exchange between Europe and its former colonies (Greene 1968; Lindroth 1966; Wulf 2009).
In North America as in Europe, there were a large number of participants in the transatlantic botanical trade who can be considered both producers and consumers of botanical material. Although these North American residents resembled their European colleagues in that many of them also had a primary "profession" in addition to their botanical roles, the situation was altogether different on the western side of the Atlantic. Whereas men such as Sloane, Fothergill, and Collinson did have primary occupations, the nature of their trades in Europe allowed them to achieve enough success to devote considerable time to leisure pursuits such as the patronage of botany and horticulture. For their American counterparts, leisure was hard to come by.

For the vast majority of these American producer/consumers, botany was done in small batches, when a few moments could be spared. "The principle cultivators of natural science, in the United States, are professional characters, who cannot, without essentially injuring their best interest, devote to these subjects that sedulous attention which they demand," wrote Benjamin Smith Barton in 1805 (Barton 1805: 158-159; quoted in Greene 1958: 15). Benjamin Rush echoed this lament in his own correspondence, writing that "philosophy does not here, as in England, walk abroad in silver slippers; the physicians (who are the most general repositories of science) are chained down by the drudgery of their professions" (quoted in Greene 1968: 39). Although similar in name, wealthy medical professionals with leisure and resources to devote to botanical pursuits such as Hans Sloane and John Fothergill were almost unheard of in late eighteenth and early nineteenth century America.
Even in their laments on the state of botanical practice in America, though, Barton and Rush underscore the kinds of individuals participating as botanical producer/consumers: "professionals" such as doctors and clergymen. Doctors in particular seemed to have been drawn to the study of natural history, especially botany, as many of them were given some basic training in botanical identification and the application of plant-based remedies as part of their formal medical training. Most European medical schools required students to take a course in *materia medica* and natural history, and by the middle of the eighteenth century many universities had chairs in botany as well (Drayton 2000; Greene 1968; Harvey 1998; Hobhouse 1997; Woods and Warren 1988; Wulf 2009). Until 1765 when the University of Pennsylvania (then the College of Philadelphia) opened the first medical school in America, most doctors in Philadelphia (and elsewhere in the colonies) were trained in Europe where the connection between medical expertise and botanical knowledge had deep roots stretching back to the Middle Ages. When the American colonial medical schools began to open in the late eighteenth century, the followed European precedent in training doctors in basic botany and *materia medica* (Drayton 2000; Eaton 1951; Graustein 1961; Greene 1968; Reingold 1976; Thomas 1997; Wulf 2009).

Individuals such as Benjamin Smith Barton, a doctor and professor of *materia medica*, natural history, and botany seemed almost to see natural history (and botany in particular) as a second calling. He amassed a large private herbarium, writing numerous books on the subject, including the first botany textbook ever
published in the United States, and kept up an impressive correspondence network with experts at home and abroad. Barton exchanged information and specimens not only with established botanists in Europe, but also with a number of his former medical students stationed in various exotic locales (Ewan 1983; Ewan and Ewan 1963; 2007; Graustein 1961; [PHS] 1976). He encouraged his current and former students to pursue botany in addition to their medical studies, often taking them out to William Hamilton's estate at The Woodlands to study the vast array of local and exotic plants arranged in the gardens and greenhouse complex, and advising them on the collection and preparation of specimens to be sent back to him in Philadelphia (Boyd 1929; Ewan and Ewan 2007; Fussell and Long [1998-2009]; [PHS] 1976).

A University of Pennsylvania medical student who seems to have taken this encouragement to heart was William Darlington, who set up his medical practice in Chester County (just outside of Philadelphia proper) in 1807 after first practicing as a ship's surgeon in the East Indies. Darlington received his medical degree in 1804, and would have known Benjamin Smith Barton by reputation, if not personally, especially given his interest in botany and natural history. After retiring from his medical practice, Darlington devoted himself to the pursuit of botany full-time, creating a respectable herbarium, and authoring several books on botany and natural history, including publishing the correspondence of other naturalists such as John

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11 Barton, Benjamin Smith. (1803). *Elements of Botany, or Outlines of the Natural History of Vegetables.*
Bartram and Humphry Marshall.\textsuperscript{12} He was instrumental in encouraging botanical activities among other Chester County residents, and founded the first botanical society in Chester County (Boyd 1929; Lansing 1985; [PHS] 1976).

Drs. Alexander Garden (of Charleston, South Carolina), and Cadwallader Colden (of New York), both immigrants to the colonies from Scotland in the first half of the eighteenth century, were also men whose passion for botany found an outlet in the exchange of information and specimens with correspondents at home and abroad. Garden’s letters are full of complaints about the lack of time he has for the study of botany, although he had enough time to earn the respect of correspondent Carl Linnaeus, who named a genus of flower after him (the \textit{gardenia}), and to be proposed for membership as a colonial member of the Royal Society of London – an honor received by very few American residents (Dierks 1998; Wulf 2009; 2011).

Dr. Colden was also well known for his botanical expertise, was a corresponding member of the Royal Society, and exchanged information and specimens with a wide variety of correspondents, including both Garden in Charleston, and John Bartram in Philadelphia. Colden passed on his love of botany to his daughter, Jane, who became a well-known botanist in her own right, with her own circle of correspondents that included several Royal Society Fellows, and authored a treatise on New York flora that was well-received by the top botanists of the day (Dierks 1998; Parrish 2002).

Other individuals participating in the transatlantic botanical exchange as both producers and consumers came from other “professional” fields, such as the clergy. Like medical professionals, members of the clergy sometimes felt a special draw towards the study of natural history as a way of connecting to the divine through the beauty of nature (Dierks 1998; Drayton 2000; Keeney 1992; Parrish 2006; Wulf 2009). The popularity of natural theology only added to the tendency of some clergy and laymen to justify their botanical pursuits as religious devotion. In early Federal Philadelphia the most well known clergyman-cum-botanist was Gotthilf Heinrich Ernst Muhlenberg, an ordained Lutheran minister who oversaw parishes in Pennsylvania and New Jersey.

Upon his retirement from the ministry in 1779, Muhlenberg focused on botany and other aspects of natural history, producing a number of books on the subject. He corresponded with a number of botanists in Europe, including James Edward Smith, president of the Linnaean Society of London (and successful purchaser of Linnaeus’s collections from his widow), along with German botanists Karl Ludwig Willdenow and Johann Schreber (Daisy 1996; Darlington 1849; Greene 1968). His careful and meticulous work won him praise and respect from other botanists, including the great taxonomist Carl Linnaeus, who named a genus of grasses in Muhlenberg’s honor, and by William Hooker, the third director of Kew Botanic Gardens (Chisholm 1911; Drayton 2000; Greene 1968; Smith 1954; Wulf 2009).

Another clergyman-cum-botanist producer/consumer in late eighteenth and early nineteenth century America was the Reverend Manasseh Cutler, a
Congregationalist minister from Massachusetts with a penchant for botany that he indulged more than once by visiting Philadelphia to meet with other enthusiasts, and taking trips to see some of the elaborate gardens (Cutler and Cutler 1888; Long 1991; Wulf 2011; Wunsch 2004). Cutler also contributed several articles to local and national botanical societies of which he was a full or corresponding member, as well as maintaining a sizeable correspondence with fellow botanical enthusiasts on both sides of the Atlantic (Cutler and Cutler 1888).

Along with his fellow countrymen Rush and Barton, Cutler also lamented the state of botany in North America, which he blamed on “the scarcity of books on natural history” and the lack of collections to study. Writing to Gustav Paykull in 1799 that “we have no cabinets of natural history in America, excepting one in Philadelphia and another in Boston… they are kept merely for the purpose of getting money, by showing them to common people, and consist primarily of exotics” (Cutler and Cutler 1888: ii: 298; quoted in Greene 1968: 15). Whether Cutler was disparaging the profusion of public gardens in Philadelphia or the arrangement of Charles Wilson Peale’s museum, he hit on another important segment of the producer/consumer category of botanical trade participants: the entrepreneurs and creators of public pleasure gardens and other natural history displays.

Conceived as partly an answer to the public interest in botanic gardens and partly a way to profit from outdoor entertainment, public pleasure gardens began popping up on both sides of the Atlantic in the late eighteenth and early nineteenth centuries. They offered not only public displays of local and exotic flora similar to
what might be found in the private collections of wealthy consumers, but also augmented these displays with live shows, fireworks, and refreshments. In the cosmopolitan city of Philadelphia there were a number of public gardens built in imitation of the famed London Vauxhall Gardens, including a Philadelphia version of the famous Vauxhall Gardens of London, and Gray's Gardens located just down the river from Bartram's Garden's and Hamilton's estate at The Woodlands (Eberlein and Hubbard 1944; Jackson 1932b; Scharf and Westcott 1884). Originally designed by Samuel Vaughn, Gray's Gardens was set up along the west bank of the Schuylkill River, and aimed to attract visitors from the city looking for respite and entertainment among winding paths and flowing gardens. The proprietor, George Gray, also operated Gray's Ferry and Gray's Inn, pulling in a large variety of visitors to his gardens, which remained popular through the late eighteenth century (Scharf and Westcott 1884; Stetson 1949b).

Another botanically ambitious Philadelphia resident who poured a considerable amount of financial resources into the transatlantic botanical exchange was Philadelphia entrepreneur Henry Pratt, who purchased Robert Morris' Lemon Hill estate (now part of Philadelphia's Fairmount Park district) in 1800 in order to turn it into a public garden similar to the popular Gray's Gardens. This effort required a significant amount of money and labor to redesign and expand the gardens to capture the public's interest and accommodate large numbers of visitors (Jackson 1932b; [Lemon Hill Mansion] 2005; Nash 2002; Scharf and Westcott 1884). It was to Lemon Hill that John McArann went after his service at The
Woodlands, no doubt parlaying his work with a famed private garden into success with these new public pleasure grounds (Jackson 1932a; Scharf and Westcott 1884).

Charles Wilson Peale was another well-known natural history entrepreneur in Philadelphia who besides painting portraits of prominent figures of early American history (and wealthy Philadelphia residents) was a great collector of natural history items. Peale was so interested in natural history, in fact, and so convinced of the necessity of it being part of everyone’s general education, that he took his collections and opened the first natural history museum in Philadelphia in 1786, and delivered a well-received and popular series of lectures on the subject in the years following (Greene 1966). Although this museum was never as financially successful as Peale had hoped, it was popular among Philadelphia residents, and counted among its collections the first complete mastodon skeleton ever displayed to the public (Greene 1966; others).

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Botany as it was practiced in the eighteenth and nineteenth centuries was a far cry from the modern-day approach to this biological science, but the discoveries made at this time -- and those who made them -- were crucial to the foundation of the modern day field, which is perhaps why so many historians of science have sought to classify and understand this period of scientific development in America. In the early period of this scholarship these practitioners were often evaluated based on modern standards, rather than the particular context of early American scientific practice. In 1976, historian Nathan Reingold attempted to rectify this error, creating
categories of classification based on the scientific practices of the day (Goldstein 1994; Keeney 1992; Reingold 1976). Others followed in Reingold’s footsteps, refining his system of classification and offering their own models. While all these models can offer important insights in the means and motivations of the botanically inclined individuals in the days before the “professionalization” of the field, no model is without its flaws. Here I have offered my own system of classification based on the significant commercial enterprise that was the transatlantic botanical exchange of the eighteenth and nineteenth centuries as another potential way of classifying the various participants.

By focusing on the financial and commercial aspects of the eighteenth and nineteenth century botanical trade, we can gain new insights into the relationships between individual participants, and the role that patronage and colonial-imperial relations played in structuring the nature of this trade – even in post-colonial America. Profiling individual participants in the Philadelphia and wider botanical communities provides context and a basis of comparison against which one individual – William Hamilton – and his botanical collection can be evaluated in terms of his experience as a botanical consumer in early Federal Philadelphia. The next chapter narrows in focus to Hamilton and his botanical collection at The Woodlands to examine his experience in this context, with an extended comparison of Hamilton and his neighbor, John Bartram, in the second half of this chapter clarifies the differences in their experiences as participants in the transatlantic botanical exchange of the eighteenth and nineteenth centuries.
CHAPTER FIVE: William Hamilton and The Woodlands

As the previous chapter demonstrated, the intricate and fascinating story of the transatlantic botanical trade in the eighteenth and nineteenth centuries is not only a story of plants and places, but also a story of people. It is a story of the groups of people whose actions encouraged the transatlantic botanic trade at every level, from the plant hunters who risked life and limb to chase new species, to the nurserymen who sold exotics to collectors, and to the collectors, gardeners, and doctors who constant demand for new and interesting plants fed the market. It is a story of individual botanical enthusiasts finding their own unique ways to participate in this exchange, and of the multitude of individual experiences of these participants that add depth and material reality to our understanding of this botanical trade.

This chapter and the following one examine the experience of a particular individual participant, William Hamilton, from two specific angles: this chapter examines the biographical and documentary evidence of Hamilton’s involvement in the transatlantic plant trade and his development of The Woodlands as a monument to his participation. To put Hamilton’s actions into context, his story is compared to that of his neighbor John Bartram, to underscore the different ways in which each man participated in this botanical exchange. The following chapter will examine Hamilton’s participation in this exchange by analyzing the physical and material evidence of his greenhouse based on three seasons of archaeological investigation.

In the multifaceted network of individuals who participated in the transatlantic botanical trade of the eighteenth and nineteenth centuries, William Hamilton falls into the group of consumer-patrons as described in the previous
chapter. Hamilton, in fact, exemplifies this class of participants: independently wealthy, he was a leisured gentleman from a prominent Philadelphia family who devoted the majority of his time to his botanical hobby, creating a landscaped estate consisting of formal gardens, tree groves, landscaped paths, and a two-story greenhouse complex that was said to outclass any other landscaped estate in the Americas at that time (Betts 1979; Fussell and Long [1998-2009]; Harshberger 1924; Huddleston 1969; Jacobs 2006; Jefferson 1944; Long 1991; Madsen 1989; McLean 1984; O’Malley 1996; Schlereth 2007; Stetson 1949a; Ward 1879). Over the course of five decades, from his initial occupation of his country estate, The Woodlands, in 1767 through his death in 1813, Hamilton indulged his passion for botanical cultivation and collection to a degree rarely seen even in Europe, and practically unheard of in Colonial and early Federal America. Through his connections with botanical enthusiasts and nurserymen in Europe, Philadelphia, and elsewhere along the Atlantic coast, Hamilton created a unique and highly praised botanical collection at The Woodlands in the tradition of European botanic gardens discussed in the third chapter.

During his tenure on this estate, Hamilton created a place for himself and his plant collection in the early history of American botany, negotiating between the various roles of botanical cultivator, social host, public patron, and private collector. Glimpses of Hamilton’s attempt to balance these roles can be found throughout his biography and the surviving documentary evidence of his estate, which provide the basis for understanding his experience as a participant in this exchange vis-à-vis his famous neighbor, John Bartram.
Grandson of Andrew Hamilton I (d. 1741), a prominent lawyer most famous for his defense of John Peter Zenger in 1735, and nephew of James Hamilton (1715-1783), who served as the Mayor of Philadelphia in 1745 and was twice the Lieutenant-Governor of Pennsylvania (1746-1754; 1759-1763), and connected by marriage to the Allens, Frankses, and Penns, William Hamilton was born in 1745 to one of the most prominent families in colonial Philadelphia. His father, Andrew II (1710-1747), was involved in a successful merchant enterprise, which William's older brother, Andrew III (1743-1784), continued. William, however, had no desire to follow the rest of his family into politics or business, preferring instead to spend his time pursuing various hobbies – in particular, his obsessions with architecture and botany, at the estate inherited from his father, The Woodlands (Allen 1885; Betts 1979; Carter 1980; Fisher 1892; Franks 1899; Fussell and Long [1998-2009]; Hitzheimer 1892; Jackson 1932; Jacobs 2006; Jenkins 1898; Johnson 1901; Kelleher 2009; Long 1991; Neible 1908; Nash 2002; Rasmusson 1966; Steiner 1897; Stetson 1949a; Stiles 1892; Ward 1879; Wunsch 2004).

Originally part of a 545-acre tract belonging to William Penn, Andrew Hamilton I acquired 250 acres of land along the west bank of the Schuylkill River in 1734 that became the initial area of The Woodlands (Fry 1995; Jacobs 2005; 2006; Long 1991; Wunsch 2004). Andrew I added another fifty acres to The Woodlands estate before his death in 1741, when the estate passed to his eldest son, Andrew II. Although another 56-acre tract was added to the growing Schuylkill river estate in 1743, Andrew II did not further develop The Woodlands during his six-year
ownership of the estate, which ended with his own death in 1747 (Long 1991; Wunsch 2004).

After Andrew II’s untimely death, two-year-old William and his brother, Andrew III inherited parts of their father’s and grandfather’s estates that seem to have set them on the separate paths they would pursue in adulthood (Long 1991). Andrew III, as the oldest son, inherited the family house on Third Street, in the heart of Philadelphia as well as interests in their father’s business. William, on the other hand, inherited The Woodlands, by this time a 356-acre tract, which stretched from the Schuylkill River west to what is today 43rd street, and north to Market Street.
(figure 4) (Jacobs 2006; Fry 1995; Long 1991; Wunsch 2004). As neither boy was of age, or even old enough to understand their separate inheritances, the properties remained in the control of their mother, Mary Till Hamilton, and their father’s brother, James Hamilton. James, a lifelong bachelor, most likely oversaw the boys’ education and probably served as an advisor to them as they transitioned into adulthood (Long 1991; Wunsch 2004).

It seems reasonable that James had a fair amount of influence over his brother’s sons – or at least over one of them. His status as a bachelor and male head of a prominent Philadelphia family allowed James to indulge his own interests at his estate of Bush Hill, which at the time was just outside of the city proper (figure 5). James seems to have taken an interest in botany, or at least in garden design, and there is some suggestion that William’s own interest in the subject can be traced back to his time spent in the well-situated landscape of Bush Hill (Betts 1979; Jacobs 2006; Long 1991; McLean 1984; Stiles 1892). James was also known for his patronage of the arts, and his fine collection of statuary and paintings, which also became an interest of William’s when he began to set up his own household at The Woodlands (Betts 1979; Long 1991; Madsen 1989). Whether James found a kindred spirit in his nephew and encouraged his pursuit of botany and the arts remains unproven, but the subsequent legacy left to William upon his uncle’s death, which included the Bush Hill estate, and several tracts of land in New Jersey and Lancaster, PA, and the fact that he was named an executor of his uncle’s will suggests the two were fairly close (Jacobs 2005; Long 1991; Wunsch 2004).
In any case, William Hamilton was certainly botanically inclined by the time he graduated from the University of Pennsylvania in 1762, then known as the College of Philadelphia (Jacobs 2006; Long 1991; Nash 2002; Tinkcom 1982). Although Hamilton would not have benefited from a full course of materia medica as the medical school at the University of Pennsylvania did not open its doors until three years after Hamilton completed his studies, it is likely that some science and natural philosophy courses would have been part of his curriculum (Long 1991). Upon reaching his majority in 1766, Hamilton devoted his energies to improvements at The Woodlands, acquiring a small tract of land in 1767 (11.5 acres) and a large, 179-acre tract from his uncle James in 1776 (see figure 4) (Fry 124)
Although at times interrupted by personal and political upheavals, Hamilton made remarkable progress on his estate, constructing the first mansion house at The Woodlands on high ground overlooking the lower Schuylkill river in 1770, and no doubt planning the gardens and landscape to accompany this structure, in keeping with the established taste for vistas and landscapes coming out of eighteenth-century Europe (Jacobs 2005; 2006; Long 1991; Wunsch 2004).

