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Environmental Archaeology in Recent Contexts: Migration, Scale, and Landscapes

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Cover Page Footnote

My thanks to Valerie Hall, Sarah Janesko, and Sarah Grady for inviting me to contribute to this special issue. I am also grateful to Valerie Hall, Kathleen Clifford, and Jim Gibbs for their editorial comments on an earlier draft of this manuscript. I am proud to count in my academic pedigree two brilliant environmental archaeologists and trailblazers who paved the way for several generations of scholars who might otherwise have chosen another path: Elizabeth (Betsy) Reitz and Elizabeth (Liz) Wing. However inadequately, I pay forward their wisdom, tenacity, and excellence to my own students.

Environmental Archaeology in Recent Contexts: Migration, Scale, and Landscapes

Barnet Pavão-Zuckerman

Environmental archaeology is a diverse field of study focused on understanding the complexity of human ecological relationships, as is well represented in the articles in this issue. Environmental archaeologists use a wide range of approaches to examine human/ecosystem interactions, including zooarchaeology, paleoethnobotany, geomorphology, archaeomalacology, and geochemistry. Both human/environment interactions and research in environmental archaeology occur at many scales, from local to global. This is particularly true for environmental archaeology research addressing the past few hundred years, as human environmental impacts have become increasingly global in scale. The last 500 years has been particularly significant for human/ecosystem relationships as a result of the global movement of human populations, the accompanying translocation of alien species and exploitation practices, and the harnessing of energy, causing unprecedented changes in the functioning of global ecosystems. Recent approaches to the study of human/environment interactions also recognize that human landscapes and ecosystems are inseparable from cultural and political processes and meanings. Human landscapes and land-use practices hold a mirror to human worldviews regarding the separability or inseparability of humans and the natural world, and, indeed, relationships with one another.

L'archéologie environnementale est un domaine d'études varié qui vise à comprendre la complexité des relations écologiques entre l'humain, comme le montrent bien les articles de ce numéro. Les archéologues spécialistes de l'environnement utilisent un large éventail d'approches pour examiner les interactions homme / écosystème, notamment l'archéologie, la paléoéthnobotanique, la géomorphologie, l'archéomalacologie et la géochimie. Les interactions homme / environnement et la recherche en archéologie environnementale ont lieu à plusieurs niveaux, du local au global. Cela est particulièrement vrai pour la recherche en archéologie environnementale portant sur les quelques cent dernières années, car les impacts environnementaux sur l'environnement sont de plus en plus mondiaux. Les 500 dernières années ont été particulièrement importantes pour les relations entre les hommes et les écosystèmes, du fait des mouvements mondiaux de populations humaines, de la translocation des espèces exotiques et des pratiques d'exploitation connexes, et de la mobilisation de l'énergie, qui ont entraîné des changements sans précédent dans le fonctionnement des écosystèmes mondiaux. Les approches récentes en matière d'étude des interactions homme / environnement reconnaissent également que les paysages et les écosystèmes humains sont indissociables des processus et des significations culturels et politiques. Les paysages humains et les pratiques d'utilisation des terres sont le reflet des conceptions du monde humain concernant la séparabilité ou l'inséparabilité de l'homme et du monde naturel, ainsi que les relations entre eux.

Introduction

The last century has seen the rapid development of new environmental archaeology methods and techniques but these innovations were largely developed for application to time periods predating European colonialism. Environmental archaeology approaches developed for non-market societies were mismatched within complex, urban contexts. For this reason and for others explored below, implementation of environmental archaeology approaches to recent time periods has lagged behind their use in precolonial contexts. This is the case in the Chesapeake, an ecologically dynamic region where most attention has been paid to either pre-Columbian environmental change or to the dramatic anthropogenic changes of the past century. The following articles seek to close the gap by addressing human/environment interactions in the Chesapeake from the 17th to the 20th centuries. This contribution serves as an introduction to the following six articles, exploring some of the reasons for the historical unease between environmental archaeology and his-

torical archaeology, and providing an overview of recent approaches that successfully integrate environmental archaeology methods with historical archaeology questions.

Broadly speaking, environmental archaeologists are interested in understanding the complexity of human/ecological relationships through time. Beyond this unifying theme, however, there is no single widely accepted definition of environmental archaeology (Reitz and Shackley 2012). An early definition by Myra Shackley (1985: 14) proposes that "environmental archaeology is concerned both with the reconstruction of these past environments, and with elucidating the role and significance of human communities within them." Reitz et al. (2008: 3) define environmental archaeology as "an eclectic field directed toward understanding the ecology of human communities" and add, "at its best, environmental archaeology interprets human behavior set in an environmental framework that includes broad social, spatial, temporal, physical, and biotic parameters" (Reitz et al. 2008: 3).

Most practitioners of environmental archaeology align themselves with one of four subfields: geoarchaeology, archaeobotany, zooarchaeology, and bioarchaeology (Reitz et al. 2008: 5). Geoarchaeologists apply geological techniques, including sedimentology, geomorphology, pedology, geophysics, geochemistry, and archaeometry, to questions of archaeological interest (Grady, this issue). Archaeobotanists study plant remains from archaeological contexts, including seeds, pollen, wood, phytoliths, and chemical residues. Zooarchaeology is the study of nonhuman animal remains from archaeological sites, and includes the analysis of bones, teeth, shells, exoskeletons, DNA, and stable isotopes (Biuk, this issue; Hall, this issue; Lee, this issue). Similarly, bioarchaeologists study human remains, including bones, teeth, DNA, and stable isotopes, from archaeological contexts to understand past human health and environments. It is possible to ask environmental archaeology questions using evidence from outside these subfields, including historical maps, censuses, and other written documents (Clifford, this issue; Janesko, this issue).

It is not a coincidence that interest in environmental archaeology has intensified in the last quarter of the 20th century in concert with the development of the scientifically oriented methodologies described above. New "specializations" in zooarchaeology, paleoethnobotany, and geoarchaeology, among others, were added to the discipline, complementing existing specializations in lithics, ceramics, and other material culture. These emerging fields, without established networks that served as barriers to outsiders, became important entry points for archaeologists from underrepresented groups, particularly women—a phenomenon that is reflected in both the authors of this issue and the bibliographies of their contributions. In addition to opening professional doors and welcoming new perspectives, the greater attention to site formation processes, a deeper appreciation of the research value of biological materials, and the incorporation of new technologies permitting the recovery of archaeological materials and residues that were previously invisible allowed archaeologists to ask questions that were inconceivable just a few decades prior.

Environmental Archaeology and Historical Archaeology

Environmental archaeology cut its teeth in the processual tradition of the late 20th century (Shackley 1981). At that time, most archaeological investigations were carried out on sites that American archaeologists traditionally refer to as "prehistoric"—dating to the era prior to European colonialism. A new interest was emerging, however, within a subset of archaeologists who were interested in more recent time periods and the integration of written documents with archaeological evidence: historical archaeology (Deagan 2008; Orser 2004). Although historical archaeologists often employed processual approaches, many scholars practicing in the 1960s to the 1980s sought new paradigms that better fit their

explorations of ethnicity, gender, and social identities, steering clear of evolutionary and ecologically driven models of cultural change.

Research on more recent complex societies presents unique challenges, but contemporary scholars question the reification of "historical archaeology" as a subfield that is separate from "prehistoric" archaeology. The intellectual limitations of these terms and the colonialist implications of dividing time in this way are substantial and widely acknowledged (Lightfoot 1995; Mitchell and Scheiber 2010; Scheiber and Mitchell 2010; Silliman 2010). Despite this unease, these terms continue to be used as a shorthand within the field, including in the title of this journal. I use them here to reflect this disciplinary history while simultaneously acknowledging their shortcomings.