Hamilton’s interest in developing the grounds around the mansion house were certainly in full force by April 1779, when he writes to his friend, William Tilghman of his desire to construct a “small park,” and how he expects that his lawn “will shine this summer, it already looks elegantly. And so it ought you’ll say, when you are told the manuring of it this last Winter has cost me £1500” (Hamilton to Tilghman April 1779; quoted in Wunsch 2004: 23; Long 1991). As other scholars have pointed out, Hamilton’s dedication to his landscape was significant and expensive, as the cost for his manure along was almost eight times the annual income of a skilled craftsman at the time (Long 1991: 85; Wunsch 2004: 24). Such expenditure is even more notable for its time, as the city of Philadelphia was enduring a wartime shortages of food and other supplies, which only underscores Hamilton’s dedication to his landscape plans (Long 1991; Wunsch 2004).

The evidence from Hamilton’s early life prior to his full-time removal to the country is unfortunately thin, but it does suggest that although his priorities were to his estate, the growing dissatisfaction with the current English rule did not pass him by. Many men of Hamilton’s social circle were caught up in the growing agitation
sweeping the colonies at this time, and members of families on both sides of the conflict were actively involved in some of the protest measures proposed and adopted to counteract specific laws and taxes passed by British Parliament in the 1760s and early 1770s (Allen 1885; Long 1991; Tinkcom 1982). Even Hamilton was not immune to the general anger and frustration with the British government. There is no evidence that Hamilton actually fought in the American Revolution, but documentary evidence suggests that he may have served as an officer in a militia regiment raised from Blockley Township, and on the Council of Safety in the early years before the outright declaration of war (Colonial Records III: 328).^13^  

Although evidence for Hamilton’s direct support of the American colonies’ rebellion against the British crown is ambiguous at best, his loyalties – at least private – are not. Hamilton makes it clear in his personal correspondence that he supports his fellow Americans on the western side of the Atlantic, even if he has reservations about outright war and rebellion. Writing to his friend Dr. Thomas Parke from London on September 24, 1785 “there is a society in our own [country], preferable to anything [in England],” he laments only “were the government of America only equal to its gifts from nature, I must own I should prefer it to any other” (Hamilton to Parke 24 September 1785). Hamilton’s reservations about his

^13^ The evidence for Hamilton’s militia participation is questionable. The name “Billy Hamilton” appears in connection with the Blockley Township militia, which was a known nickname of Hamilton’s, and certainly the timing and location match. But William or “Billy” Hamilton is not an unusual name, and there is no other distinguishing evidence (such as “of The Woodlands”) to definitely match this entry to William Hamilton of The Woodlands (Tim P. Long, personal communication February 2, 2010).
loyalties are what might be expected from an individual with personal and business ties to Britain.

As was true of many elite Philadelphian families, the Hamiltons’ political and mercantile successes were tied inexorably to their connections with prominent British citizens on the other side of the Atlantic, with several of them having been appointed by the Penn family to various colonial offices or serving them directly as agents in the colony – connections which put them in the uncomfortable position of having to choose sides when outright revolution was declared (Allen 1885; Betts 1979; Fisher 1892; Jacobs 2006; Long 1991; Steiner 1897; Stetson 1949a; Ward 1879). While the city of Philadelphia probably had as many Loyalist families as any other prominent colonial capital whose wealth and status came from commercial and personal ties with the metropolis the growing tension between the two factions would only have been magnified by living in the city that was not only the place of the creation of the Declaration of Independence, but also home to the Revolutionary government for much of the war (Bridenbaugh 1965; Nash 2002; Tinkcom 1982).

The city of Philadelphia was symbolic for the British as well; it represented both the pinnacle of wealth and sophistication in the American colonies and the capital of rebellion and tyranny against the British government. It was also a strong military target, since shutting down the port at Philadelphia and its business would severely hurt the struggling American infrastructure (Doerflinger 1986; Tinkcom 1982). Therefore, Philadelphia held a particular appeal as a target for the British forces, and in September 1777 the British Army under General Howe captured Philadelphia and occupied it until the following June. The nine-month British
occupation of the city, although a military loss, did not seem to greatly impact the upper class residents, or put a damper on their social activities. Instead, the presence of high-ranking British officers only seemed to increase the frenzy of the Philadelphia social season – no doubt part of the reason that Benjamin Franklin reportedly quipped that General Howe had not captured Philadelphia so much as Philadelphia had captured Howe (Nash 2002; Tinkcom 1982).

When American forces finally ousted the British from the city, the fledgling Whig government returned, bringing with them a deep sense of injustice and a desire for retribution against any and all suspected Loyalists who enjoyed freedom and wealth during Howe's tenure in the city (Bridenbaugh and Bridenbaugh 1965; Doerflinger 1986; Nash 2002; Scharf and Westcott 1884; Tinkcom 1982). Given the number of actual Loyalists present in Philadelphia (a number of whom left the city with the British) and the willingness of many the city’s residents to acquiesce to – if not outright welcome – the British troops, the returning Whig government had a long list of those they accused of “consorting with the enemy” (Tinkcom 1982: 142; Nash 2002). Laws were passed declaring that anyone who had served the British during their occupation of the city had committed high treason, and was therefore subject to forfeitures of property, assets, and other indignities (Nash 2002; Tinkcom 1982; Young 1966). A large number of individuals were accused of treason and dragged off to prison to answer for their crimes during the occupation.

Among those accused and hauled in on charges of treason was William Hamilton, who in fact suffered this indignity twice. In September of 1778, Hamilton was hauled in on charges of high treason and subsequently acquitted of all charges.
after a twelve-hour trial on October 17, 1778 (Biddle [Drinker] 1889: 110; Long 1991). Given the length of the trial and his subsequent acquittal of the treason charges it seems likely that Hamilton was merely swept up in the first rounds of the Loyalist witch-hunt by overzealous Whigs. Hamilton certainly made a good target for their ire; as a member of the Philadelphia elite who suffered very little at the hands of the British, his family connections to prominent Loyalist families, and his uncle James’ loyalty to the Penn family, Hamilton was a perfect candidate for an accusation of “consorting with the enemy” (Tinkcom 1982: 142).

However suggestive these circumstances were, though, there is no evidence that Hamilton himself was a Loyalist; on the contrary, as his later letter to Parke suggests, he was always loyal to his birthplace, only stopping short of supporting the Revolution because it was essentially open rebellion against the legitimate British government (Long 1991). In another letter to Parke from London, Hamilton reiterates his American loyalties, writing that “every hour that I exist I find myself more attach’d to America & more fully persuaded that I cannot be so happy anywhere as with my friends there” (Hamilton to Parke December 1, 1784; quoted in Long 1991: 108-109). Such loyalty is remarkable, especially after formal accusations of treason, but perhaps it is telling that these loyalties are expressed privately, rather than in a public setting.

While Hamilton’s first arrest and trial for treason might seem to have been primarily for form’s sake, his second arrest and subsequent trial was a much more serious event. On October 2, 1780, just two years after his first arrest and acquittal, Hamilton was again arrested along with four other gentlemen, this time for
"unlawful and dangerous correspondence and intercourse with the enemy in New York" (Biddle 1889: 129; Colonial Records XII: 495; Long 1991; Murdoch 1960). Those in charge of the arrests were primarily interested in tracking down the men involved in a smuggling scheme mentioned in the court-martial of Major-General Benedict Arnold. Although "there is nothing in the minutes of the Council to indicate that... William Hamilton had been in any way involved in the affair" (Murdoch 1960: 50; Colonial Records XII), the charges were serious enough to hold Hamilton over for trial and deny him bail due to his having previously admitted to "actions in support of the Tory cause during the occupation of the city" and the charge of having corresponded with the enemy (Murdoch 1960: 51).

Hamilton's trial commenced immediately in the court of Oyer and Terminer, where he was found guilty of "an attachment unfavorable to the rebellion," which, though ominous, was much less serious than being found guilty of treasonous correspondence (Murdoch 1960: 52). It did, however, come with serious repercussions: Hamilton was sentenced to "immediate and perpetual banishment" from the state of Pennsylvania and fined £200,000 (Colonial Records XII: 499; Murdoch 1960: 52). He petitioned for, and was granted, the chance to remove to St. Eustatius for the duration of the war (Colonial Records XII: 502; 503; Long 1991; Murdoch 1960). However, Hamilton was not entirely without luck; he petitioned for a delay of departure from the city, and managed through a series of petitions from his mother and himself to delay his departure, reduce his bond to £100,000, and finally be allowed home in February 1781 (Colonial Records XII: 549; 632; Long 1991; Murdoch 1960).
There are a number of reasons why Hamilton's second arrest and trial were more severe than the first, one of the main ones being the different atmosphere in Philadelphia at the time of each trial. In 1778, the Whig Philadelphia government had just come back into power, ready to make every Tory pay, but they had yet to effect much change with their new laws, and it was still early enough in the war that no widespread ill effects were felt in the city (Nash 2002; Tinkcom 1982). So while the Whigs themselves were ready and eager to arrest everyone the least bit suspicious, the general feeling was one of tolerance (Murdoch 1960; Tinkcom 1982; Young 1966). But by the time that Hamilton was arrested a second time the city was suffering from widespread inflation and food shortages due to the war, and the unequal distribution of these miseries among the poorer Philadelphia residents had increased the class tensions in the city and the mistrust of anyone who appeared to be well off (Nash 2002; Tinkcom 1982).

Added to this general ill feeling was the recent revelation of the treasonous actions of Benedict Arnold, one-time military commander of Philadelphia. It was partly due to the discovery of the extent of General Arnold’s abuse of office during his tenure as the military commander of Philadelphia (from June 1778 to March 1779) and his subsequent alliance with Major John André of the British Army that Hamilton was arrested the second time (Murdoch 1960). In September of 1780 Philadelphians first learned of Arnold’s treacherous actions against the American army, and the news inspired a brief revival of anger against him and an interest on the part of some members of the Supreme Executive Council of Pennsylvania to discover who his associates and business partners were during his time in the city.
Unfortunately for Hamilton, his name, and those of four other gentlemen came up in connection with a specific smuggling case, including that of David Franks, Hamilton’s longtime friend and business partner (Long 1991; Murdoch 1960).

While there seemed to be no real evidence linking either Hamilton or Franks to the specific episode of the smuggling operation involving Arnold and a few others, the prevailing feeling against well-heeled elites – and especially those with Tory connections – was so strong, and the specific charges against Hamilton and Franks so plausible, that they might have counted themselves lucky to escape with only minor convictions. Of course, Hamilton in particular may have looked like an especially easy target given his previous arrest, family connections – and the fact that he spent £1500 just on manure for the grounds of The Woodlands at a time of general food shortage in the city, and when a laborer’s annual salary averaged less than one-third that amount (Long 1991). Given the circumstances, and his obvious prioritizing of his gardens Hamilton could count himself lucky that the Supreme Executive Council did not seize his property for the state.

Although likely not guilt of treason, Hamilton was certainly guilty of the appearance of wealth in a time of poverty in Philadelphia proper, having inherited a tidy package from his father – which included the core of The Woodlands estate – and as he seemed to be very close to his bachelor uncle James, there was good reason to suspect that he would inherit a significant amount from that quarter as well (Betts 1979; Jacobs 2006; Long 1991; Wunsch 2004). The expectation of future wealth – especially from friends of the Proprietors – in a time of increasing social
tensions and inflation and an increasing food shortage due to the war would only have added to the mistrust and suspicion of Hamilton by his fellow Philadelphians.

Being arrested and tried for treason, not just once but twice in the space of three years would be enough to make even the staunchest supporters of the new American government somewhat wary of politics, so it comes as no very great surprise that Hamilton felt no desire to follow in his paternal relatives’ footsteps into that realm. In fact, Hamilton’s retirement to the country, and his decision to focus on botany and art rather than politics or business suggests a personality that had learned to be cautious, and outwardly neutral, whatever may have been his position before the war.

For all intents and purposes, this seemed to work. Hamilton, who had already begun to acquire more land to extend the original size of The Woodlands, purchased a small 12-acre tract in 1783, and eventually extended The Woodlands to a full 600 acres by 1789 (Fry 1995; Jacobs 2005; Kelleher 2009; Long 1991; Wunsch 2004). Unsurprisingly, it is in this period, soon after the end of the Revolutionary War and the resumption of cordial relations with Britain that Hamilton’s efforts on his estate – architectural, botanical, and aesthetic – are the most pronounced. He threw himself into estate development, purchasing books on landscape design, hiring gardeners to oversee daily operations, and planning the construction of a magnificent greenhouse complex – all the while corresponding with other botanical enthusiasts in Europe and America on both sides of the political spectrum, and setting the stage for his entrance into the botanical community on a grand scale (Betts 1979; Jacobs 2006; Long 1991; Wulf 2011; Wunsch 2004).
In 1783, as Hamilton was in the midst of improving his estate through landscape design and assorted house improvements his uncle James died, leaving him the estate at Bush Hill, land holdings in New Jersey, Delaware, and Lancaster (PA) – and large debts charged to the estate. As Hamilton was also an executor of James' will, it became his responsibility to settle his uncle’s estate and satisfy the creditors. After months of correspondence back and forth with his uncle’s bankers in London, Hamilton finally concluded that the matters could best be handled in person, and he planned a trip abroad (Fry 1995; Jacobs 2005; Long 1991; Wunsch 2004).

Hamilton’s trip across the Atlantic to England was a pivotal moment for him and for the development of The Woodlands. While his primary reason for making the journey to England was to settle his uncle’s affairs with Robert Barclay, he also desired to visit the great English country estates and see for himself these pinnacles of eighteenth-century landscape design (Hamilton to Smith 30 September 1785; Hamilton to Parke 24 September 1785; Long 1991; Wunsch 2004). In a letter to his secretary, Benjamin Hays Smith, Hamilton explains his plans, writing that

“Having observed with attention the nature, variety & extent of the plantations [seen in England] of shrubs, & fruits & consequently admired them, I shall (if God grant me a safe return to my own country) endeavour to make it [The Woodlands] smile in the same useful & beautiful manner” (Hamilton to Smith, September 30, 1785).

Here, on this trip to England is when Hamilton’s botanical and landscape interests – always present, but somewhat overshadowed by his experience during the American Revolution – enter their most productive phase, and when Hamilton’s participation in the transatlantic botanical trade begins in earnest.
In order for Hamilton to (re) make his own estate in the epitome of English landscape design he needed to do research. This involved not only visiting all the estates he possibly could, but also the town residences of the British upper crust to get ideas for both his landscape and the main house. As he wrote to Parke, “my chief amusement is in viewing the best Houses in & about this metropolis which are to be seen only in the absence of their Lords now at their Seats...I have scarcely
omitted visiting any thing that is curious…” (Hamilton to Parke, September 24, 1785). Of course, once he viewed such opulence, Hamilton also had to make arrangements to acquire the various design elements himself, whether that meant purchasing certain items in London that could less easily be found in America, or arranging for the hiring of foreign laborers to come to Philadelphia for specific work.

“In order to take time by the forelock, Mr. Bob Barclay has been so good as to write for me to Glasgow, & has order’d out two or three stone quarries... You must be sensible too that I can get a first rate gardiner [sic] to go with me on very moderate terms compared with what that branch at present costs me & I shall not fail to suit myself” (Hamilton to Parke, September 24, 1785).

Along with design elements, books, hired laborers, and other sundries, Hamilton also purchased exotic plants in significant numbers while in London, visiting the established nurseries there and sending them along with detailed instructions to his secretary (Long 1991; Wunsch 2004). Letters from Hamilton to his secretary, Benjamin Hays Smith, and his friend, Dr. Thomas Parke, suggest that Hamilton’s purchases in England – botanical and otherwise – were significant, indicating that he desired not only to update his home at The Woodlands, but significantly redesign the entire estate. He writes to Parke that “some addition to the House, a stable & other offices are immediately necessary at the Woodlands” and that he “mean[s] to take from hence some [workers] who will engage with me for a certain number of years on moderate terms” (Hamilton to Parke September 24, 1785). He writes to his secretary a week later that

“The first thing to be set about is a good nursery for trees, shrubs, flowers, fruits, &c. of every kind. I do desire therefore that seeds in large quantities
may be directly sown of the white flowering Locust, the sweet or aromatic Birch, the Chestnut Oak, Horse chestnuts, Chincapins, Judas trees, Dogwoods, Hallesia, Kalmias, Rhododendron, Magnolias, winterberries, arrow wood, Broom, annonas, shrub St Johns wort &c…” (Hamilton to Smith September 30, 1785; quoted in Wunsch 2004: 25).

Although Hamilton does not specify how many seeds equal a “large quantity,” records from other elite gardens of similar size show that plants and seeds were usually ordered in the hundreds to ensure success and survival (Leighton 1976; Long 1991; Sarudy 1998).

In general, Hamilton’s letters to Smith from London are more specific (and more autocratic) than those to Parke, filled with questions about details of the estate and specific dimensions of buildings and furniture. He asks Smith to provide, among other things “the Dimensions of the Sideboard I bought of Mr. Penn: not only the size of the Board, but of the frame as to width, length, & height I wish to know what can stand under it,” and telling him also to

“Step also the Diameter of the circle or ring that ends in the Ice House Hill & tell me the space from one to the other side of the walk & of the Ha Ha. I am at a loss to determine the number of feet from the west wall of the House to the east Wall of the Green House at the Woodlands” (Hamilton to Smith September 30, 1785).14

Hamilton’s request for such specific details across several different buildings including the house and his determination to engage laborers for several years certainly seems to indicate that he planned significant changes on his Schuylkill River estate.

14 Although his trip to England between 1784 and 1786 was by far his longest stint away from home, the nature of Hamilton’s landholdings often required his presence in Lancaster and elsewhere, and much of the refashioning of The Woodlands, while directed by Hamilton, was supervised by Smith (Long 1991; Wunsch 2004; Yeates 1781).
Some part of these significant changes for The Woodlands was due to a sudden change in circumstances for Hamilton and his extended family. While in England Hamilton learned of the death of his older brother, Andrew, and of Andrew's wish that William oversee the education and provisioning of his young family (Long 1991; Wunsch 2004). Three of Andrew's older children had accompanied their uncle on his extended trip abroad, the two eldest boys, James and Andrew in order to be educated in England, and William's favorite niece, Ann (Long 1991).