Although early historical archaeologists often eschewed environmental explanations and claimed somewhat separate intellectual roots, these lines of inquiry became increasingly entwined (Deagan 2008). The integration of environmental archaeology methodologies within historical contexts has not been without its difficulties, however. Environmental archaeology emerged as a means to address questions relevant to prehistoric contexts. In North America, environmental archaeology research questions often centered on small-scale hunting-and-gathering or horticultural societies. Many environmental archaeology research tools and strategies were not well-suited to complex human societies operating within regional or global market economies, multiethnic urban spaces, or in postindustrial contexts. Furthermore, while early environmental archaeology approaches were based on evolutionary models of human social change, historical archaeologists working on complex human systems often favored approaches grounded in social theory and explorations of identity, cultural preference, and consumerism. Deagan (2008: 24) notes:

> Articulating these [historical archaeology] questions with those of environmental archaeologists within a coherent theoretical framework was furthermore often made problematical by the respective explanatory foundations of the two fields. While social theory prevailed among historical archaeologists, evolutionary biology models were emphasized by environmental archaeologists, who necessarily trained at least partly in biological science.

Traditional environmental archaeology emphases on seasonality and settlement patterning, domestication, and catchments are significantly less relevant to archaeology in recent contexts (Bowen 1996). For example, while dietary faunal diversity can be an indicator of social status in nonmarket economies (Schmitt and Lupo 2008), it is a poor correlate for socioeconomic status in complex societies (deFrance 2009). In the context of market economies, globalization, and consumer choice, diversity in faunal assemblages tends to be much lower than in pre-Columbian contexts, regardless of social status (Deagan 2008: 25).

While greater complexity in social organization requires greater reliance on social theory, it does not serve scholarship to marginalize the role of the environment in understanding complex societies (Hardesty 2009). In the 1980s, many historical archaeologists ignored seasonality, reasoning that sedentary agriculturalists were not subject to seasonal fluctuations in resource availability. Seasonality was only discussed within the context of the exploitation of wild game, a minor resource at most historical sites. This perspective was countered by research that revealed distinct seasonal patterns in animal husbandry practices, including slaughter, driven by the requirements of meat preservation and storage (Bowen 1988). Despite human "control" of production, complex societies are by no means divorced from environmental realities.

The far-flung connectivity of human actors operating within postcolonial contexts also requires historical environmental archaeologists to tack between local and global scales to an extreme that is not matched in precolonial contexts. Actors living in more recent time periods move through networks with a global reach as a result of colonialism, capitalism, environmental degradation, and urbanization

(Deagan 2008). Mass migration of human populations, the accompanying translocation of alien species and land-use practices, and the harnessing of energy leading to unprecedented changes in the functioning of global ecosystems necessitates looking beyond sites and catchment areas to investigate transoceanic interactions and extraordinarily complex sociopolitical dynamics. At the same time, written documentation not only permits historical environmental archaeologists to explore the ways in which complex societies exploited and modified the natural world on a global scale, but also to examine human cultural understanding of the natural world and the construction of cultural landscapes.

Migration, Scale, and Landscapes in Historical Environmental Archaeology

Despite the theoretical and methodological challenges outlined above, a new synthesis of historical archaeology and environmental archaeology is emerging. Much of recent historical environmental archaeology scholarship, including the articles in this journal, coalesces around three common themes: scale, migration, and landscapes. These themes are universal to archaeology, but take on greater salience and complexity in explorations of more recent human history. Here, I explore historical archaeological approaches to scale, migration, and landscapes in the context of human/environment interactions, and place the articles in this issue within this broader research context. It is, of course, not possible to summarize all historical environmental research centered on these themes, so I focus primarily on historical environmental archaeology of the Eastern Woodlands, especially the Chesapeake.

Migration

While migration has always characterized human history, the scale and pace of migration has expanded considerably in the past few hundred years. The colonization of Native American lands by Europeans heralded centuries of unprecedented mass migration, both voluntary and forced. Mass migration also spread alien crops, animals, and pests across both hemispheres, causing substantial environmental and health impacts (Crosby 1972, 1994).

One of the most significant environmental effects of migration was the loss of native land stewards and managers. Native American ancestors throughout the Americas were enslaved, killed by violence and disease, displaced by treaties and land grabs, and forcibly removed from their lands by European colonialists. Although native communities resisted and persisted under colonialism, the environmental impact of the displacement of native peoples was dramatic. Since the mid-Holocene, millennia prior to European colonialism, landscapes across North America were managed by native people, particularly through controlled fire (H. Delcourt and P. Delcourt 1997). Early European colonialists described parts of the Eastern Woodlands as "park-like" and were able to ride on horseback through the cathedral-like forests that were clear of brush and understory (Hammett 1992; Mellars 1976). Native fields and habitation areas created patchwork landscapes, providing a diversity of habitats, including key edge habitats that were attractive to many game species. European colonizers understood that the landscapes they encountered were managed by native people (Guffey 1977; Hammett 1992), even though they would later lay claim to these lands as "uninhabited."

Low-intensity fire was a key land management tool for Eastern Woodland people (Wagner 2003). Native communities used fire not only to clear land for agricultural production, but also to encourage the growth of the annual plant species that provided the bulk of human diet and medicines (Guffey 1977; Mellars 1976). These same species also attracted preferred game animals, including deer, and fire itself was used as a hunting technique (Hammett 1992; Waselkov 1978).

Fire is a natural phenomenon in the Eastern Woodlands. Even before intentional

use of fire by native people, lightning-caused fires were common and served to promote new growth by clearing underbrush and aided established trees by returning nutrients to the soil (Pickett and White 1985). Lacking a complete understanding of the role of fire in ecosystem health, fire suppression became the norm under European and, later, American land-management practices. Without natural fires and without fire management by native people, the Eastern Woodlands became choked with underbrush. Further, the removal of native land managers through violence, disease, and displacement shrank the amount of land under cultivation leading to a loss of critical "edge" habitats that attract many plant and game species, including deer, bear, rabbits, and raccoons (Hammett 1992; Mellars 1976). The Eastern Woodlands never existed without human management. Fire suppression and the removal of the keepers of traditional ecological knowledge surrounding forest management led to the emergence of an entirely novel forest ecosystem in the Eastern Woodlands.

The Eastern Woodlands were further transformed by the introduction of Eurasian plants and animals (Crosby 1986, 1994), and European agricultural practices. Metal plows introduced by Europeans reduced the labor costs of agriculture, but increased soil erosion (Grady, this issue). Some introductions, such as pests and weeds, were unintentional. Domesticated plants and animals, however, were introduced by Europeans in an effort to support the transplantation of European agrarian economies and lifeways to North America (Hall, this issue). The success and failure of Eurasian livestock in North America was influenced by a number of variables (Pavão-Zuckerman and Reitz 2006, 2011; Reitz 1992a, 1999). Pigs were particularly adaptable throughout the Eastern Woodlands, tolerating warm and cool temperatures, and thriving in high humidity. Cattle and sheep are not as well adapted to high humidity, but sheep did well in cooler climates, especially in the north, and cattle thrived in areas with adequate grazing and water. Chickens, although requiring specialized infrastructure, were widely raised, particularly for egg production.

These alien livestock, however, brought a whole host of new environmental challenges, including overgrazing, erosion, and competition with wild game (Crosby 1994). Many native grasslands were not adapted to withstand the grazing behavior of cattle, which tend to pull plants out of the ground, killing shallow-rooted plants. Most native North American ungulates are browsers that consume a variety of plants and tend to exploit grasses by nipping the plants off near the ground surface, allowing them to regrow. The resulting loss of groundcover due to cattle grazing left topsoil subject to water and wind erosion, increasing runoff and the sediment load of rivers and streams, negatively affecting aquatic communities. Riparian plants also serve the important purpose of slowing down water flow—if these plants are removed from the banks of streams and rivers through grazing, the unimpeded flows gain energy, leading to river downcutting and erosion.

Landscape changes wrought by the implementation of European agricultural practices in the Eastern Woodlands also altered species communities. In the Chesapeake, expanding colonialism replaced wild game habitats with agricultural fields, and intensive hunting depleted wild game populations (Bowen 1996). A decline in the consumption of more "exotic" game, such as swans, may reflect shifts in cultural sensibilities, as preferences for medieval-period banquets presenting animals in lifelike poses fell out of fashion and were replaced with complex preparations of meats from domesticated animals (Bowen 1996).