Whatever Hamilton's intentions for The Woodlands might have been prior to receiving the news of his brother's death and his role of guardian and provider, he came to the conclusion that the best way to honor his brother's wishes was to take Andrew's household under his wing – a decision not made lightly, as this included seven children total, his widowed sister-in-law, and Hamilton's own mother (Cutler 1888; Long 1991; Wunsch 2004). Such a decision, however, would necessitate a significant overhaul of the house and grounds in addition to the changes already planned at The Woodlands, for, as Hamilton wrote to Parke in November 1785,

"As I can by no means afford to live at Bush Hill, I shall be under the necessity of adding to the House & building Offices at the Woodlands... It will be proper however to fix on some general plan for the whole & according as I have wherewithal while I am on the spot mean to procure whatever materials in the way of finishing & furnishing may be here purchased on a saving plan" (Hamilton to Parke November 2, 1785).

Such investments were necessary, as the plans Hamilton made for the improvement of The Woodlands mansion included the addition of a third floor and an elliptical-style wing on either side, along with the raising of the second floor to accommodate
a large saloon or ballroom along the southern façade (Betts 1979; Jacobs 2005; 2006; Kelleher 2009; Long 1991).

Accordingly, Hamilton took full advantage of his time in London, purchasing as many items as he thought necessary for the improvement of his house, and ordering several hundred plants to be shipped from London nurseries to his Schuylkill River estate. Although forced by the circumstances of construction at The Woodlands to reside temporarily at his late uncle’s house at Bush Hill upon his return to Philadelphia in 1786, Hamilton devoted much time and energy to overhauling The Woodlands as quickly as possible. He wrote constantly to his
secretary for status updates, often rode out himself to check on the progress, and
was less than pleased with any delays (Long 1991; Wunsch 2004). His frustration is
clear in a 1788 letter to Smith:

"I am really surprised and not a little displeased that Mr Child [the main
contractor/builder during the renovations] has not yet sent the model and
draft for the iron railing… if Mr Child pays so little attention to my other
directions I must in my own defense immediately on my return give up all
thoughts of removing to the Woodlands during this year of our Lord”
(Hamilton to Smith, October 22, 1788).

Hamilton’s devotion paid off after a few solid years of construction, and he and his
expanded household were firmly entrenched at the Schuylkill River estate by 1791
(Fry 1995; Log 1991; Wunsch 2004).

Although the main house at The Woodlands was habitable by the last decade
of the eighteenth century when Hamilton and his family took up residence much
work still remained. Hamilton’s letters and account books from the 1790s are full of
construction orders for various items and work inside the house and out on the
estate, including the construction of a stable and a large greenhouse complex both
completed by 1793 (Fry 1995; Kelleher 2009; Long 1991; Wunsch 2004). This
greenhouse complex was the centerpiece of Hamilton’s landscape plan, constructed
at the center of the estate halfway between the main house and the stables, and
became the cornerstone for the rest of the design. Hamilton’s desire to model his
estate at The Woodlands on the sweeping examples of English landscape design that
he had witnessed on his trip abroad was a labor of love, and became a lifelong
improvement project that culminated in a botanical paradise constructed and
maintained by a well-respected collector with an international reputation (Betts
William Hamilton, however, was not the only well-respected botanist with an international reputation in Philadelphia – or even on the west bank of the Schuylkill River. John Bartram the early American botanical pioneer, owned and operated his own botanic garden/farm and nursery only a few miles from The Woodlands, and did his own part to bring American botany to the attention of the world. Although Bartram and Hamilton were a generation apart, drawing a brief comparison between these two participants and neighbors illustrates some aspects of the trade that were common to many participants, and allows us to evaluate the differences in their participation and experiences.

Figure 8: Map of Philadelphia County, by Charles Ellet, Jr., 1843, and detail of west bank of the Schuylkill River gardens. Courtesy of the Free Library of Philadelphia.

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Hamilton’s botanical devotion and his ability to indulge the fullest extent of his botanical vision at his country estate ensured his participation in the international botanical exchange of the eighteenth and nineteenth centuries. If one were to judge success by contemporary praise, Hamilton could be considered one of, if not the, most successful of the super-consumer participants in this botanic exchange. Thomas Jefferson once remarked that Hamilton’s estate, The Woodlands, was “the only rival I have known in America to what may be seen in England” (Jefferson to Hamilton July 1806; quoted in Betts 1979:214).

While Thomas Jefferson’s favorable opinion of the landscape design at The Woodlands is by far the most-often repeated by contemporary scholars (see for instance, Betts 1979; Cornett 2005; Jacobs 2006; Long 1991; Madsen 1989; Schlereth 2007; Wunsch 2004) many other, less exalted visitors to Hamilton’s Schuylkill River estate were no less impressed. From “the moment you enter the grounds you discover all the neatness of the possessor,” writes one visitor to her sister, “it would take several days to be perfectly acquainted with the various beauties of this charming place…you can form but an inadequate idea of its charms from a visit of two hours” (L.G. to Eliza 15 June [1794]). One European visitor who, after noting somewhat dismissively that Hamilton’s house and furnishings “would be nothing elsewhere,” admits that “here the eye, deprived for a long time of all that resembles art, dwells with pleasure on all which reminds one of it,” (Niemcewicz 1965: 53). The visitor, Julian Ursyn Niemcewicz, was constantly unimpressed by American style and taste, but cannot even find a backhanded
compliment for the whole of Hamilton’s estate, only writing somewhat wistfully at the end of his journal entry, “we passed briefly through this lovely place” (Niemcewicz 1965:53).

Not all the visitors to The Woodlands were American statesmen and foreign dignitaries, however. Hamilton was generous with his grounds, hosting large parties and other events that allowed his fellow citizens to witness the splendor of his botanical collection (Cutler 1884; Jacobs 2006; Long 1991; Madsen 1989; Stetson 1949a). Hamilton was especially encouraging of those with an interest in and aptitude for botany. He had a long-standing arrangement with Benjamin Smith Barton, a professor at the University of Pennsylvania Medical School, to bring medical students to Hamilton’s estate to study the most extensive collection of exotic and native flora in early America (Eaton 1951; Ewan 1983; Graustein 1961; Long 1991). Portuguese botanist Hipólito José da Costa Pereira Furtado de Mendonça wrote in his journal that he would “make a catalogue of all the plants [Hamilton] has [in his greenhouse]” – a formidable task that required a significant time investment, as de Mendonça visited The Woodlands first on February 24, 1799, and then made three subsequent visits between March 6 and April 11 (Smith 1954: 95). In this way The Woodlands operated as a privately-owned equivalent of other botanic gardens: much like the botanic gardens in the Caribbean, or even Kew itself, Hamilton’s botanic collection at The Woodlands epitomized the transatlantic botanical exchange by providing visitors with the material manifestations of this trade along with the opportunity to study, cultivate, and enjoy them.
There were also more official recognitions of Hamilton’s botanical prowess and the unparalleled importance of his botanical operations at The Woodlands. In 1794, the American Philosophical Society gave Hamilton a box of seeds sent to that institution by the East India Company, believing him to have both the requisite knowledge and facilities to cultivate whatever exotics lay in the box ([APS] 1799; Long 1991; Wunsch 2004). Three years later, Hamilton was elected a member of this august body, which put him in touch with other botanically inclined individuals, including Thomas Jefferson (Long 1991; Wunsch 2004).

Jefferson made no secret of his admiration for Hamilton and his botanical collection at The Woodlands; in addition to providing all subsequent scholars with his estimation of The Woodlands in 1806, Jefferson also kept up a long correspondence with Hamilton, often asking for seeds from his stock and specifically requesting in 1809 that Hamilton grant Jefferson’s grandson, Thomas Jefferson Randolph, access to The Woodlands for the purpose of studying “the style of your pleasure grounds” ([APS] 1799; Jefferson to Hamilton 1809, quoted in Cornett 2005: 17; Long 1991; Wunsch 2004). Jefferson’s high opinion of Hamilton was also officially manifest during his time in office; in 1805, and again in 1806, he made sure that Hamilton received packages of seeds from the Lewis and Clark expedition with which to experiment. As very few of these new seeds and plants were distributed, Jefferson’s singling out of Hamilton and his facilities is a fitting testament to his confidence in Hamilton’s cultivation skills and his appreciation for new species – not to mention the echo of the British use of Caribbean botanic

While Hamilton’s botanical activities at The Woodlands and participation in the transatlantic plant trade exemplifies the “super-consumer” participant more common among Anglo-American elites in the eighteenth and nineteenth centuries, John Bartram, a Quaker farmer from just outside Philadelphia, exemplifies an alternative approach. Bartram was not a member of the colonial elite, or a super consumer of botanical material as Hamilton was, but rather a producer/consumer – one of the earliest and most successful of any of the Philadelphia-area producers. Over the course of the eighteenth century Bartram turned his interest in the natural world into a legitimate and highly successful plant export business that made him famous in the world of botany and survived well into the nineteenth century (Berkeley and Berkeley 1982; Cadbury et al. 1957; Darlington 1849; Harshberger 1899; 1924; Jenkins 1933; McLean 1984; [PHS] 1976; Scheick 1983; Smith 1927; Washington 1895a; b; Wulf 2009).

John Bartram was not a member of one of the most politically prominent Philadelphia families like his neighbor Hamilton, but the son of a middling Pennsylvania farmer with no great social aspirations (Berkeley and Berkeley 1982; Hoffmann and Van Horne 2004; Scheick 1983; Wulf 2009). Bartram grew up

15 Although no direct evidence survives, it is also extremely likely that Lewis, who spent some time in Philadelphia prior to his departure from St. Louis, would have met Hamilton. Benjamin Smith Barton was asked by Jefferson to train Lewis in the basics of botanical collection and specimen preparation, and there is a good chance that Barton would have taken Lewis through Hamilton’s greenhouse to develop his botanical instincts. Jefferson also asked Barton to educate his grandson in botany (Jefferson to Barton, October 12, 1808; Fussell and Long [1998-2009]; Long 1991; Wunsch 2004).
learning his father's trade, but spent his free time in wandering through the Pennsylvania wilderness and indulging his curiosity about the natural world (Berkeley and Berkeley 1982; [PHS] 1976; Scheick 1983; Wulf 2009). As a farmer supporting a large family, Bartram had little time to spare for his botanical hobby, but his desire to learn more about the scientific approach to the natural world and his own early collecting trips brought him to the attention of James Logan (Berkeley and Berkeley 1982; Hindle 1955; Hoffmann and Van Horne 2004; [PHS] 1976; Tolles 1957a; b; Wulf 2009).

Unlike John Bartram, Logan was a member of the colonial elite; he was William Penn's agent in Pennsylvania from many years, and was a scholar in the truest sense of the word. He was interested in a wide variety of intellectual pursuits ranging from horticulture to translation of classics, and had the most extensive scientific library in the American colonies — including the libraries at the newly founded universities of Harvard and William and Mary (Nash 2002; [PHS] 1976; Tolles 1957a; b; Wulf 2009). Although Logan had a passing interest in botany, he was more interested in furthering Bartram's botanical education and encouraging his collecting and study than in doing so himself, and became one of Bartram's earliest friends and patrons ([PHS] 1976; Tolles 1957a; b; Wulf 2009). Logan often lent Bartram books and scientific papers, and it was through Logan and his friends at the newly formed Library Company of Philadelphia that Bartram was put into contact with Peter Collinson in 1731 (Collinson 2002; Hindle 1955; O'Neill and McLean 2008; [PHS] 1976; Prince 1958; Tolles 1957b).
The thirty-plus year friendship and correspondence between John Bartram of Philadelphia and Peter Collinson of London that resulted from this first introduction had an enormous impact on the eighteenth-century botanical trade, and has been the subject of several studies (see for instance Berkeley and Berkley 1992; Collinson 2002; Darlington 1849; Hoffman and Van Horne 2004; O’Neill and McLean 2008; Wulf 2009). The attention is not undeserved, either: it was through Collinson’s exchange with Bartram that some of the most famous English gardens of the eighteenth century got their collection of North American plants, some supplied directly by Bartram, and others from London nurseryman who got their seeds and cuttings from Bartram (Berkeley and Berkeley 1982; Harshberger 1899; 1924; Harvey 1998; [PHS] 1976; Wulf 2009).

Not that Collinson and Bartram had any conscious intention of setting the English gardening world on its head with their first exchange of plants. The original hope for the correspondence was much more limited. Collinson had agreed to be the British buyer of books for Ben Franklin’s newly formed Library Company of Philadelphia for free – the only thing he asked for in return was some seeds and cuttings from a variety of North American plants that he had heard of, but could not get from the nurserymen in London (Bloore 1935; Collinson 2002; O’Neill and McLean 2008; [PHS] 1976; Wulf 2009). Joseph Brietnall, then Secretary of the Library Company and amateur botanist himself, put Collinson in touch with Bartram and the two began corresponding regularly (Bloore 1935; Jenkins 1933; [PHS] 1976; Wulf 2009). After Bartram’s first shipment of plants and seeds reached Collinson in 1733, the two began a regular exchange of botanic material and other
goods that expanded to include an impressive list of high-ranking and influential individuals including the both the Duke of Richmond, Charles Lennox, and the Earl of Bute, John Stuart, who would become the Prime Minister of Britain in 1762. Bartram also corresponded with other, slightly less illustrious botanical enthusiasts, including several fellows of the Royal Society and other influential producers, such as Philip Miller, head of the Chelsea Physic Garden and author of some of the most popular gardening books of the mid-eighteenth century (Bartram 1992; Berkeley and Berkeley 1982; Greene 1968; Hoffmann and Van Horne 2004; Jenkins 1933; Leighton 1976; Martin 1984; 1991; [PHS] 1976; Wulf 2009).

Eventually the orders for North American plants became so numerous and extensive that Bartram and Collinson came up with the idea of creating boxes of the one hundred and five most popular North American seeds that Bartram would ship and sell through Collinson for five guineas each (Jenkins 1933; [PHS] 1976; Wulf 2009). These “five-guinea boxes” became the basis of Bartram’s plant business, while large orders from certain regular clients like Lord Petre were also filled, though they often demanded extensive collecting trips across large parts of the North American continent (Jenkins 1933; [PHS] 1976; Prince 1958; Scheick 1983; Wulf 2009).

It is clear from Bartram’s list of correspondents and subscribers that he was a highly successful participant in the eighteenth-century botanical exchange. His plants and seeds traveled across the European continent to a number of different botanists and plant enthusiasts, all of who knew the name of the Quaker farmer-turned-botanical-entrepreneur out of Philadelphia (Cadbury et al. 1957; Jenkins
Bartram's success can be seen in more than just the names of his clients and foreign correspondents. He is credited with the introduction of multiple North American plant species to Britain, including species of Kalmia, Rhododendron, and Magnolia, among others, and was indirectly responsible for other introductions made by his clients and correspondents (Bartram 1992; Berkeley and Berkeley 1982; Cadbury et al. 1957; Hoffmann and Van Horne 2004; Jenkins 1933; [PHS] 1976; Prince 1958; Wulf 2009). His introductions and boxes were so influential, in fact, that he received official royal recognition for his botanical work, being named the King's Botanist by George III in 1765, and was inducted into the Swedish Royal Academy of Sciences four years later (Cadbury et al. 1957; Jenkins 1933; Kinch 1986; Wulf 2009).

King George III was not the only one to praise Bartram's efforts, however. Many other eminent botanists were impressed with Bartram's botanical collecting and exporting efforts. Bartram's papers on snakes and other animals encountered during his plant-hunting expeditions were read before the Royal Society, an honor rarely accorded a nonmember, and even so eminent a botanist as Carl Linnaeus admired Bartram, calling him "the greatest natural botanist of his time" (Daisey 1996; Harshberger 1924; Jenkins 1933; Parrish 2006; Prince 1958; Smith 1927; Wulf 2009). Linnaeus even did Bartram the honor of naming a genus of moss after him, indicating that Linnaeus thought Bartram's work was important enough to earn him a slice of botanical immortality (Hoffman and Van Horne 2004; Wulf 2009). Such a wide variety of honors certainly indicate that Bartram was a successful
participant in the eighteenth-century botanical exchange, and arguably the most successful of the primary producer participants, especially in the American colonies.

Although Hamilton and Bartram found different ways to participate and earn lasting recognition in the eighteenth-century botanical trade, their paths to botanical glory shared important, if not crucial, elements. In order to participate successfully in the international botanical exchange of the eighteenth and early nineteenth centuries in any capacity – be it as a leisured gentleman or professional plant supplier – there were certain important criteria that one had to have. Perhaps the most obvious requirements are the physical ones, such as the land to care for large numbers of plants with space to build special structures such as greenhouses, and the vast labor force to care for plants with a wide variety of environmental needs.

But the absolutely crucial requirement for the successful participation in the international botanical exchange of the eighteenth and early nineteenth centuries was an individual’s connection to the international network of botanical enthusiasts who made it possible for men such as Hamilton and Bartram to pursue their botanical exploits through encouragement, exchange of information and plant material, and even patronage by wealthy and influential individuals. Without the acres of land, the labor, and the international connections, such individuals could not hope to compete with the most successful of these participants, those who earned international reputations for their botanical endeavors, such as William Hamilton and John Bartram.

To participate in the eighteenth-century botanical exchange in a significant way that set one apart from the rest of his or her community it was necessary to
have a fair amount of land and labor to support the operation. Successful participants in this botanical exchange not only needed the physical space to plant such flora outside and the room to build special structures like greenhouses to house the more delicate botanical specimens; they also needed the skilled labor to care for a wide variety of plants with vastly different physical needs. Members of the colonial elite such as Hamilton, who had access to inherited land as well as the ability to acquire more, had little difficulty meeting this first need. Hamilton's estate at The Woodlands was six hundred acres at its largest extent, and included a number of special areas specifically designed for the care and display of different kinds of plants, including groves, grottoes, formally landscaped gardens, and a 140-foot-long greenhouse-hothouse complex that contained, according to one contemporary, a lily pond and as many as ten thousand exotic plants (Betts 1979; Cutler 1884; Harshberger 1924; Huddleston 1969; Fussell and Long [1998-2009]; Jacobs 2006; Long 1991; McLean 1984; Madsen 1989; O'Malley 1996; Schlereth 2007; Stetson 1949a; Wunsch 2004).

Hamilton's elite status and available credit also made it feasible for him to hire professional expert gardeners from Europe to care for his extraordinary botanical collection (Ewan 1963; Fussell and Long [1998-2009]; Jacobs 2006; Long 1991; Schlereth 2007). Although Hamilton did not patronize and promote other botanical producers in the same was as Hans Sloane or John Fothergill, several of his gardeners did go on to successful botanical careers after their tenure on his estate (Ewan 1952; 1983; Ewan and Ewan 1963; Graustein 1961; Jenkins 1933; McLean 1984; Pursh 1814; Reed 2005; Schlereth 2007). The careers of Frederick Pursh,
John Lyon, and John McArann have already been discussed, but there are likely to be others who also benefited from botanical experience at The Woodlands estate. Hamilton’s letter to Parke from England in September of 1785, in which he reminds Parke that he “can get a first rate gardiner to go with me on very moderate terms” suggests that Hamilton hired fairly knowledgeable individuals to take charge of his plants, so it is no wonder that his former employees found success after they left his service.

Certainly Hamilton’s elite status aided in his acquisition of the physical requirements needed for a successful participation in the botanical exchange of the eighteenth and early nineteenth centuries, but other successful participants who were not colonial elites, such as John Bartram, also found ways to obtain the necessary physical requirements. As a farmer Bartram had amassed enough resources to purchase land along the Schuylkill River in 1728, and as his botanical business became financially solvent, he was able to acquire more land and enlarge his holdings (Bartram 1992; Berkeley and Berkeley 1982; [PHS] 1976; Wulf 2009). Bartram even built a greenhouse to house his more tender botanical specimens, and he arranged other heartier specimens on his property in environments that mimicked the plants’ natural habitats ([PHS] 1976; Wulf 2009).

This arrangement of plants did not meet with everyone’s approval, however. George Washington was unimpressed by the garden’s appearance when he visited in 1787, writing in his journal that the gardens (then run by Bartram’s sons William and John Jr.) that “‘tho’ stored with many curious plants, Shrubs & trees, many of which are exotics [the garden] was not laid off with much taste, nor was it large’”
While Bartram's landscaped botanical collection may not have been as aesthetically pleasing as Hamilton's, it was nevertheless effective; Washington, for all his distaste, still ordered plants from the Bartrams (Leighton 1976; Martin 1984; 1991; Sarudy 1998; Washington, Lear, and Biddle 1919), as did many others, including William Hamilton (Long 1991; [PHS] 1976; Wulf 2009). The fact that Bartram's Garden was doing business on two continents decades after Bartram's own death certainly indicates that he and his family were successful participants in the eighteenth and nineteenth-century botanical exchange.

Another advantage that Bartram had that made him a successful participant in the botanical exchange was labor; but unlike Hamilton, who hired gardeners to tend his plants, Bartram could keep his labor costs down by spreading the duties among his offspring as well as hired hands. Bartram had eleven children by two different wives, all of whom had enough basic botanical skills to aid their father in his plant business (Berkeley and Berkeley 1982; Hoffmann and Van Horne 2004; Wulf 2009). This free labor source meant that Bartram could run his plant business and still keep up his farm, and as his children got older, he was able to leave both enterprises in their hands while he went on increasingly extensive plant-hunting expeditions across much of the North American continent (Berkeley and Berkeley 1982; Jenkins 1933; Prince 1958; Scheick 1983; Wulf 2009). On some of the longer expeditions Bartram's fifth son, William accompanied him. As discussed in the previous chapter, William Bartram showed a great aptitude for botanical illustration, and became famous in his own right for the book he published about his and his
father’s last plant-hunting expedition, and for his accompanying illustrations (Prince 1958; Scheick 1983; Specht 2001; Stetson 1946; Wulf 2009). Bartram’s other children were also involved in the botanical trade; after their father’s death in 1777, William Bartram and his brother John Jr. took over the business, and were themselves succeeded by John’s daughter Ann and her husband, who managed Bartram’s Garden well into the nineteenth century (Harshberger 1899; 1924; Leighton 1976; McLean 1984; [PHS] 1976; Washington 1895b; Washington, Lear, and Biddle 1919; Wulf 2009).

Of all the necessary criteria for successful participation in the international botanical exchange of the eighteenth and early nineteenth centuries, the most crucial requirement for success was a connection to the international network of botanical enthusiasts for mutual encouragement, the exchange of botanical materials and other information about their care, the latest discoveries and experiments, and of course, the patronage of wealthy and influential fellow enthusiasts. Neither Hamilton nor Bartram could have participated in the international botanical trade without connections to both the local botanical community in Philadelphia and the larger transatlantic community.

Although both networks were crucial for success, it was the connection to their European counterparts that allowed Hamilton, Bartram, and others to enter into the world of European scientific discovery. Through their British contacts, the most successful American participants in this exchange were able to develop more contacts across Europe, in other botanical centers like Paris, Leiden, and Stockholm,
which allowed them to further their own botanical ambitions (Brockway 1979; Hobhouse 1997; Long 1991; Scheibinger 2004; Wulf 2009).

Hamilton’s status as a member of the colonial elite with family members in high political positions meant that he already had an entrée into the British world of upper- and middle-class families, many of who were also members of the international botanical community (Betts 1979; Jacobs 2006; Long 1991). Hamilton was able to draw on these contacts, which included family members still living in England and business contacts of his uncle James from the very beginning of his entrance into the world of international botanical exchange (Betts 1979; Jacobs 2006; Long 1991; Rasmusson 1966). Rather than having to go through an intermediary nurseryman in Philadelphia such as Bartram (though he did use them occasionally), Hamilton often wrote directly to friends and contacts in England to request the newest seeds and plants on the European market (Long 1991; Schlereth 2007; Smith 1905; Wunsch 2004). Direct access to the newest plants and seeds meant that Hamilton had a chance to earn fame and recognition as the first to introduce certain plant species into North America and increase his own reputation as a cultivator and collector.

Hamilton was also able to draw on these contacts to provide introductions to other members of the international botanical community, which came in hand during his visit to London between 1784 and 1786 (Betts 1979; Fussell and Long [1998–2009]; Jacobs 2006; Long 1991; Wunsch 2004). These introductions would have been necessary for Hamilton not only to further his acquaintance with fellow enthusiasts while in the city of London, but also key to his being able to visit some
English country estates to view their gardens and botanical arrangements (Betts 1979; Jacobs 2006; Long 1991; Schlereth 2007). Once Hamilton had established these further contacts within the international botanical community, he was able to draw on even more friends, agents, and plant suppliers for plants after he returned to Philadelphia, including an exchange with André Michaux of the Jardin du Roi in Paris, who sent him seeds and cuttings from his own extensive collection (Long 1991; Schlereth 2007; Wunsch 2004).

Hamilton’s extensive contacts within the international botanical community, including American leaders like Thomas Jefferson and George Washington, not only gave him access to the newest botanical specimens and information, it also increased his reputation and connected him to people in high places. Such contacts allowed Hamilton access to botanical wonders that other, less-well-connected individuals could not manage, such as the reception of materials from the Lewis and Clark expedition. Hamilton was one of the few individuals whom Jefferson trusted with their care and study (Cornett 2005; Fussell and Long [1998-2009]; Jacobs 2006; [PHS] 1976; Wunsch 2004).

For Bartram and other producers the connection to the international botanical community was of the utmost importance, because for them everything – their honors, fame, and successful participation in the botanical exchange – came from their connection to important and influential members of this community. From the very beginning Bartram’s success depended on the patronage of members of the international botanical community, beginning with his connection to James Logan, who lent him all the scientific books he wanted, and Joseph Brientnall, the
Secretary of the Library Company who first put him in touch with Peter Collinson (Bell, Jr. et al. 1959; Bell, Jr., 1997; Bloore 1935; Tolles 1957a; b; Wulf 2009).

Through Collinson, Bartram made important friends and clients of some of the most important and influential men in Europe, and not just in the botanical world. Sir Hans Sloane was one of Bartram’s European patrons; he not only bought Bartram’s seeds and plants, but also corresponded with him and sent him books and other tokens of his esteem, including an engraved golden cup that held a place of honor in Bartram’s collection (Berkeley and Berkeley 1982; Hoffmann and Van Horne 2004; Scheick 1983; Wulf 2009). Such connections not only guaranteed Bartram’s reputation among other botanists by bringing him more clients and fame, but also made it possible (financially and otherwise) for Bartram to concentrate more fully on his botanical interests and conduct increasingly extensive plant-hunting expeditions (Bartram 1992; Berkeley and Berkeley 1982; [PHS] 1976; Wulf 2009).

It was also through Bartram’s botanical contacts and patrons, especially Collinson, that he had some of his journals from his plant-hunting expeditions presented at a meeting of the Royal Society, and how he earned ever-lasting fame through honors and recognition for his devotion to botany and his plant introductions to Europe. Collinson and Logan, as well as other influential men in Britain were the ones who pleaded Bartram’s case before King George and helped him secure the title and salary of King’s Botanist in 1765, which would not have been possible without them (Jenkins 1933; Kinch 1986; Wulf 2009). Bartram’s correspondence with other important botanists outside of Britain, such as Linnaeus
and Gronovius, and led to lasting fame when a genus of moss (the *Bartramia*) was named after him (Cadbury et al. 1957; Jenkins 1933; Prince 1958; West 1954; Wulf 2009). Such an honor suggests that Bartram was a successful, and perhaps immortal, participant in the international botanical trade of the eighteenth century and a full member of the international botanical community.

*  *  *

Evaluating both William Hamilton’s and John Bartram’s experiences with, and participation in the transatlantic plant trade based on their interactions and activities during their lifetimes suggests that both men successfully engaged with their botanical colleagues across the Atlantic but found different ways of doing so. Although some of these different approaches and different experiences were due to access to resources, one of the major differences between their participatory experiences has to do with their different interests and the changing nature of the botanical trade itself.

When John Bartram first began his exchange with Collinson and other in the 1730s, there were very few individuals engaged in regular, transatlantic plant exchanges; North American botanicals were shipped across the Atlantic of course, but the trade was not organized, and depended heavily on the willingness and ability of individual correspondents to procure what they could lay their hands on and hope it survived the oceanic journey (Greene 1968; Parrish 2006; Wulf 2009). Also, this trade in the decades prior to the American Revolution was heavy with imperial overtones; Bartram and his generation primarily exchanged “raw” North American
materials – in this case, plants or observations of the American wilderness – for finished products such as European publications, finished goods, and other tokens of esteem (Collinson often sent Bartram cloth from his warehouse, and gifts for his wife and children along with botanical material) (Coats 1970; Darlington 1849; Greene 1968; Wulf 2009).

By the time that William Hamilton entered into the world of the transatlantic plant trade in the late eighteenth century, however, there had been a shift in the nature and direction of this trade. Although there seems to have been no real change in the trade between Britain and its former colonies after the American Revolution, the interest in botanical imports from the New World was not as frantic as it had been during – and partly because of – Bartram’s era (Greene 1968). By the time of Bartram’s death in 1777, the trade in New World plants was not only more regular, it was also dominated by independent “commercial dealers” and enterprising nurserymen such as John Lyon and Bernard McMahon, who became the primary means of bringing North American plants to European consumers (Green 1968: 29). Although there was still an impressive amount of botanical exchange occurring between individuals at this time, plant trade participants of Hamilton’s era could access greater varieties and quantities of plants from dealers such as Bartram, McMahon, or Landreth in Philadelphia, or Lyon and others in London (Green 1968; Hobhouse 1997; Harvey 1998; Wulf 2009).

A crucial difference between the participation and experience of Hamilton and Bartram in the transatlantic botanical exchange is related to the shift in the nature of the trade just discussed, but has to do more with the differing interests of
Hamilton and Bartram as individual participants. Bartram’s participation in this plant trade was primarily as an exporter of North American plants to Europe, and his interest was piqued originally by the bounty of nature in his immediate vicinity (Boyd 1929; Darlington 1849; [PHS] 1976). Although he did request and receive some plant materials from his correspondents, Bartram was primarily known to his contemporaries — and certainly remembered by later generations — for his introductions of North American species into Europe, and for his discovery and subsequent export of “new” species previously unknown to that continent (Darlington 1849; Hoffman and Van Horne 2004; Wulf 2009). Even his property on the Schuylkill, Bartram’s Garden, was arranged to reflect his primary interest in North American plants, with its recreated environments mimicking the original surroundings of botanicals discovered on his many expeditions. Carl Linnaeus’s praise of Bartram and his naming a genus of moss after him underscore the imperial tension of Bartram’s experience and interests: his focus was on American plants, but his fame, and ultimate success was dependent on European reception.

William Hamilton’s participation in the transatlantic plant trade and his subsequent legacy differ significantly from Bartram’s. Although Hamilton could possibly have chosen to participate in this trade as an exporter of American plants to Europe like some of his contemporaries, or even focus on the cultivation of primarily American species on his estate, as George Washington did at Mount Vernon (Wulf 2011), Hamilton chose a different path. He did indeed cultivate American species, but he also imported hundreds of foreign species from Europe and beyond to stock his gardens and greenhouse. Unlike Bartram, Hamilton’s
experience and lasting legacy in the transatlantic botanical exchange was as an importing consumer of non-American plants, and he is remembered primarily for his introduction into North America of several varieties including the Lombardy poplar, the gingko, the Norway maple, and the tree-of-heaven (Long 1991; Schlereth 2007; Wunsch 2004).

Hamilton is also remembered, like Bartram, for the botanical collection displayed on his Schuylkill River estate, but unlike Bartram’s Garden, which remains a botanic space even today, Hamilton’s legacy at The Woodlands evolved over time into something rather different: the eighteenth-century private estate became a nineteenth-century rural (and now urban) cemetery with its own important legacy in Philadelphia. When Hamilton died in June 1813, his eldest nephew, James inherited the estate along with all the debts Hamilton had incurred over the years in pursuit of botanical paradise. As was true of many of Hamilton’s fellow elites, he had been land rich but cash poor, and James’ own premature death in 1817 complicated the situation still further (Long 1991; Wainwright 1978; Wunsch 2004). James Hamilton died without a will or any immediate heirs, which left The Woodlands in the care of his four siblings still residing on the estate, his brother-in-law, James Lyle, and Lyle’s two daughters (Jacobs 2005; Long 1991; Wunsch 2004). Although the size of the estate had been significantly reduced to only 385 acres by 1813, the debts incurred against The Woodlands by Hamilton and his heirs made it impossible for them to continue in the lavish style and botanical devotion that had characterized their uncle’s tenure (Jacobs 2005; Kelleher 2009; Long 1991; Wunsch 2004).
James Hamilton’s family struggled and managed to hold on to the core of The Woodlands property, including the 92 acres that contained the mansion house, stables, greenhouse, and surrounding pleasure grounds, until 1827, when the financial strain became too great (Fry 1995; Jacobs 2005; Kelleher 2009; Long 1991; Wunsch 2004). In November of that year the property was seized by the Sherriff, and put up for sale (Fry 1995; Jacobs 2005; Long 1991; Wunsch 2004). It was immediately purchased by a Hamilton in-law, who then brokered the sale of the estate out of the family in January of 1828. The property changed hands several times over the next decade, finally coming into the hands of Eli Kirk Price and several other trustees of the newly incorporated Woodlands Cemetery Company in July 1840 (Fry 1995; Long 1991; Wunsch 2004).

The aim of the Cemetery Company was to convert The Woodlands into a rural cemetery retreat where families might enjoy a park-like atmosphere while visiting and remembering their relatives. Price felt that Hamilton’s original landscape design was a selling point for a cemetery, as the shaded walks and plantings could provide a refuge for future generations just as they had provided for their original owner (Fry 1995; Long 1991; Wunsch 2004).  

In the intervening 173 years there have been a few noticeable changes to the landscape of The Woodlands, including land appropriated by the city of Philadelphia.

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16 The creation of The Woodlands Cemetery Company in 1840 was part of a larger movement, known as the “rural cemetery movement” that swept both Europe and America in the mid-nineteenth century. The idea was born out of a confluence of social reforms, including the desire to remove cemeteries out of urban areas, and to create parks and other outdoors spaces as retreats from an increasingly unhealthy urban atmosphere (Long 1991; Wunsch 2004). For a more detailed discussion of the rural cemetery movement, see Long (1991) “The Woodlands: A Matchless Place” (Master’s Thesis, University of Pennsylvania), and Wunsch (2004) “Woodlands Cemetery Historical American Landscape Survey, HALS PA-5.”
Philadelphia for the construction of University Avenue in the 1930s and by the federal government for the construction of a Veteran's Administration hospital in 1947, along with other small pieces slated for use and construction of sewage and rail lines (Fry 1995; Long 1991; Wunsch 2004). Today the original 92-acre purchase has been reduced to approximately 54 acres, but elements of the long history of the estate are still present (Fry 1995; Long 1991; Wunsch 2004). Both the mansion house and original stables remain, and the area between them, which once held Hamilton’s greenhouse complex, and today contains the ruins of a nineteenth-century octagonal carriage house, is considered the “historic core” of the property, and has never been used for burials (Fry 1995; Long 1991; Wunsch 2004).

The importance of The Woodlands in both its present and its past incarnations has been recognized over the years by a series of local and federal designations. First granted a Philadelphia Historical Commission certification in 1956, the estate was elevated to national recognition eleven years later when it became a National Historic Landmark and was added to the National Register of Historic Places. Historic American Building and Landscape Surveys (HABS and HALS), undertaken in 2002 and 2004, respectively, led to the addition of the cemetery and estate grounds to federal recognition when The Woodlands became a National Historic Landmark System in 2006 (Kelleher 2009; Wunsch 2004).17 The local and federal recognitions of the historical significance of The Woodlands as a cemetery, mansion, and landscape are impressive statements of the importance of

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17 The HABS survey of The Woodlands mansion undertaken in 2002 and the subsequent report issued (Jacobs 2005) was actually an addendum to an original HABS survey performed in the 1930s (see Jacobs 2005; Long 1991; Wunsch 2004).
the property and its potential to provide new insights into the early history of Philadelphia and the nation (Jacobs 2005; Kelleher 2009; Wunsch 2004). The integration of Hamilton’s story with the story of The Woodlands Cemetery comes together in its landscape, and the ways in which multiple generations of visitors have experienced the site. In the next chapter, elements of these multilayered experiences are teased out through the analysis of the physical and material evidence from three seasons of archaeological work in the area of Hamilton’s greenhouse complex.
CHAPTER SIX: Archaeology at The Woodlands: The Search for Hamilton’s Greenhouse

Investigating William Hamilton’s participation in the transatlantic botanical exchange through existing documentary sources and comparison provides important insights into his experience with this exchange, but the documents reveal only part of the story. The individuals involved in this exchange – not to mention the actual items exchanged – did not exist solely on paper, but also had physical and material dimensions, and it behooves scholars to investigate the material aspects of participants’ experience alongside the evidence provided by extant documentary sources.