The practice of animal husbandry in European colonies diverged from pastoral strategies on the other side of the Atlantic. While livestock tended to be pastured and fenced in Europe, they were at least initially allowed to roam freely in the Americas, foraging in forests and old fields (Bowen 1996). Allowing cattle to free range was particularly efficient in the Chesapeake region during the 17th century, prior to agricultural diversifica-

tion and intensification (Arbuckle and Bowen 2004; Carson et al. 2008). Ample forests surrounded farms during that time, and the emphasis on tobacco production, with its long fallow periods allowing weedy regrowth and enhancing soil fertility (Earle 1988), created additional foraging opportunities. Arbuckle and Bowen (2004) found that cattle were larger during that period, reflecting more diverse diets and better nutrition. Agricultural intensification and diversification in the 18th century, shifting away from tobacco production and toward crops with shorter fallow periods, adversely affected cattle. With less-nutritious forage, the body sizes of cattle declined significantly.

Domesticated livestock initially did not fare well in Native American economies for a number of reasons (Lapham 2011; Pavão-Zuckerman and Reitz 2006, 2011; Reitz 1992a); likely the most important of which is that there were no large (nor hoofed) domesticated animals in North American prior to the colonial era. Throughout the North American Southeast, domesticated livestock contributed very little to the diet of native people for several centuries after their first introduction (Pavão-Zuckerman 2000, 2007; Reitz 1993, 1999; Reitz and Dukes 2008).

The Eastern Woodlands are not homogeneous, varying from the temperate woodlands in the north to the subtropical forests of the south. This latitudinal variation very much structured the implementation of animal husbandry across the eastern seaboard. Cooler temperatures in New England permitted the development of a robust dairying industry, but higher temperatures in the south made the preservation of dairy products more difficult and dairying less successful (Bowen 1996).

The suite of Eurasian and African botanical species brought to the Americas by Europeans in the colonial period was far more diverse than the suite of animals, and native responses to the introduction of Eurasian plants were highly variable and context dependent (Newsom and Gahr 2011). While foodways tend to be conservative, native people picked and chose among the flood of new cultigens, deciding which species to adopt and how to incorporate them into their daily and seasonal rounds (Newsom and Gahr 2011).

Migration also had profound effects on the foodways and environmental relationship of the colonists. In many cases, European diets were more profoundly influenced by colonialism than were Native American foodways (Reitz 1985, 1991, 1992b; Reitz and Scarry 1985). European migration to North America necessitated a great deal of adaptation to new environments even while the domesticated plants and animals they introduced brought irrevocable changes to the alien landscapes. European colonialism is best characterized as a process of improvisation and experimentation, with no small amount of learning from the practices of the original American land managers (Carson et al. 2008). Many European cultural practices were not easily transferred to American environments. European colonialists adapted, not always happily, to local environments by adopting local foods (Scarry 1985, 1993; Scarry and Reitz 1990).

In the Chesapeake, English colonists relied primarily on domesticated animals for meat, but the proportion of the diet contributed by wild game was much greater for immigrants than their European counterparts (Hall, this issue; Lee, this issue). In England, wild-game hunting was a pastime reserved for the very wealthy (Bowen 1996). A vestige of this status hierarchy was present in America; wealthier colonialists often hired hunters to obtain venison.

Food and foodways in the Chesapeake were influenced by a number of factors, including socioeconomic status, cultural practices, and personal preferences (Lee, this issue). The Anglophone colonies of the American East were particularly conservative, with a strong preference for English foods and foodways (Chaplin 2011, 2014). Despite such preferences, cuisine differences are often muted in frontier contexts. On the frontier, ecological and market availability of different

foods play outsized roles in the emergence of local similarities in foodways (Scott 2008).