One of the ways to access the physical and material elements of this botanical trade and the experience of its participants is through the archaeological investigation of the physical sites of this exchange – the places where these imported or exported botanicals were cultivated, maintained, studied, and displayed. The archaeological excavation of William Hamilton’s greenhouse complex at The Woodlands brings the physical and material elements of the transatlantic plant trade back into the story, adding a crucial dimension to our understanding of the world of early American botany and the experience of individual participants. The investigation of the material setting of the heart of Hamilton’s botanical activities – the greenhouse complex – not only sheds light on the physical elements of his participation and the requirements of housing and maintaining a botanical collection, but it also reveals the larger contexts within which Hamilton’s actions and decisions were embedded. By combining the material evidence from three
seasons of archaeological investigation in the area of Hamilton’s greenhouse
complex with the rich documentary legacy of personal experiences within and
around this structure, we get a richer, more nuanced story of the botanical
participants of early America and their experiences with the transatlantic botanical
trade of the eighteenth and nineteenth centuries.

* * *

William Hamilton’s Greenhouse Complex at The Woodlands

The greenhouse complex constructed by William Hamilton at The
Woodlands in the late eighteenth century falls into the broader categories of
meaning and interpretation that have been applied to other investigated greenhouses
of early American elites, as discussed in the second chapter. It allows us a peek into
the botanical center of a consumer participant in a city at the center of the eighteenth
and nineteenth century plant exchange, whose collection had both private and public
components. The greenhouse complex at The Woodlands was the physical center of
Hamilton’s participation in the international plant trade, and in the botanical
community of Philadelphia. It was the place where all of his botanical efforts came
together, where he and his visitors interacted with the botanical network through the
plants he imported and raised in his greenhouse – a place that represented in
microcosm the experience of a participant in the botanical community, whose
physical layout provides insight into one man’s experience through the physical and
material examination of the space in which it all came together.
The sequence of construction and use of Hamilton’s greenhouse complex at The Woodlands as derived from the documentary evidence is complicated, as there were likely multiple botanic structures on the property. The earliest known reference to a greenhouse at The Woodlands comes in a letter from Hamilton to his secretary Benjamin Hays Smith, in September 1785 in which Hamilton asks for, among other things “the number of feet from the west wall of the House to east wall of the Green House at the Woodlands” (Hamilton to Smith, September 30, 1785). This mention of a greenhouse at The Woodlands predates the majority of other references to such a structure by three or four years, and also predates any mention of construction work on a building of this type by almost a decade. This has led other scholars to suggest that there was an earlier greenhouse closer to the main house, that predated the magnificent centerpiece of Hamilton’s landscape transformation after his return from England (Fry 1995; Long 1991; Smith 1905).

The existence of an earlier greenhouse structure close to the house with fit with the later documentary evidence from Hamilton and other visitors to the estate. A detailed description of The Woodlands landscape recorded by a visitor in 1806 mentions a “Spacious Conservatory about 200 yards to the west of the Mansion” (quoted in Long 1991: 48), along with other details that are reiterated by subsequent visitors to the estate. The distance between the house and greenhouse given above would seem to be large enough not to impact any expansion to the house, which was the primary reason for Hamilton’s questions about the distance in 1785, suggesting that a newer structure was erected to replace one that may have been torn down to accommodate renovations to the main house (Long 1991).
It is this second greenhouse structure that represented Hamilton’s most extensive period of botanical activities in the three decades between his return from England in 1786 and his death in 1813. Letters and accounts for the period of major construction at The Woodlands indicate that this second structure was built in 1792, but sections of it – or perhaps the earlier one – were in use by 1789-1790 (Fry 1995; Long 1991; Smith 1905). The construction of different parts of Hamilton’s greenhouse complex at different times would make sense, as the construction information from 1792 indicates that the entire structure was completed in a few months, which “was very ambitious” given the its final dimensions (Long 1991: 144).

In any case, the late eighteenth-century greenhouse at The Woodlands was completed and in use by 1793, and it dominated the surrounding landscape. It measured 140 feet in length, contained a sunken pond for aquatic botanicals, and, by one estimate, held as many as ten thousand plants (Fry 1995; Jacobs 2006; Long 1991; Oldschool 1809; [PHS] 1976; Schlereth 2007; Wunsch 2004). More accurately a greenhouse complex, this structure consisted of a central greenhouse section one and half stories tall, with full-length south-facing windows, and two hothouse wings attached to the east and west ends. Dimensions provided in a 1798 Tax Assessment survey confuse rather than clarify the construction, as they suggest that there is only one hothouse, rather than two. According to the Tax Assessment, the greenhouse measured approximately 65x24 feet, and the hothouse approximately 33x36 feet (Fry 1995; Kelleher 2009; Long 1991). Extrapolating from the tax assessment and other sources, the entire dimension of the greenhouse
complex (with two hothouses) comes to 131 feet, which is close to other period descriptions. The differing widths for the greenhouse and the hothouse(s) suggest that the hothouses may have been in the “lean-to” style popular in the late eighteenth and early nineteenth centuries (see figure 10), and also match the outline of the structure drawn in 1843 (see figure 17). Letters from Hamilton to Smith indicate that the hothouse was heated by a flue system that carried hot air along the back (north) wall of the structure, and that there may also have been a fireplace for the greenhouse to raise the temperature in that space “during severe weather” (quoted in Long 1991: 126).

There are only two known images of Hamilton’s greenhouse complex made prior to its destruction in the mid-nineteenth century, but neither provides much detail. However, there are a few surviving descriptions of this building from visitors privileged enough to have seen the complex at the height of its operation. The most detailed description comes from the diary of Dr. Charles Drayton, which he composed after his visit to The Woodlands on November 2, 1806:

“The Conservatory consists of a green house, & 2 hot houses – one being at each end of it. The green house may be about 50 feet long. The front only is glazed. Scaffolds are erected one higher than another, on which the plants in pots or tubs are planted, so that it represents a declivity of a mountain. At each end are Step-ladders, for the purpose of going on each Stage to water the plants -- & to a walk at the back-wall. On the floor a walk of 5 or 6 feet extends along the glazed wall. & at each end a door opens into an Hot house – so that a long walk extends in one line along the Stove walls of the houses & the glazed wall of the green house.

“The Hot houses, they may extend in front I suppose 40 feet each. They have a wall heated by flues -- & 3 glazed walls & a glazed roof each. In the center, a frame of wood is raised about 2 ½ feet high, & occupying the whole area except leaving a passage along
by the walls. In the flue wall or adjoining, is a cistern for tropic aquatic plants. Within the frame, is composed a hot bed; into which the pots & tubs with plants are plunged. This Conservatory is said to be equal to any in Europe…” (Drayton 2 November 1806; quoted in Long 1991: 50; Wunsch 2004: 33). 18

A sketch he made of this structure accompanies Drayton’s description, but it does not add any other details to the written account. The only other extant image of Hamilton’s greenhouse complex is an outline of its location and dimensions given in an 1843 survey completed by The Woodlands Cemetery Company (figure 17). Although not greatly detailed, this 1843 representation shows the extension of the east and west hothouse wings mentioned in Drayton’s description, and suggests that the general footprint of the structure was not significantly altered between Hamilton’s tenure on the estate and the first few years of the Cemetery Company’s operation.

This is not to say, however, that the greenhouse complex remained unchanged from 1806 onward. When the Cemetery Company took charge of The Woodlands in the 1840s, the estate had suffered a fair amount of neglect, no doubt owing to its having passed through several different hands between 1828 and 1840. A visitor to the site in late 1839 noted that “the greenhouses and hothouses [had] fallen in and decayed” (H. 140: 201), but the Cemetery Company had plans to revive the space. By May of 1840, two Philadelphia nurserymen, Messrs. Hirst and

18 Dr. Charles Drayton’s unpublished diary is now owned by the National Trust for Historic Preservation, which owns and operates Drayton Hall, Charles Drayton’s home in Charleston, South Carolina. When Long first came across this diary in his research on The Woodlands, it was in a private collection, and the owners asked that Long withhold the identity of its author, which is reflected in his endnotes (see Long 1991:395n). Quoted material from this source is from a typed transcript of the November 2, 1806 diary entry.
Dreer, had reached an agreement with the Cemetery Company to repair Hamilton’s greenhouse complex and use it for their own seed and plant business (Fry 1995; H. 1840; Long 1991; Wunsch 2004). This venture was short-lived, however. As the cemetery business took off in the 1840s and 1850s, the landscape priorities at The Woodlands shifted, and the botanical business in the greenhouse complex lost steam. Finally in 1854, with the structure almost sixty years old and showing its age, the Cemetery Company decided to demolish it and erect an octagonal carriage house in its place – the remains of which still stand today (Fry 1995; Long 1991; Wunsch 2004).

Although there are no detailed images of Hamilton’s greenhouse complex while it stood, the two that do exist, coupled with descriptions provided by Drayton and other visitors, provide enough information to compare this structure to two other early American greenhouse complexes – one still extant, the other documented – for clues as to how Hamilton’s may have appeared during its heyday. The Wye House Orangery, located on the Wye House plantation in Talbot County, Maryland is the only extant example of an eighteenth-century greenhouse in the Chesapeake region, and one of the best preserved in the Americas (Chesney 2009; Fry 1995; Kelleher 2009; Pruitt and Skolnik 2013). Constructed in two separate phases almost thirty years apart, the current appearance of the orangery, with its tall central section (originally built in 1755), and two single-story wings (constructed between 1781 and 1784) provides a representative example of this form of greenhouse complex and how such a structure might have sat on the landscape (Chesney 2009; Forman 1967; Fry 1995; Kelleher 2009). Although the Wye House Orangery predates the
greenhouse complex at The Woodlands constructed in the last years of the eighteenth century, its form and outline match the general description of The Woodlands complex, and as one of the few extant examples of this kind of structure in the United States, provides an important comparison.

The greenhouse complex at the Elgin Botanic Gardens in New York that existed during the first two decades of the nineteenth century provides an even more instructive idea of how Hamilton’s complex may have looked, as the design of the Elgin structure is directly linked to the Hamilton’s greenhouse complex at The Woodlands. In 1803, two years after purchasing the lands for his botanic gardens,
David Hosack, medical doctor and professor of botany at Columbia University, wrote to Dr. Thomas Parke, one of William Hamilton's close friends, about his plans for the Elgin gardens: “I duly received the plans of Mr. Hamilton's Green and Hothouses...My Green House is already erected and is now finishing – it will not differ very individually from Mr Hamiltons” (Hosack to Parke 25 July 1803; Kelleher 2009; Kornwolf and Kornwolf 2002). Although Hosack states that his greenhouse was close to complete by the time he writes to thank Parke for passing Hamilton’s plans, his statement that the Elgin greenhouse will look similar to Hamilton’s provides yet another potential example of what Hamilton’s may have looked like – as well as confirmation that Hamilton’s complex was much admired and provided a suitable example for public gardens.

Figure 10: View of the Botanic Garden at Elgin, in the vicinity of the City of New York. Courtesy of the New York Historical Society.
Hamilton’s greenhouse complex was located at the center of The Woodlands estate, near the main house, and was the crowning glory of a winding garden walk through ten acres of landscaped grounds meant to drop the visitor suddenly in full view of its southern façade (Betts 1979; Fry 1995; Long 1991; Notes and Queries 1884; Oldschool 1809). From the time of its completion until Hamilton’s death in 1813, the greenhouse complex was a massive undertaking, full to bursting with exotic blooms that attracted visitors from all over, and was praised by both casual visitors and botanical devotees (Betts 1979; Jacobs 2006; Jefferson 1944; Long 1991; Notes and Queries 1884; Schlereth 2007). After Hamilton’s death, his heirs struggled to maintain the landscape and greenhouse, but by 1840, when the newly created Woodlands Cemetery Company acquired the property, the greenhouse had fallen on hard times. An article in the *Magazine of Horticulture* from June 1840 includes a visitor’s description of the greenhouse as a derelict site as late as October 1839 (H. 1840). It is interesting to note that the author of this piece describes only a single hothouse as being “about forty feet in length, and divided into an upper and lower apartment, being about 25 feet in width” and goes on to refer separately to “the conservatory” as being “on the old system” (H. 1840: 202).

Whether this description represented changes made to Hamilton’s original structure between 1813 and 1840, or a confusion on the part of the author is hard to say, but as the authors does on to state that Hirst and Dreer plan to construct “new houses the coming season” it seems reasonable to suppose that only one hothouse and conservatory were in working condition, since the original 140-foot structure would seem to be ample space for a nursery garden (H. 1840: 203). Further
corroboration of this interpretation is suggested by the subsequent decision by the Cemetery company to demolish the greenhouse in 1854 due to its being in disrepair (Fry 1995; Long 1991; Wunsch 2004). Although the nurserymen could conceivably have let their space disintegrate during their tenure, it is equally possible that the state of disrepair referred to another, perhaps unused, section of the greenhouse that continued to fall apart, and added to the increasingly dilapidated appearance of the structure. The implications of this interpretation for the archaeological discoveries will be discussed further in the next section.

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Archaeology at The Woodlands

Although The Woodlands has been of interest to architectural historians and preservationists since the early twentieth century, it has only been the subject of archaeological inquiry in the last thirty years. Joel Fry of Archaeological and Historical Consultants for the University City Historical Society conducted the first systematic archaeological study of The Woodlands in 1993. Financed through a grant from the Historic House Museum Challenge Grant Program, Fry’s survey explored the archaeological integrity of the historic core of The Woodlands to determine whether there were any preserved archaeological features near the mansion, stables, or carriage shed ruins (see figure 11) (Fry 1995; Kelleher 2009; Weinberg and Lawrence 2006). Fry excavated a series of shovel test pits northwest and east of the nineteenth-century carriage shed, along with two separate 5x5-foot
test units: Unit 1 was sited four feet east of the mansion’s south portico, while Unit 2 was placed adjacent and east of the carriage shed ruins.

Fry’s shovel test pits revealed both historic and precontact artifacts indicating a lengthy history of human occupation of the site (Fry 1995; Kelleher 2009; Weinberg and Lawrence 2006). The two test units produced a similar range of artifacts, along with several notable Hamilton-era features including evidence for the original portico stairs (Unit 1), and an unidentified brick and mortar feature (Unit 2) likely related to Hamilton’s greenhouse complex (Fry 1995; Weinberg and Lawrence 2006). Fry’s discovery of this brick and mortar feature in Unit 2, although not clearly identifiable, was enough to indicate that features related to the greenhouse were preserved below the cemetery occupation and warranted further testing (Fry 1995; Kelleher 2009; Weinberg and Lawrence 2006). The area around Unit 1 was expanded and investigated again in 2005 by A.D. Marble and Associates to look for evidence of former stairs associated with the south entrance to the mansion, but no additional work was undertaken near Unit 2 (Weinberg and Lawrence 2006).

In the spring of 2009 curiosity and interest on the part of The Woodlands Cemetery Company led to further excavations by the nineteenth-century carriage house ruins. Dr. David Orr of Temple University and students in his Historic Sites class excavated two 3x3-foot test pits southwest of the greenhouse complex on an elevation break along a shallow ravine. The test units were situated approximately eight feet apart along a north-south axis (Kelleher 2009). Although the northern test pit showed signs of disturbance, containing evidence of trash burning and dumping,
the southern unit displayed a more natural stratigraphy. Both test units contained greenhouse-related material, including hand-thrown rounded rim flowerpot sherds and square-cut nails, but unlike Fry's unit from 1993, there was little to no fill, and artifacts were present immediately below the current ground surface (Kelleher 2009). The combined results of Fry's and Orr's surveys suggest that although the greenhouse complex is no longer standing, the archaeological integrity of the area had not been irredeemably compromised by any modern construction or landscaping activities, and the area surrounding the greenhouse foundation remains potentially significant and viable for a larger-scale excavation.

With this potential in mind, Dr. Orr, his doctoral student Deirdre Kelleher, myself, board members and staff of The Woodlands Cemetery Company gathered in early 2009 (prior to the small-scale testing by Orr and his students) to begin planning some larger-scale testing of the area east of the ruins of the nineteenth-century carriage house in the general location of Hamilton's greenhouse complex. The plan for the 2009 summer excavation called for an exploratory trench near the projected south wall of the greenhouse complex based on conjectural drawings and earlier archaeological testing done in the same area (Fry 1995; Kelleher 2009; Long 1991; Weinberg and Lawrence 2006). The goal was to locate Joel Fry's original Unit 2 containing the brick and mortar feature, and then expand outward from that feature to figure out how it related to the greenhouse complex and the overall landscape design of the estate.
In May 2009, a three-week exploratory excavation was opened just east of the carriage house wall. It was clear from the earlier 1993 excavations that the Hamilton-era occupational layer lay beneath a solid five-to-six feet of mostly sterile fill relating to various phases of construction and landscaping performed under the auspices of The Woodlands Cemetery Company (Fry 1995). Given the time and budget constraints of the project, it seemed prudent to narrow the focus of the investigation from the planned 20x20-foot gridded area to just the eastern 10x10-foot unit (Unit 2), and within that, to focus primarily on the western half of the 10x10, creating a 10x5-foot exploratory trench.
Excavation proceeded by manual stratigraphic methods, with depths and distances recorded in tenths of feet. Layers, features, and artifacts were recorded in specific written descriptions, scaled photographs, and drawings. Analysis of the recovered material was limited to the strengths of the principal investigator, and based on the research questions outlined in the original project meeting. Field and laboratory work was carried out by graduate and undergraduate student volunteers from Temple University, and by myself as principle investigator.

Two and half weeks of excavation through mostly sterile layers of nineteenth- and twentieth-century Cemetery fill exposed what appeared to be the Hamilton-era occupational ground surface approximately five and a half feet below grade. Immediately above this potential occupational level was a six-inch thick layer of brick and mortar rubble containing window glass fragments and other construction materials, including a variety of iron nail fragments, and likely related to the destruction of the greenhouse complex in the 1850s. There was also a small oval ash feature in the northeast corner of the trench that was absent of artifacts, and while suggestive, does not seem to be large enough or deep enough to be accumulated ash from a greenhouse heat source. Below this feature along the eastern wall of the trench was a linear brick bed, and a deliberate placement of large stones in the northern 5x5. Removing the three smaller stones revealed that they covered a circular opening about two feet in diameter surrounded by angled brick and mortar that appeared to be a vertical access hole to a large brick and mortar cistern (figure 12).
Figure 12: Photo of brick cistern by Jesse West-Rosenthal, June 2009. Used with permission.

The cistern is cylindrical in shape, with walls that slope up toward the opening in the top of the chamber, similar to the shapes seen in early pharmaceutical bottles (see Noël Hume 2001: 72, no. 10). The chamber itself is about 8 feet in diameter, 10 to 12 feet deep, and the inner surface of the cistern appears dark, but whether this is due to organic growth (mold) or the original facing of the material is hard to say. The details of the interior of the cistern, including its depth, are approximate, as there was no safe way of lowering an excavator into the feature to take samples or measurements. There also appeared to be a few access holes for pipes or something similar that would likely empty into the cistern located near the floor in two places along the eastern half of the interior wall.
The discovery of a previously unknown cistern in close proximity to the location of Hamilton's greenhouse complex was entirely unexpected, as there was no indication in the extant documents that any such structure existed. The presence of such a feature is not particularly surprising, however, given that the greenhouse complex held several thousand plants, including aquatic varieties (Boyd 1929; Lockwood 1931; Long 1991; McLean 1984; Madsen 1989; Oldschool 1809; PHS 1976). Such an extensive botanical collection would have required a large quantity of water on a regular basis, so constructing a cistern right near the building would certainly make caring for the greenhouse plants much easier.

But where did the water for the cistern come from? What appeared to be openings for pipes near the bottom of the structure could be seen heading north and east, but the angle of the opening was such that any higher opening along the shoulder of the cistern was impossible to make out. Although there is documentary evidence that Hamilton had an icehouse to the northeast of the greenhouse that may have drained into the cistern through these pipes (Timothy P. Long, pers. comm. 2009; Long 1991), their placement along the bottom edge of the cistern rather suggests that they may have been for draining water from the cistern rather than filling it up. Pipes heading north from the cistern may have led to the greenhouse itself.

Another possibility is that the openings into the cistern were for pipes bringing water from a nearby stream or other source. In the June 1, 1815 issue of *Poulson's Daily Advertiser*, James Hamilton, nephew of William, and at the time, owner of The Woodlands, is mentioned as
"Completing a plan, begun by his late uncle, for conducting the water of a spring or springs, from a considerable distance, into his garden. A number of pipes (wooden) have been laid and covered some years – there were two ranges of pipes each from a spring distant from the other, finally uniting in one conductor... generally laid several feet underground – each log from eight to ten feet long, and joined in the usual manner" (*Poulson’s Daily Advertiser*, June 1, 1815; quoted in Long 1991: 173)

Whatever the sources, then, it seems that Hamilton, and later, his nephew, constructed systems to move water from one area to another, and given Hamilton’s obsession with his greenhouse plants and their need for constant water close at hand, it is likely that the openings in the cistern were once connected with this wooden pipe system. The presence of these pipe connections also confirm that this feature is in fact, a cistern, rather than well, which would not require pipes or other devices to fill its area, or indeed, would it be likely that anyone would construct such openings near the bottom of a well, as that would defeat the entire purpose of such a structure.

In the late spring of 2010 we returned to the site of the previous year’s discoveries for a second season of excavation. The goal for this season was to expand the original area north and east of the cistern to search for the greenhouse foundation. Given the amount of time spent excavating through large areas of sterile fill in 2009, the excavators decided to employ mechanical excavation techniques to remove the top layers of fill, including the thick layer of sterile clay that dominated the previous excavation season. Accordingly, on May 8, 2010, an entire 10x10-foot unit was opened just north of the 2009 excavation (see figure 13). Thus the 2010 site included one 10x10 foot unit directly north of the unit laid out in 2009 (Unit 2).
In the western half of the northern 10x10 (Unit 3) mechanical excavation revealed the expected thick layer of sterile clay fill, which was removed to a depth of about four feet. The removal of this clay fill exposed a five-to-six-foot wide area of redeposited fill in the western wall of Unit 3 about 2.5 feet north of the cistern opening, which is almost certainly Joel Fry's original Unit 2 dug in 1993. Locating Fry's test unit had been one of the original goals of the project, and finding it just north of the cistern suggests that the brick and mortar feature found by Fry in the southwest corner of his unit is almost surely related to the greenhouse complex.
itself, rather than the brick and mortar path described by Drayton in 1806 (Fry 1995; Long 1991).

In the eastern half of Unit 3, instead of sterile yellow clay a reddish-brown (5YR4/3) silty gravel later was revealed, which sloped upward toward the northeast corner of the unit. This same gravel fill was seen in the 2009 excavation just below the topsoil, and consisted primarily of larger stone and gravel, with some scattered brick fragments and almost no artifacts. As this was clearly not the thick layer of sterile clay found in the western half of Units 2 and 3, the mechanical excavation was halted immediately, and the excavation of this red gravel fill proceeded by hand. As excavation continued it became clear that this red gravelly fill continued into the unit from the eastern wall until it met the sterile yellow clay later about three feet in from the western wall (figure 14). Artifacts recovered from this layer were minimal, and included two whiteware sherds, seven iron nail fragments, and twelve pieces of window glass. The location and matrix of this layer suggest that it dates to the nineteenth century, and might in fact be related to one of the landscape improvement campaigns conducted by the cemetery company in the 1880s (Wunsch 2004: 74).

Below this layer of red gravel fill the excavators found the same yellow clay layer seen in the western half of Unit 3 and in the 2009 trench, except that it contained a small number of artifacts. Fragments of pressed glass, sherds of utilitarian yellowware and undecorated pearlware, a copper alloy button, and 70 iron nail fragments, (including several identifiable square-cut nails) were recovered. The presence of artifacts in the seemingly sterile clay layer was disconcerting at first, but
a possible explanation soon emerged. The yellow clay did not completely underlie the total area of the red gravel; instead it began about .5 feet in from the eastern wall of Unit 3, where it was only .1 foot thick, and proceeded to descend into the unit, increasing in thickness as it spread westward, finally becoming 2.8 feet thick in the northwest corner of Unit 3 (see figure 14). This clay layer sloped significantly, and as its consistent and mostly sterile matrix suggested an intentional deposit, the slope (which was less prominent in the preceding layer) implied that it was overlaying subsequent sloping layers. In the very northeast corner of Unit 3, directly under the red gravel fill in the corner but found to be below the yellow clay fill throughout the rest of the unit, was a dark mixed rubble fill (10YR 5/6). This dark mixed rubble fill turned out to be a considerable deposit, stretching almost seven feet along the eastern wall of Unit 3 and extending another 7.05 feet into the center of the unit on a slope, with a maximum thickness of 1.6 feet (figure 14).
The shape of this deposit, coupled with the loose soil, steep slope, and large numbers of artifacts suggest that it was a midden of some kind, filled with a combination of artifacts related to the operation and subsequent destruction of the greenhouse as well as what appears to be domestic trash, possibly from the main house and/or subsidiary buildings. A total of twenty-four 12x15-inch, 3mm bags of archaeological material were recovered from this layer, including large numbers of oyster shells and some clam shells, other faunal material from large and medium sized animals, window and bottle glass, as well as glass from ornaments or table wares, pipe bowls and stems, copper wire, iron fragments and nails, and large amounts of unrefined utilitarian ceramics and refined decorated table wares.
characteristic of late eighteenth/first half of nineteenth-century deposits. The ceramics included, besides examples of both hand thrown and wheel turned redware flowerpots, a variety of lead-glazed earthenware sherds from milkpans or other utilitarian vessels, pieces of Chinese export porcelain, large amounts of shell-edged, transfer-printed, and polychrome pearlware and whiteware, sherds of banded mocha ware, and other local ceramic varieties.

By far the largest category of material recovered from the midden was metal, which although the assemblage included a few pieces of copper alloy wire, rings, a fastener for clothes, and a few small pieces of lead, the vast majority of recovered metal consisted of corroded iron. Much of this corroded iron was in the form of small fragments, possibly nails, but there were also a number of identifiable iron spikes, some flat pieces of iron, and numerous identifiable square cut nails. The combination of late-eighteenth and first-half-nineteenth-century ceramics, along with the presence of glass tableware and square cut nails strongly suggests that this midden was in place by the time of the seizure and auction of The Woodlands estate via sheriff’s sale in 1827, around the time when the Hamilton family would have ceased living on the property and likely cleared out the mansion (Fry 1995; Jacobs 2005; Long 1991; Wunsch 2004).

As very few capital improvements were undertaken at The Woodlands between the Sheriff’s sale in 1827 and the beginning of the Cemetery Company’s reorganization of the property in 1839 and 1840 (Wunsch 2004), it seems likely that this midden would have remained open, and possibly used during the 1830s, perhaps through the demolition of the structure in 1854. The visit of “H” to The
Woodlands in 1840, although not conclusive, is certainly suggestive. "H" writes of the contrast between the appearance of "the greenhouses and hothouses fallen in and decayed" as witnessed in October 1839, with the improved appearance of these facilities the following spring, but only describes entering one hothouse in which the author "perceived a large collection of cacti" (among other plants), mentions the "conservatory" being "on the old system," and finally mentions the "green-house" which "was a perfect blaze of flowers" (H. 1840: 201-202).

Although it is possible that the author here describes the three separate elements of Hamilton's original greenhouse complex (a central greenhouse with two hothouses) using differing terminology for each section, it seems more likely that "conservatory" and "green-house" are used to describe the same area; namely, the central unheated portion of Hamilton's complex. While "H." uses three different terms, he only provides dimensions for two buildings, describing the "hot-house" (singular) as being "about 40 feet in length and divided into an upper and lower apartment, being about twenty-five feet in width" (1840: 202). The conservatory is described as "over eighty feet long" (1840: 202), but no separate dimensions are given for the "green-house," which could also refer to the overall structure. If this is the case, and H. describes only one hothouse and the central section in operation, then the midden could be in the unmentioned – and perhaps unimproved or repaired – section of Hamilton's greenhouse, first described by H. in the earlier visit in October 1839, which includes mention of "hot-houses" in the plural. This would explain the mix of greenhouse-related artifacts in the midden alongside domestic household material.
As intriguing as the material discovered in this midden and its implications is the shape and existence of the feature itself. The sloping shape of this rubble deposit suggested that there might be an architectural feature below it (i.e. something against which this rubble mound had formed, or alternately, something that was keeping the rubble from spreading any further west). Unfortunately, the depth of this feature made it impossible to explore this possibility in the time remaining of the five-week excavation. Rather than leave the excavation with so many unanswered questions, I came back by myself for three weeks in August and September to further explore this deposit and the area just north of the cistern. The goal for a short, secondary field season was to expose the northern wall of the cistern and to investigate what might lie below the midden to cause its steep slope from east to west.

The excavation of Unit 3 resumed in mid-August 2010, beginning with the exploration of the area just north of the cistern. The starting point was the northern half of the cistern roof, which was exposed by working back towards the northern end of the unit from the southern boundary with the 2009 trench. Removing a mix of red gravel and tan clay with mica (the same soil matrix discovered directly over the southern shoulder of the cistern in 2009) fill along the eastern edge of the cistern revealed a row of bricks mortared into the slope of the cistern roof. I continued pulling back the gravel and clay mix until it became just the sterile yellow clay fill, about four feet north of the southern edge of the unit. The removal of this fill revealed that the bricks mortared into the cistern formed a drain, which leads north through Unit 3.
This drain is composed of coursed brick and marble fragments mortared to form a rectangular channel, with a single brick across the top to form the roof of the drain. The drain follows the slope of the cistern wall, beginning with one course at the neck of the cistern, and extending north along the shoulder of the tank to a full six courses. Once past the actual body of the cistern the drain is less well preserved: only the southern three feet of the drain have the top brick; after six feet, only the bottom of the drain channel exists, and further north there is only a large indiscriminate mortar scatter. Very few artifacts were recovered above the cistern and drain; with the exception of a few shards of window glass and brick and mortar fragments recovered from around the features themselves, the yellow clay fill remained sterile until the brick features were exposed.

The discovery of a drain to the cistern indicates the complexity of water management that Hamilton employed in his greenhouse complex and provides physical evidence for the large-scale irrigation/drainage system in use by Hamilton.
and his nephew, but the layout of the complex itself was still unclear. Was this upper drain for filling the cistern, while the lower openings seen in 2009 served to drain it? Where does this upper drain lead? Does it head down from Hamilton’s icehouse, or into the greenhouse for the plants? Given the length and direction of the drain, where, exactly is the greenhouse? Is this drain inside or outside the structure? What was needed was to find a foundation wall of some kind to help clarify the orientation of the buildings. So the excavation was expanded eastward from the cistern drain towards the midden looking for other greenhouse features. About one foot east of the brick drain was a large piece of Pennsylvania fieldstone, and upon widening the exploratory trench it was discovered to actually be a number of fieldstone pieces mortared together and forming a straight southern edge about four feet south of the northeast corner of Unit 3, and just west of the edge of the midden.

The excavation followed this fieldstone feature eastward until it hit the midden deposit. At that point a small trench in the rubble mound was opened up about 1.5-2 feet wide in line with the stone feature to see what lay directly under the rubble. Immediately below the artifact-heavy layers was a layer of brick and mortar rubble that also contained a high concentration of window glass. Removal of the rubble layer revealed brick in course mortared directly on top of the fieldstone to form a brick and stone foundation typical of the period (Joel T. Fry 2010, elec. comm.). Although the preservation of this foundation varies, it seems to have been well made originally, with both brick and stone placed neatly to form precise lines and angles. The foundation itself is a brick and a half wide (about 16 inches), with at least three brick courses above two stone courses. The entirety of the feature is only
a little over three feet in length, extending west from the eastern wall of Unit 3 and stopping abruptly about a foot short of where it would have intersected the cistern drain. The location of this foundation, along with the presence of the brick, mortar, and glass rubble above it strongly suggest that we have — at last — located a section of Hamilton’s greenhouse: most likely part of the southern, or front, foundation of the easternmost hothouse wing.

Figure 16: Image of Unit 3 excavation, showing foundation section, above, and brick drain, below. August 2010.

Finding both a section of the greenhouse foundation and a cistern drain at the end of the 2011 season helped to clarify the original layout of these features, and their relationship to one another on the landscape. But the foundation itself raised some questions, as it seems to end abruptly about one foot east of where it would
have intersected with the cistern drain (about three feet in from the eastern wall). It is possible that the foundation did originally continue to the drain and beyond, but either the brick and stone elements were removed at some later time, or were differentially preserved and crushed under the subsequent filling-in of the area by the Cemetery Company in the mid-nineteenth century (Fry 1995; Long 1991). The existing foundation does in fact line up with a trench feature found by Joel Fry in his 1993 test excavation (Fry 1995; 2010 pers. comm.), which could indicate that the foundation did continue, and may have arched over the cistern drain without leaving any indication of its presence in the surrounding soil.

However, it is clear from the survey map of The Woodlands from 1843 and surviving documentary descriptions that the greenhouse complex was of varying widths along the southern elevation, and that in fact the easternmost wing is not symmetrical, but is instead inset from the northeast corner (figure 17). The C-shaped outline on the map indicates that the east and west hothouses were of the lean-to style popular with gardeners of this period (see figure 10), and a break in the foundation could possibly indicate where one of the hothouse wings met the central greenhouse section. This would be consistent with Drayton’s description of the hothouses as “extend[ing] in front...40 feet each” (quoted in Long 1991:50; Wunsch 2004: 33), as well as with the dimensions given in the 1798 Tax Assessment (Fry 1995; Long 1991).

Given the location of the greenhouse and its relation to the 1993 and 2010 excavations, however, it seems likely that this foundation relates to the easternmost section of the complex, and could therefore be related to the jag in the building’s
perimeter as shown on the 1843 plan (figure 17). But as there is only three feet of this foundation present in Unit 3, it is impossible to say for sure what section of the foundation it represents until the feature can be chased further eastward. The discovery of this three-foot foundation section brought the second 2010 excavation season to an end, and plans were made to return for a third season with the goal of tackling some of the looming questions about the placement of these features on the landscape and their physical and symbolic relationship to one another.

Given the angle and direction of this foundation section (running east to west), there are three possible parts of the greenhouse complex to which it could belong. Based on the plan outline of the greenhouse complex from 1843, it could be
part of the northern foundation wall, the southern foundation wall, or the short jag in
the foundation seen in the eastern wall. Although any section would be equally
plausible, determining which section of foundation wall was revealed in 2010
awaited more specific spatial clues that referenced not only the Hamilton-era
features of the landscape, but also provided enough information about other
modern-day landscape features. Such information would help orient both the
foundation to the larger landscape and, from the foundation, illuminate the physical
relationship between the greenhouse and the cistern and drain system.

In 2011, the archaeological crew returned for a third and final season of
excavation, with the twin aims of exposing more of the features discovered in 2009
and 2010, and of expanding the excavation eastward to chase out the foundation
discovered the previous summer. The summer and early fall of that year had seen
several severe rainfalls in the Philadelphia area, with about 20 inches of rain in
August alone (Callahan 2011). The effects of the unusually wet weather were felt all
over the region, including at The Woodlands where the saturated earth caused a
partial collapse of the western wall of the 2010 excavation area: the section of
backfill from Joel Fry’s original 1993 test unit.

Removing the collapsed fill had not been in the original plan for the fall of
2011 and it forced a setback on other stated goals for the season. But it proved to be
fortuitous, as it provided a chance to pull back more of the sterile clay fill at the
bottom of Unit 3 and expose more of the northern side of the cistern towards the
1993 backfill. In so doing, another discovery was made: a second covered
rectangular brick drain, just like the one discovered in 2010, connected to the
shoulder of the cistern, and heading diagonally northwest (figures 18 and 19). The
direction of this drain not only suggested it was heading to another section of the
greenhouse complex, but the angle of its curve and the composition of materials
matched that of the brick and mortar feature that Joel Fry had discovered in 1993
(figure 19).

Figure 18: Photo of north side of cistern showing both brick drains. August 2011.
Unfortunately, the removal of the collapsed fill from the west wall of Unit 3, although it did reveal a new features by necessitating the removal of more of the yellow clay fill between the cistern and the west wall, also affected the original plans to expand the excavation area eastward from Unit 3 to chase out the foundation. The timing of the collapse and the lack of a full crew, along with the continuation of wet weather resulted in an abortive excavation of the unit laid out directly to the east of Unit 3 (Unit 4). Although I was only able to descend approximately 1 foot across Unit 4, the various layers match up to the layers seen in the excavation of Units 2 and 3. This included both a layer of bright yellow clay with mica (10YR 4/6), which appeared as a lens in Unit 2, as well as successive layers of red and dark brown gravel fills likely related to late nineteenth or early twentieth century cemetery construction (Fry 1995; Long 1991; Wunsch 2004).

Of note were two discoveries in this unit: the first was a sizeable collection of large animal bones including pieces of long bone and large joints, which were
discovered in the northwest corner of the unit right at the transition between the reddish black gravel layer and the yellow mica lens. Farther to the west, in the same layer of red gravel fill, an odd-looking copper alloy item was found, which was subsequently identified as a bell-pull that connected one set of wires with another in order to reach household staff across different floors of the house. The identification of this artifact was verified by the discovery of another pull still in place in the attic of the mansion (figure 20).

Figure 20: Copper alloy bell-pull, from excavation, left, and another still in place in the attic of the Hamilton mansion, right. September 2011.