Not all migrations were voluntary. European colonists kidnapped and enslaved over 12 million African people who were brought to the Americas via the transatlantic slave trade. The forced labor of African Americans transformed American landscapes and shaped American cuisines (Deetz 2017). Zooarchaeological analyses at slave plantations reveal diverse economic strategies. The diets of enslaved communities and landowning households were often similar in terms of the types of meats consumed, but varied in proportion and quality (McKee 1987). Wild game and plants were important sources of food for enslaved households throughout the Eastern Woodlands, and enslaved households often relied on wild game to a much greater extent than did white land owners (Bowen et al. 1998; McKee 1987; Young 2003).

Slave labor on plantations was organized differently depending on the main economic crop that was grown (such as rice, cotton, or tobacco), the geographical location of the plantation (coastal or piedmont), and the social status of enslaved families within the plantation hierarchy (Morgan 1982; Reitz et al. 1985). The organization of plantation labor affected the ability of families to supplement food rations with their own food quests. Slaves who labored in task-oriented systems were often able to manage their time to allow engagement in supplementary subsistence activities, while enslaved people organized in gang-labor systems had very little free time to devote to food acquisition and were, therefore, more dependent upon rationed foods.

Social hierarchies within enslaved communities served as a form of social control and structured access to resources. "House" or "domestic" slaves, who spent the most time with white landowners, often received better rations and better treatment, and greater privileges, including, in some cases, access to firearms for hunting (Bowen 1993). Social hierarchies meant that not all enslaved African American families had equal access to these supplementary foods.

The relationship between enslaved cooks and white slave owners was particularly complex (Deetz 2017). Kelley Deetz argues that, working under the close daily supervision of the plantation "mistress" and laboring under threat of physical violence, the specialized knowledge of enslaved cooks meant that they were able to exert considerable power within their relationships over those who held their freedom. The social status of the white wives of plantation owners was, in no small part, tied to the skill of the enslaved kitchen staff. As Deetz (2017) argues, enslaved cooks brought the culinary knowledge and techniques of their ancestors to the table that, when combined with English and French cultural traditions, built what is now recognized as "Southern" cuisine; a distinctly American food tradition.

Scale

While all archaeological inquiry requires movement across multiple scales, the scale of economic and political interaction expanded considerably after the 16th century, leading to the emergence of a global economic system. The economic and political transformations of the past few centuries are stunning but so too are the environmental transformations.

Archaeologists working on more recent time periods ask questions that must be placed within an unprecedented breadth of scale, from individual and household to community, regional, and global scales. Local resource extraction in recent complex societies must be placed within the broader context of global economic processes, no matter how peripheral to colonial metropoles. While many of the communities explored herein were at the margins of the colonial powers to which they were tied, none of them existed in a vacuum—all existed within global interaction networks. Global expansion was motivated in part by capitalism and the commercialization of natural resources. Understanding the role of

households and communities within the emerging capitalist world system is key to understanding environmental relationships (Biuk, this issue; Clifford, this issue; Janesko, this issue; Lee, this issue).

Globalization led to growing urbanization, and historical archaeologists are increasingly concerned with the organization of urban food-supply systems (Deagan 2008; Landon 2008). Urban communities in the Chesapeake were supported by extensive hinterland farms (for a thorough discussion of the development of the planter economy and urbanization in the Chesapeake, see Walsh [2010]). Rural plantations carefully planned slaughter around the life cycles of domesticated animals, as well as the seasonal conditions affecting the preservation of meat. While urban dwellers in the Chesapeake had access to markets with imported goods, the yearly cycle of slaughter in the rural hinterlands structured their access to meats and, as a result, in terms of their meat consumption urban and rural households were far more alike than different (Bowen 1993; Landon 2008). This pattern, however, was not universal. Elsewhere, such as on the southern Atlantic Coastal Plain, rural households relied more on wild game than urban households, and this pattern held regardless of social status (Reitz 1986).

Scale is intrinsic to both ecological and archaeological research (Wagner 2003), and, like ecological research, environmental archaeological research ranges from coarse- to fine-scaled. Fine-scaled research reveals complexity that appears homogenous from a coarse-scaled view, but emergent properties of human ecosystems are often only visible at wider-scale views.