The bulk of the 2011 season was spent on the wall cleanup and exposing the northern side of the cistern. The discovery of a second drain connected to the cistern complicates the physical understanding of the landscape of the greenhouse, instead of determining the location of these features in relation to the 1843 greenhouse plan. But it does offer some important clues. First of all, locating this feature allowed us
to confirm its location on the modern landscape relative to Fry’s 1993 excavation, and add the features discovered between 2009 and 2011 onto his map (figure 13). Adding these discoveries to Fry’s map provides a sense of our location in the landscape, but as Fry’s map only showed the outline of extant features, it did not provide any indication of where exactly these features fit into Hamilton’s greenhouse complex. But architectural historian Timothy Long, whose master’s thesis on the development of The Woodlands (1991) has been the source for much of the current interpretation and understanding of the site (see, for example, Fry 1995; Kelleher 2009; Wunsch 2004), including the basis for information used in the Addendum to the HABS report (Jacobs 2005), and the HALS survey (Wunsch 2004) created as a sketch composite map showing the relative locations of earlier features (including the greenhouse complex and Hamilton-era paths) superimposed onto Fry’s 1995 map (figure 11).

Although this composite map would seem to solve the spatial questions about how the cistern, drains, and foundation related to each other and the greenhouse, it does not. First of all, Long’s additions to Fry’s original map are sketches only, and while they may be generally correct, the lack of included details – the jag in the eastern greenhouse wall seen in the 1843 map is absent in Long’s sketch – present a problem for interpreting specific features on the landscape. Another limit to this composite drawing has to do with where it locates Fry’s 1993 Unit 2. Although Fry’s depiction of his dig is measured and mapped onto extant landscape features, the projected composite map suggests that this unit was located over the southern foundation wall, which is shown as straight in Long’s sketch.
Although Fry does report the discovery of a trench in Unit 2 (Fry 1995), it crosses the middle of his 5x5 foot test unit, not the southern edge, as suggested by the composite map, and makes no account for the jag shown on the 1843 map, which would be very close by (possibly even running through the unit).

Figure 21: Composite Map (Fry/Long) overlaid on 1843 survey map, oriented via greenhouse.

When the composite map and the 1843 map are overlaid and adjusted for scale, other discrepancies become visible. If one chooses to match up the greenhouse on the 1843 map with the one sketched on the composite drawing (figure 21), the greenhouse and stable coincide, but not the mansion, and other
features are also slightly misaligned. In this depiction, the placement suggests that the foundation discovered in 2010 is part of the southern wall of the eastern hothouse wing, and that the cistern and connected drains are located outside the building, in front, and potentially visible to visitors on the landscape. But if one instead aligns the two maps based on the position of the mansion the physical placement of the archaeological and contemporary features changes significantly (figure 22). No longer do the two greenhouses line up; neither do the two stables, and some of the roadways are also misaligned. In this orientation, the foundation from 2010 would appear to be part of the northern or back wall of the greenhouse complex, which would put both the cistern and parts of the two drains inside the complex, near the back wall, thereby possibly changing their visibility to visitors if blocked by rows of exotic plants.
Although the discrepancy between the 1843 map and the contemporary composite drawings raise serious questions about any interpretation of the physical relationship between the archaeological discoveries of Fry and Chesney, the first overlay (in which the greenhouses are aligned) is more robust, as the alignment of the greenhouse although not represented with enough accuracy to be conclusive, also aligns the stable across both maps, which – unlike the mansion – was not significantly altered between the creation of the 1843 map and the present (Long 1991; Wunsch 2004). This alignment also offers an explanation for the size and slope of the midden discovered in Unit 3, wherein its mounded shape could result from being pushed over (against a north-south running wall (the jag shown in the Figure 22: Composite Map (Fry/Long) overlaid on 1843 plan, oriented via mansion.
1843 plan). Understanding the midden as conscious redeposition explains both the large amount of kitchen and other non-greenhouse-related material contained within it as well as it being primarily a thick, single layer of loose material, rather than something built up over time.

This interpretation also places the cistern and both drains outside and in front of the greenhouse complex, and the abrupt ending of the northern drain before potentially connecting with the foundation could indicate the presence of a gutter system on the front of the building. In such a system the covered section of drain would connect to a vertical section, and the mortar spread could be an internal channel for hothouse use. A gutter system, although not present on every early Federal structure, was not unheard of, and evidence of their use on other structures of this period is known (Joel Fry, pers. comm. 2011). As an added benefit, a gutter system would allow Hamilton to capture rainwater and reuse it in his greenhouse – a very efficient water management system, which would certainly be advantageous to anyone managing the water needs of thousands of greenhouse plants. This interpretation is also consistent with Hamilton’s overall plan for an irrigation system discussed earlier.

The discovery over the last few years of a cistern, two brick drains, and a partial foundation of Hamilton’s greenhouse complex suggest that his botanical activities at The Woodlands were quite extensive and complex. The construction of a cistern with an extensive drain system is not particularly surprising given the vast numbers of plants said to have been housed within this structure. But the proximity of this cistern to the greenhouse and its drains to the north and northwest suggest
that there was a complicated water management system designed to draw water
directly from nature for the benefit of the greenhouse's exotic inhabitants. To go to
the trouble of creating such a system, Hamilton's greenhouse must have been every
bit as extensive as has been claimed — even if ten thousand plants may be an
exaggeration.

The location and appearance of the cistern and its drains in relation to the
foundation also raises a number of interesting questions about the visual impact of
this complex and the competing needs of utilitarian plant management, such as a
cistern and drain system, versus the picturesque nature of the greenhouse itself and
the exotic appeal of the plants housed within its walls. There is a striking difference
between the appearance of the south side of the cistern (first exposed in 2009),
which consists of neatly laid brick and mortar rows, and the north side, which
consists of a messy, uneven mortar spread over the cistern bricks. The drains
attached to the north side of the cistern are functional, but not particularly neat, with
some rows of bricks sticking out farther than others. Given the current interpretation
of the partial foundation as being the southern wall of the easternmost hothouse, the
cistern would be visible to any visitors to the greenhouse.
However, there would only be about four feet of space between the greenhouse complex itself and the south side of the cistern, so it was likely that the only side of the cistern really visible was the neatly finished northern side, rather than the more utilitarian workmanship on the southern side. This combination of utilitarian innovations and exotic botanicals might seem a bit jarring, but it would suggest that Hamilton appreciated both the mundane necessities of caring for his botanical collection as much as the beauty such care produced. Hamilton showed off his greenhouse as both a utilitarian workspace and an art gallery – although even the utilitarian elements were required to be neat and clean where they were in full view of visitors. Hamilton’s instructions of this point are clear in a letter to his secretary: “the exotic yard if I may so call it & all the space between green H & the shop should be made clean and neat,” he writes to Smith, “as I have no doubt there will
be visitors to view them” (Hamilton to Smith May 2, 1789; quoted in Long 191: 138).19

The physical layout of the greenhouse and associated features discovered thus far seem to suggest that Hamilton was negotiating between the practical needs of his botanical collection, as befit an individual interested in making his mark on the international botanical community, and the aesthetic standards of late eighteenth and early nineteenth century landscape design. What is particularly interesting about this placement is that elsewhere on the estate Hamilton does intentionally conceal utilitarian features, such as fences, with hedges and other landscape elements, which are noted by Drayton, and consistent with current architectural trends that Hamilton employed within the main house (quoted in Long 1991:64; 63). This begs the question: why were some utilitarian elements concealed, and others were not?

The answer to this question is part of a larger inconsistency noted by a number of visitors to Hamilton’s Schuylkill River estate. For every two visitors such as “L.G.” who found delight and wonder in the arrangement and design of The Woodlands, there was one visitor who noted that Hamilton’s landscape was not, in fact, perfect. Julian Niemcewicz, a Polish émigré who was not overly impressed by Americans or their tastes, recorded his visit to The Woodlands in March of 1797, stating that Hamilton’s “farm contains 200 or 300 acres of very mediocre land…but which cultivated could produce something. He leaves it fallow; he is interested only in his house, his hothouse, and his Madeira” (Niemcewicz 1965: 53). The

19 Hamilton’s reference to his “exotic yard” here likely refers to the space in front of the greenhouse complex where heartier exotics were displayed. It is the same space described by Drayton that was used to display plants in tubs during the warmer months (see Long 1991: 51).
suggestion that Hamilton could turn The Woodlands into a fine European-style estate if he tried (or was not distracted by other interests) is harsh, but Niemcewicz was not the only one to comment on the seeming irregularity of arranged features and undressed landscape. His sentiments are echoed by the duc de la Rochefoucauld-Liancourt, who laments that

“[Hamilton’s] house and gardens would receive as great embellishment from the neighborhood of good tenantry, as he would himself derive emolument from their labor; but either from indifference, or from a want of necessary funds to defray the expenses of clearing the land, it remains uncultivated, and his house seems surrounded by a desert” (duc de la Rochefoucauld-Liancourt 1800: III: 482-483; quoted in Fry 1995: 11-12, and Wunsch 2004: 27-28).

Recent scholars have suggested that this critical appraisal of Hamilton’s landscape at The Woodlands might be attributed to equal parts “snobbery” and the distinct cultural differences governing continental Europeans’ ideas of beauty and aesthetics as opposed to British and American viewers (Wunsch 2004: 28). But even the most complementary descriptions from visitors to Hamilton’s estate sometimes note in passing the sense of unfinished business that existed in certain areas. Charles Drayton’s detailed description of the estate in 1806, while mostly complimentary, notes that although “the Approach its roads, woods, lawn & clumps are in laid out with much taste & ingenuity...the park lawn is not in good order for lack of being fed on” (Drayton, November 2, 1806). Even the enthusiastic L.G., who has nothing but poetical praise to offer the recipient of her letter’s description of The Woodlands mentions an area near the garden path where “some part of the ground is hollowed out where Mr. Hamilton is going to form a grotto,” clearly indicating that there was
some unfinished landscape element within full view of the group of visitors (L.G. to Eliza, June 15, 1794; quoted in Long 1991: 369).

In the larger context of the estate, then, the juxtaposition of working elements associated with daily greenhouse or other estate operations with carefully proscribed vistas and landscaped garden walks would seem to be the order of the day, right down to small features such as the varied appearance of the cistern and its placement in front of the greenhouse complex. The appearance and physical relationship of these landscape elements seem to exhibit an overall design consistency present at The Woodlands, but do not shed any light on why such decisions were made. Attributing motivations and explanations for physical remnants must be approached carefully by archaeologists, but there are some persistent themes that echo throughout the documentary and archaeological evidence that help sharpen our picture of Hamilton and his role in the early Philadelphia botanical network. The tension between Hamilton's various roles as botanical collector, patron, and member of elite Philadelphia society were negotiated on the grounds of The Woodlands just as they were negotiated in personal correspondence. Although the public and private elements of both Hamilton and his botanical collection have been noted by previous scholars (most recently, Wunsch 2004), it bears reexamination in light of the archaeological discoveries made during this project.

The archaeological discoveries that have been made thus far in the area of William Hamilton's greenhouse at The Woodlands suggest that Hamilton had a botanical collection and greenhouse operation that far surpassed the typical
horticultural efforts found on other country estates of the Philadelphia elite. While men such as James Logan and William Bingham had beautifully landscaped gardens and grounds on their country estates, neither one of them seems to have devoted the same kind of time and energy exclusively to botanical pursuits that Hamilton did. Logan and his heirs were interested in many related agricultural pursuits, of which cultivating exotics was only one, while Bingham seemed more interested in the public statement made by his landscaped grounds than in puttering around them himself (Brown 1937; Harshberger 1924; Jacobs 2006; Long 1991; McLean 1984; PHS 1976; Schlereth 2007; Ward 1879). But Hamilton was a man with a driving passion for acquiring and cultivating new and exotic plant specimens, whose ambition and success rate more closely resembled that of business-oriented plant dealers like his neighbor John Bartram, rather than the more varied interests of Logan and Bingham.

It was not just Hamilton’s extensive botanical collection that set his estate apart from others of its kind, however; the way in which he attempted to use the estate as both a private and a public botanical space made The Woodlands unique. Many of Hamilton’s actions and decisions concerning The Woodlands suggest that he constantly negotiated between his desire to acquire botanical specimens for his own private enjoyment, and his desire to show them off to various appreciative publics. While in England in 1785 Hamilton wrote to his secretary, Benjamin Hays Smith that “having observed with attention the nature, variety, & extent of the plantations [in England]… and consequently admired them, I shall… endeavour to make [The Woodlands] smile in the same useful and beautiful manner” (Hamilton 209).
to Smith, September 30, 1785). Hamilton, from the very beginning then, conceived of his estate along English lines, both in terms of design elements, and in terms of use and access, perhaps similar to the English tradition of "public days" on great estates (Betts 1979; Jacobs 2006; Long 1991).

But unlike the English public days where specific dates and times were set aside to allow visitors inside the grounds of English estates, the gates of The Woodlands seemed to be open year round for the convenience of the curious. This may have been due partly to Hamilton having established The Woodlands as his permanent residence by 1791, so that visitors to the estate could have expected someone to be at home in any season, and partly to Hamilton's reputation as a generous and welcoming host (Betts 1979; Long 1991; Notes and Queries 1884; Oldschool 1809; Wunsch 2004). In fact, "the beauties of nature and the rarities of art, not more than the hospitality of the owner, attract[ed] to [The Woodlands] many visitors" – a number of whom felt so confident of their welcome to view the estate that they wandered around even when the owner himself was away (Birch 1808: unpaged; Manigault 1984[1808]; Niemcewicz 1965).

Visitors of all kinds seemed to be welcome to come and admire his estate, though Hamilton was especially encouraging of those with an interest in and aptitude for botany, including university students from Philadelphia and other enthusiastic naturalists who sought access to his collections (Eaton 1951; Ewan 1983; Graustein 1961; Jacobs 2006; Long 1991; Ward 1879). His estate became a favorite day-trip destination for gentlemen statesmen while in Philadelphia, some of whom encouraged other friends and relatives to seek out The Woodlands when next
Thomas Jefferson, as already discussed, was an ardent admirer of Hamilton's landscape, and skill as a botanist. His request that Hamilton allow his grandson access to the estate, and his decision to grant Hamilton some of the Lewis and Clark material make it clear that Jefferson esteemed Hamilton as both a personal friend and an American botanical treasure (Cornett 2005; Long 1991; Wunsch 2004).

Hamilton actively sought out botanical visitors to the Philadelphia area, and encouraged them to come see his collections at The Woodlands. When such visitors did arrive, Hamilton's enthusiasm knew no bounds, and sometimes his visitors suffered for it. Hamilton was so anxious to show off his collection to his fellow botanical enthusiasts that he was blind to all else, including the ill health of the Reverend Manasseh Cutler on the occasion of his visit in 1803, who, after having been dragged all through the gardens and the greenhouses, was then shown books of pressed plants and flowers until one in the morning (Jacobs 2006; Long 1991; Notes and Queries 1888; Wunsch 2004).

As seemingly open as Hamilton was to various publics viewing his botanical collection on many occasions, there are other times when he seems to have struggled with the necessity of public access to a collection and space that required a significant amount of time and effort to maintain. An anecdote related by a Bartram relative in 1861 recalls an incident in which a "Mrs. M", a visitor to Hamilton's estate, aroused her host's ire by cutting a prized camellia bloom that he had planned to display to his dinner guests that evening. Mrs. M had entered the greenhouse unaccompanied, and her actions caused Hamilton to "stop, horrified; and lifting his
hands, [he] stamped on the ground, and exclaimed in great anger – ‘By Heavens Madam, I would sooner have given you fifty guineas!’” (Carr 1861:9).

Hamilton’s distress at the actions of Mrs. M epitomize this struggle over access, as do his warnings to his secretary to make sure that certain plants were locked away from any visitors, and that “no soul should be suffr’d alone in the pot or Tub enclosure” (quoted in Cornett 2005: 10; Stetson 1949). Although Hamilton clearly disliked the idea of visitors wandering through his greenhouse unattended, he had no problem showing them around the structure himself, suggesting that he could negotiate as needed between the public and private elements of his botanical activities. It is this negotiation of a public and a private space for his greenhouse plants – and by extension his own experience in the local and international botanical communities that comes across in the documents and the design of this complex.

From Hamilton’s correspondence and that of his fellow botanical enthusiasts we get a sense of conflict. Bernard McMahon complains to Thomas Jefferson that “altho’ he [Hamilton] is in every other respect a particular friend of mine, he never offered me one [plant] in return”, and remarks that he “well know[s] [Hamilton’s] jealousy of any person’s attempt to vie with him, in a collection of plants” (McMahon to Jefferson January 3, 1809; quoted in Long 1991: 149). But other letters, including multiple ones from Jefferson himself contain profuse thanks for Hamilton’s sharing of plants and seeds (Cornett 2005; Jefferson 1944; Long 1991; Wunsch 2004). The same man who writes impatiently to William Bartram “I was in hopes your curiosity would have induced you before this to take an opportunity of looking at the flower I mentioned to you some time ago…” (Hamilton to Bartram,
November 19, [1794]) then has a fit some six years later when a Mrs. M dares to enter his greenhouse unattended. Looking at these incidents, Hamilton comes across as both generous and capricious, eager to display his treasures, but only when he can control the situation. He is a man whose private botanical successes need public validation, but who is reluctant to allow full public access, and therefore must negotiate between sometimes-conflicting desires for private enjoyment and public display. As Wunsch notes in his historical narrative of The Woodlands under Hamilton’s tenure, “the role of unrivalled collector obviously appealed to [Hamilton], but that niche required constant maintenance. Visitation was crucial” (Wunsch 2004: 87). Such maintenance suggests that some of Niemcewicz’s and Rochefoucauld-Liancourt’s assessments of Hamilton may have been on target, and that the practical methods for keeping up this maintenance meant perhaps that necessity might trump aesthetics.

The negotiation of this control and the public and private elements of Hamilton’s participation in local and international botanical communities can also be seen in the archaeological discoveries and the overall landscape design of the estate. The placement of the greenhouse complex and its associated features on the landscape near the main house complement the larger design of the estate, but also keep the greenhouse in full view of anyone inside the house, so that Hamilton could keep his eye on the comings and goings around his precious exotics. His decision to not screen the cistern in front of the greenhouse from view as he did with other features, and the placement of this feature in front of the greenhouse (rather than behind, or to the side) affects the overall view, suggesting that Hamilton wanted his
visitors to know the kind of devotion a one-of-a-kind botanical collection required. After all, part of the impressive nature of such a collection was the realization of the amount of labor, time and financial resources – not to mention social and political clout – necessary to maintain it. With the cistern in front of the greenhouse complex, Hamilton also would be able to keep his eye on the gardeners and other greenhouse staff as they accessed the water necessary for maintaining the exotic blooms inside the greenhouse.

Placing the cistern in front meant that Hamilton could control access to his greenhouse plants (or at least, it may have given him a sense of control over access), thereby resembling a private retreat, but it was also a necessary public statement, its very existence speaking to the need for such control – and public appreciation – because the main function of the cistern and its associated drains was to maintain the thousands of greenhouse plants. Without the massive quantities of plants, Hamilton would have no need of such a cistern, no need for a greenhouse – and no reputation as a first-rate botanical collector.

Without the plants or the greenhouse complex, Hamilton also would not have had the same kind of experience as a participant in the transatlantic botanical exchange in the late eighteenth and early nineteenth centuries. The construction of The Woodlands greenhouse complex brought the disparate nature of this trade into a contained physical space, where Hamilton’s interactions with his fellow botanical enthusiasts were made manifest in the physical display of these exotic plants. The space of this greenhouse complex and surrounding infrastructure was a physical and material manifestation of Hamilton’s botanical experience: it was within and around
this structure where he negotiated the physical elements of botanical exchange, such as the care and maintenance of these plants, but it was also where he negotiated the social aspects as well. The greenhouse was both the highlight of the estate's botanical bounty, the pinnacle of Hamilton's collection that he loved to show off and also the place where he exerted control over access. While some of these elements of Hamilton's experience in this transatlantic plant exchange can be gleaned from the surviving documentary record, it is the physical record of this experience, brought to light via archaeological investigation, that reveals the contexts of Hamilton's activities as a participant in this exchange.
CHAPTER SEVEN: Conclusions

The physical and material aspects of Hamilton’s experience as a participant in the transatlantic botanical exchange of the late eighteenth and early nineteenth centuries as revealed through the archaeological investigation of his greenhouse complex at The Woodlands are crucial elements in advancing our understanding of the lives of early American botanical enthusiasts. Although there is much to be learned from the surviving documentary records about this trade network, there was a physical aspect to this exchange that cannot be overlooked. Actual, physical plant material was exchanged between participants, not just knowledge, and these physical elements required the construction and maintenance of special areas such as greenhouses in order to blossom and fulfill their potential (and the potential of the trade itself) in both tangible and intangible ways.

The archaeological excavation of William Hamilton’s greenhouse complex at The Woodlands has reintroduced the physical and material elements of this transatlantic botanical trade back into the discussion of early American botany by examining how these elements played out in the construction and use of a particular structure that represented and contained these material elements. From the specific discovery of previously unknown landscape features to the larger understanding of how these elements operated on The Woodlands estate to create specific experiences for Hamilton and other participants, the archaeological discoveries add a crucial element to our understanding of early American scientific practice and the experience of its practitioners.
At the most specific level of discovery, the archaeological investigation revealed previously unknown features on the landscape and provided insight into the practical realities of maintaining an extensive collection of exotic plants. Prior to the opening of the first 10x5-foot trench in May 2009, no one knew that Hamilton had a brick cistern built near his greenhouse complex, or that it connected to a system of drains and pipes likely stretching over a significant part of the estate. Although there was documentary evidence that suggested Hamilton—and later, his nephew, James—created a system of water management across The Woodlands (Poulson’s American Advertiser June 1, 1815; Long 1991; Wunsch 2004) the extent of the system was unclear, nor was there any suggestion of its connection to the greenhouse complex and exotic plant beds.

The subsequent discovery of a three-foot section of the foundation in 2010 was also significant, as it confirmed that at least some of the original foundation had survived the 1854 destruction of the building. Locating the foundation also provided physical evidence for the location of this structure on the landscape. The exposure of the greenhouse complex foundation relocated this structure within the physical landscape of The Woodlands for the first time since it had been torn down to make way for the carriage house construction. Although some confusion remains about the exact orientation of the greenhouse as discussed in the previous chapter, locating even a small section of this building adds to the overall understanding of the physical landscape of the estate, and provides an excellent basis for future archaeological work in the area.
But the significance of the archaeological discoveries at The Woodlands goes beyond simply revealing the existence of previously unknown features or details of water management systems. The physical relationship between the cistern and its drains, the foundation, and the midden reveal the completed nature of individual participants' experience with the transatlantic botanic trade as it was represented in Hamilton's greenhouse complex. The seemingly inconsistency in the appearance and placement of the cistern vis-à-vis the greenhouse suggests not just a simple tension between landscape design aesthetics and practical botanical needs, but is also the material embodiment of a whole host of complicated elements of Hamilton's participation in this exchange. The cistern's location in front of the greenhouse complex indicates Hamilton's need for a smooth operation and quick access to water. While he was clearly conscious that certain daily operations would be visible to any potential visitors as reflected in his letter to Smith ordering that the "exotic yard" be kept "clean and neat" (Hamilton to Smith May 2, 1789; quoted in Long 191: 138), this visibility also underscores the amount of resources required by such an operation.

The appearance and position of the cistern is also an explicit physical and material reminder of the labor that went into Hamilton's botanical participation, and the material evidence of those individuals whose participation and experiences laid the foundation for Hamilton's own success. The placement of the cistern right near the greenhouse was a concession to not only the needs of the plants, but also the needs of the gardeners for ready access to water for these specimens. No doubt multiple individuals moved in and out of the greenhouse continuously during the
day, watering and trimming, weeding, stoking the fire, and performing myriad other
tasks of botanical maintenance. If the cistern and work area was visible to guests, so
too were the people employed in doing the work. The gardeners, gardeners’
assistants, and other laborers were an integral part of Hamilton’s participation in the
transatlantic plant trade, while also participating in the trade themselves through
their interaction with the physical elements of this exchange: the structure in which
these plants were kept, the people who came to view these structures and their
contents, the supporting structures, such as the cistern and drains, and of course, the
actual plants themselves.

But unlike many of these other elements of the transatlantic plant trade, the
participation and experiences of the individuals who ran the daily operations of
Hamilton’s botanical collection – with the notable exception of head gardeners such
as Pursh, Lyon, and McArann – are rarely present in the documentary accounts of
this exchange. Instead their participation – and the basis of Hamilton’s participation
– comes across in the material record of their work as revealed archaeologically.
The record of their participation is primarily physical, in the placement of the cistern
for their convenience and access near the greenhouse complex, and in the different
finishes of the north and south sides of the cistern. The primary function of the
cistern and its drains was to aid in the maintenance of the greenhouse plants, and
although the finished (southern) side of the cistern suggests that Hamilton preferred
these working parts of the estate to appear neat and orderly, utility was the primary
objective. The messier, more uneven northern side of the cistern may have irked
Hamilton, but the real priority was a functioning cistern and magnificent greenhouse, rather than tidy subsidiary elements.

These archaeologically-discovered features not only relocate Hamilton’s greenhouse on the physical space of his landscape; they also ground the ephemeral story of this early botanical community in the physical world, reminding us both of the individuals who participated in this network and where they participated in it. Here, in this greenhouse, using water in this cistern to cultivate and raise exotic plants far from their native climes. In the physical space of this foundation, it is not only the individual participants who come alive, as one is forcibly reminded of the amount of manual labor and skill required to care for these plants, but also the things they exchanged – the plants themselves come to life as one pictures the walls against which they stood, on risers like “the declivity of a mountain” (Drayton November 2, 1806; quoted in Wunsch 2004: 33).

The material and physical reality of Hamilton’s greenhouse complex reinforces the material and physical reality of the transatlantic plant trade itself. This structure was a microcosm of the international plant exchange of the eighteenth and nineteenth centuries, containing within its walls the latest botanical knowledge, technology, specimens, and experts, and collapsing the physical distance of this exchange to 140 feet. Within these walls Hamilton’s experience as a participant in this trade, the relationships and connections that shaped his experience, took on real, physical dimensions. Botanists from Portugal, France, Germany, Massachusetts, and Pennsylvania met each other in person in this space, continuing conversations and
knowledge exchanges that had thus far existed primarily on paper. In this space of Hamilton’s greenhouse these participants also met the objects of their interest, representatives of far-off lands that for many, might be the closest they would get to foreign shores. When Manasseh Cutler wrote to his daughter of his tour of Hamilton’s greenhouse, marveling that “everywhere is crowded with trees and plants, from the hot climates, and such as I had never seen. All the spices. The tea plant in full perfection,” (Notes and Queries 1884:110) he is embodying the physical experience of this trade; by creating a space in which Cutler can reach out and touch a tea plant, Hamilton has effectively collapsed the distance between Asia, Philadelphia, and Massachusetts for both himself and for Cutler, thereby reinforcing the essential materiality of this trade by standing inside and experiencing its physical manifestation.

Reverend Cutler was not the only one for whom the transatlantic botanical trade was made physically and materially manifest within the walls of Hamilton’s greenhouse complex. Charles Drayton’s detailed description of his visit to Hamilton’s greenhouse “said to be the equal of any in Europe” (Drayton, November 2, 1806; quoted in Long 1991: 50), L. G.’s letter to her sister describing her own delight and amazement, along with other accounts only hint at the number of visitors to The Woodlands who became real (if only temporary) participants in the plant trade through their experiences in the physical space of Hamilton’s collection (L. G. to Eliza [1794]; Long 1991; Oldschool 1809; Wunsch 2004). The descriptions they left behind of this space suggests that they found it to be the physical manifestation of the possibilities of the international plant trade, and
Hamilton, along with his visitors, became part of that community simply by experiencing the fruits of its trade—and the fruits of the labor of others—in the actual space of this exchange.

These documentary accounts from visitors to Hamilton’s estate, coupled with other estate records and the archaeological discoveries reveal the complicated nature of the eighteenth and nineteenth century botanical trade through the material and documentary records of individual experiences. These experiences were not only unique to the individual participants, but unique also to the physical location in which they took place—Hamilton’s greenhouse complex. Linking these experiences together provides a more nuanced story of Hamilton’s own experience as a participant in this trade, and also illuminates the unique “situation” of The Woodlands greenhouse as per Dan Hicks’ situational and symmetrical historical archaeology (Hicks 2005). Hicks’ proposal for a situational and symmetrical historical archaeology urges archaeologists to reach into the different layers of interaction within an individual site to explore the variables that make that site reflective of the unique stories it tells. Although Hicks left the particular mechanisms for exploring a site’s situation open, phenomenological approaches to archaeological interpretation offer one way to explore this idea.

Drawing on the basic premise of phenomenological interpretation which is rooted in the primacy of an individual’s experience of “being in the world” (Johnson 2012: 273), we can explore the situational and symmetrical aspects of Hamilton’s greenhouse complex through the documentary and physical records of individual
experiences within and around this structure. Combining the accounts from Drayton, L. G., Oldschool, Cutler, and others with the physical remains of the space in which these individuals interacted with the material elements of the plant trade and with Hamilton himself adds details to the physical sense of this space provided by the archaeological discoveries. Drayton’s detailed description of the arrangement of the plants within the greenhouse with risers figuratively rebuilds this interior space, while Cutler’s and de Mendonça’s mention of individual plants such as tea plants and sugarcane repopulate the interior space defined by the brick foundation (Cutler and Cutler 1888; Notes and Queries 1884; Smith 1954).

L. G.’s mention of the “flourishing jesamine & honeysuckles in full bloom” clinging to the outside walls of the greenhouse bring the exterior of this structure to life, adding details to our understanding of its appearance and filling in the spaces between the cistern and gutters indicated by the archaeology (L. G. to Eliza [1794]). Now, beyond being able to imagine how this building might have appeared in the spring and summer, we can also begin to imagine how the air must have smelled: a mix of jasmine and honeysuckle, combined with other exotics out in the yard, and competing for recognition against other smells of the work area of the greenhouse, smoke from the fire, or wet earth from the drains and gutters. The archaeological discoveries also adds layers to our understanding of the situation of the greenhouse complex, reminding us of the labor involved in creating these experiences for Hamilton’s visitors through the construction of this building as well as the material signs of botanical activities and building repairs, such as broken flowerpots, copper wire, and chunks of mortar.
Through the archaeological investigation of the area around Hamilton’s greenhouse complex, the experience of modern researchers and visitors has been added to the complex meaning of this site. The archaeological crew’s rediscovery of the greenhouse foundation, along with its cistern and drains adds to our understanding of both the past and present meanings of this complex at The Woodlands. The material record of the building’s construction and use speaks to the experience of both its builders and its visitors, while the archaeological context of these features brings the experience of this greenhouse complex to a new generation of visitors. Crewmembers and other visitors to The Woodlands experienced the greenhouse complex, not as a standing structure, but as the remains of one; as the outline of a building that was once part of a private rural retreat, but today exists in the middle of an urban park space and active cemetery.

During Hamilton’s lifetime, and the heyday of his fame as a botanical collector and cultivator in the late eighteenth and early nineteenth centuries, his greenhouse complex at The Woodlands was a “hybrid” of the sort described by Hicks (2005): rather than exhibiting one unifying, overarching idea in the area of the greenhouse, the greenhouse had multiple meanings, which varied from individual to individual. As a physical manifestation of the international botanical trade, the greenhouse area was a marketplace for consumers, such as Thomas Jefferson or George Washington, who wrote to Hamilton for various seeds and cuttings (Cornett 2005; Jefferson 1944; Long 1991; Wunsch 2004). It was a puzzle to solve and a showcase of botanical skill for various producers, such as John Lyon and Frederick Pursh, both of whom worked as head gardeners for Hamilton before pursuing their
own careers, and for Hirst and Dreer after they took over in the nineteenth century. And it was a wondrous experience, a suggestion of possibilities – and a valuable resource for those falling somewhere in between (Ewan 1952; 1983; Ewan and Ewan 1963; 2007; Graustein 1954; 1961; H. 1840). For all of these members of the Philadelphia and international botanical communities, Hamilton’s greenhouse was their physical connection to an entity – the botanical network – that had few physical manifestations outside of the actual plant material exchanged and the place in which it was exchanged.

Of course, Hamilton’s greenhouse was not the only physical location of such exchanges, but it was a physical location accessible to the entire community of international botanical players, no matter the level of their participation: enthusiasts and the simply curious, those scientifically or aesthetically oriented, those looking for careers or skills, those who maintained the plants on a daily basis, and everyone in between. All of these individuals could potentially experience the range of participation within Hamilton’s greenhouse, as it was equally a public monument to this trade and a private collection of a devoted botanical collector. For Hamilton, just as much as for his visitors and employees, the greenhouse complex was a manifestation of his relationship with the international botanical network as consumer, producer, and patron – all of which bled together in a complicated, multifaceted experience for anyone who came through its doors.

But the multilayered meanings of Hamilton’s greenhouse complex for the individuals who experienced it did not end with Hamilton’s death; the “situation” of
this estate in general and the greenhouse complex in particular continued to evolve over subsequent generations, creating a unique story of a place both within and outside the city of Philadelphia. The decline of the estate between Hamilton’s tenure and the creation of The Woodlands Cemetery Company coincided with the expansion of Philadelphia’s city limits in the early and middle decades of the nineteenth century. Suburban – and ultimately urban – developments began to encroach on the once-rural farmland west of the Schuylkill River until West Philadelphia was officially incorporated into Philadelphia proper in 1854 (Nash 2002; Scharf and Westcott 1884; Weigley 1982). During the same period, The Woodlands was being transformed into a new kind of rural retreat, a place to enjoy the open country air while paying respects to the dead (Long 1991; Wunsch 2004).

The greenhouse complex was also being transformed at this time, and all the while providing a space for participants to experience the plant trade and early American botany. The dilapidated appearance of the structure in 1839, with the roof falling in and full of weeds, provided a different experience for the visitor who described its decay. “H’s” description conveys a sense of loss for the magnificent collection that had defined the structure only a few decades earlier, but was no more (H. 1840). The contrast between the melancholy note of this first description, and of the rebirth of the greenhouse complex only a few months later is striking: in the spring of 1840, the greenhouse was “a perfect blaze of flowers,” and the author’s excitement for the return of botanical abundance at The Woodlands cannot be contained (H. 1840: 201-202).
“H’s” experiences within and around the greenhouse complex in 1839 and 1840 complicate this experience – and the site itself – still further. The greenhouse complex in 1840 did not stand as a derelict monument to a previous age of botanical exchange, but a refurbished space in which new generations of participants and botanical enthusiasts could continue to experience the possibilities of the international plant trade as customer of Messrs. Hirst and Dreer (H. 1840). Their use of the greenhouse complex as the basis for their nursery business reinforces the physical importance of this space as a location of botanical exchange: the symbolic meaning of this space – not to mention the practical advantages – transcended Hamilton’s own experiences as a participant in the botanical trade and influenced a new generation of botanical producers and consumers.

Even the physical destruction of the greenhouse in 1854 did not end the enduring legacy of its representation of the botanical trade or Hamilton’s reputation as a major participant in this trade. In the 160 years since this structure was demolished the reputation of Hamilton and his botanical collection have reappeared periodically in the writings of local historians such as Townsend Ward, who mentions Hamilton’s botanical prowess and The Woodlands in 1879, or in the legacy of nineteenth and early twentieth-century botanists who made special trips to visit the remains of Hamilton’s collection (Hewitt 2012; Long 1991; Ward 1879; Wunsch 2004). In recent years, the physical memory of Hamilton’s collection has returned again, through the archaeological discovery of the greenhouse complex and its associated features. The archaeological excavation has brought the experience and meaning of Hamilton’s greenhouse complex at The Woodlands full circle: once
again reminding visitors of the physical requirements of early American plant collecting through the material remains themselves. The foundation and cistern remind viewers of the skilled labor required to manage an exotic plant collection in the days before plumbing and electricity, and speak to the complicated, negotiated experiences of this space for visitors, workers, other botanists, and Hamilton himself. The material remains of these botanical activities and the contents and placement of the midden remind us of the longer legacy of this space from its first construction through multiple uses, destruction, and archaeological rediscovery.

The unique “situation” of Hamilton’s greenhouse complex at The Woodlands is still evolving today, as the remains continue to invite new visitors to experience Hamilton’s legacy through its archaeological discovery. The discoveries made thus far are only the beginning, however; our understanding of this structure as a physical space of botanical exchange and the experience of individual participants within it will only increase with further investigations of this area, either through invasive or noninvasive testing. Exposure of more of the foundation can reveal new information about the interior organization of space, for instance, and add to our understanding of both past and present experiences of being inside a structure housing thousands of exotic plants. As architectural historian Aaron Wunsch stated in his extensive landscape survey of the estate, “The Woodlands was more than a static assemblage; it was a living nexus, a crossroads of plants and people, a node in a network of concrete and symbolic exchange” (Wunsch 2004:88). This was true during Hamilton’s tenure on the estate, it was true after his death, and it continues to be true in the archaeological investigation of the greenhouse.
complex. Although the structure was physically "static" the material and immaterial elements contained inside — the actual elements of this transatlantic botanical exchange — were not. The space itself was "a living nexus" of exchange of all kinds — physical, material, intellectual, symbolic — from its creation in the late eighteenth century through its reuse, abandonment, and destruction in the nineteenth century, to its memory and rediscovery in the present day. It has been a "crossroads of plants and people" for over 200 years, and will no doubt continue to be one for future generations.
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