It is only possible to view these emergent properties when the data are robust, including large, adequately studied datasets from multiple sites over long periods of time. In most regions this goal may be years away, but, in the southern Atlantic Coastal Plain, Betsy Reitz was able to compile decades of research on fish remains spanning the prehistoric/historical divide to demonstrate that a downward trend in trophic-level exploitation of fisheries predates the large-scale industrial fishing of the modern era. The data amassed by her research lab suggest that overharvesting began in the region as early as the 18th century (Hales and Reitz 1992; Reitz 2004). This research also highlights a well-known critique of modern conservation efforts that assume "pristine baselines," or, as Reitz puts it: "The early twentieth-century resource base may not be the stable, pristine one assumed by many resource managers" (Reitz 2004: 79).

Torben Rick and colleagues are similarly interested in understanding long-term trends in oyster fisheries in the Chesapeake (Rick et al. 2016). Oyster populations in the Chesapeake are known to have experienced a precipitous decline over the past century, but the degree of this decline was not fully understood in the absence of a working knowledge of historical oyster fisheries. This lack of a "baseline" with which to compare modern oyster populations makes informed management decisions difficult. Using measurements of archaeological, fossil, and modern oyster shells spanning 3,500 years of history, Rick et al. (2016) found that oyster populations in the Chesapeake were resilient under millennia of harvest by Native American communities, providing a sustainable example of oyster harvesting after which modern management strategies can be modeled.

Understanding vertebrate-exploitation systems in the Eastern Woodlands requires tacking between scales. Although European American colonists and African American communities (free and enslaved) were highly dependent upon domesticated livestock, a great deal of variation exists within that broad pattern. This is particularly the case in terms of the relative reliance on different domesticated animals. In the Chesapeake region, beef appears to have been the primary meat resource, followed by pork, and then mutton (Bowen 1996; Bowen et al. 1998; Hall, this issue; Lee, this issue). In the southern Atlantic region, pork was more often (but not always) dominant (Reitz 1995; Wing 1977); swine were

better adapted to the humid, subtropical Southeast than were cattle. Variation on this theme abounds, however, with pork consumption outweighing beef consumption within some enslaved communities during some time periods (Bowen 1993), and with many sites on the southern Coastal Plain exhibiting a greater reliance on beef, regardless of location, socioeconomic status, or ethnicity (Reitz 1995).

Technological innovations toward the end of the 19th century further transformed the scale of agricultural and industrial production in the Eastern Woodlands. The mechanization of agriculture allowed farms to expand considerably in size, and the mechanization of manufacturing revolutionized the production of finished goods. Innovations in transportation over land and water permitted the emergence of industries in areas that were distant from needed raw materials (Biuk, this issue) and the movement of agricultural products on an unprecedented scale. These new technologies, however, were costly, and farmers and small-scale producers in the Chesapeake and elsewhere who did not have the necessary capital to invest in technology were quickly shut out of the market (Janesko, this issue). The technologies developed for food crops were not always applicable to other crops such as tobacco, which was the primary cash crop in the Chesapeake region for much of the colonial period. New technologies further exacerbated environmental challenges, such as soil erosion, and added new insults, including water, soil, and air pollution.

Landscape

The mass migration and urbanization that characterizes the past few hundred years provides an opportunity to explore the social and political implications of landscape use. Human systems interact with, modify, and shape landscapes in keeping with cultural practices and worldviews. The concept of "landscape" is almost never well defined (Jackson 1984); however, archaeological approaches to landscapes tend to emphasize "space as place" (Knapp and Ashmore 1999: 2) and "place-making" (Anschuetz et al. 2001; Van Dyke 2011). In this conceptualization, humans ascribe cultural values and meanings to physical spaces that then become places of cultural significance. Landscapes are constructed and conceived of in keeping with human cultural values and in reflection of cultural worldviews. Archaeological landscapes encompass both the environmental and the ideological, with an emphasis on the relationships between humans and the natural world (Branton 2009; Knapp and Ashmore 1999; Pavão-Zuckerman 2011).

Recent conceptualizations of landscapes are, in many ways, a reaction against mechanistic approaches to human/environment interactions that present these relationships as devoid of cultural meaning (O'Donovan 2011). Early discussions of "landscape" used the concept as a stand-in for "the environment" and treated landscapes as static backdrops or containers for human activities (Branton 2009; Knapp and Ashmore 1999). As applied in archaeology today, landscapes emphasize interrelationships between people and places (Branton 2009). Contemporary approaches to landscapes view human actors as moving through spaces and places that are imbued with meaning and memory, within which humans negotiate their role in society and the world (Knapp and Ashmore 1999). Human landscapes and land-use practices hold a mirror to human worldviews regarding the separability or inseparability of humans and the natural world, and their relationships to one another (O'Donovan 2011). The landscape view of humans as inseparable from the natural world is arguably a closer approximation of the worldview of many of the ancestral Native American groups whom archaeologists study (O'Donovan 2011). Julia Hammett (1992) observes that native landscapes in the Eastern Woodlands were conceived and depicted as concentric circles of management surrounding Native American households, with the level of management decreasing from the innermost to the outermost concentric rings. The few surviving maps, or transcriptions of maps, drawn

by Native American cartographers reinforce the importance of circles in the communication of spatial organization (Waselkov 1989). These maps, whether drawn in ash or on hide and paper, nearly always place the cartographer's own community front and center, the point from which the known world radiates.

These maps also emphasize the landscape mosaics created by native management practices, encompassing fields, forests, canebrakes, and grasslands that encouraged the presence of a wide diversity of flora and fauna (Wagner 2003). Eastern forests were thinned or deforested for agricultural fields, for fuelwood, and for construction materials, creating new habitat for game (Wagner 2003). Humans were inseparable from the landscapes they created.

In contrast to native worldviews, the separability of humans and the natural world was integral to European colonial worldviews in which human activities occur in opposition to the wild and uncivilized natural world. A key aspect of European colonialism was a reshaping of so-called wild landscapes into "civilized" landscapes. Rather than the concentric rings of landscape management typical within indigenous communities of the Eastern Woodlands, European American models of landscape organization were generally laid out on grids and rectangular plots (Hammett 1992). Constructed landscapes played a key role in distinguishing the "wild" and "uncivilized" from the domestic and "civilized". Cultural landscapes serve as both a reflection of social dynamics and as a strategy for maintaining and manipulating these dynamics.

Conceptualizations of wild vs. domestic are epitomized in the household "garden landscapes" of elite European American households. As Branton (2009) observes, an interest in formal gardens in the context of historic preservation was an important catalyst for the incorporation of the concept of landscape into historical archaeology. House gardens and grounds are among the built landscapes that can most clearly reflect social status and identity, as well as worldviews regarding the relationship between humans and nature (Yamin and Metheny 1996). In colonial contexts, "gardens became more conscious representations of the worldview of the elite colonists and reinforced status differences within the colonial community" (Cagnato et al. 2015: 236). Wealthy planters often paid close attention to the relationships between architecture and landscapes, carefully planning the location and orientation of their built environments, thus marking the origin of the discipline of landscape architecture and a shared "grammar" of plantation design (Clifford, this issue).

Multiple overlapping cultural landscapes can and do coexist within multiethnic communities. Social groups may share the same physical space and yet construct cultural meanings around those landscapes very differently (Knapp and Ashmore 1999). Communities with vast disparities in access to power and resources, such as slave plantations, colonial missions, and company towns, epitomize this dynamic. The organization of space within these communities was often used to allow for greater surveillance of laborers by the powerful, while discouraging the organized resistance of laborers (Epperson 2000; Nassaney and Abel 2000; Shackel and Larsen 2000; Young 2003). At the same time, subordinated groups and individuals manipulated space and landscapes to resist efforts by elites to control their daily lives.

Migration, Scale, and Landscapes in the Chesapeake

The articles in this issue aim to expand the application of environmental archaeology in the Chesapeake region; a region with a long history of interest in historical archaeology, and a region that has seen a great deal of environmental change as a result of both native land management and European colonialism. All the articles emphasize the improvisational nature of Chesapeake colonialism, summarized best in Carson et al. (2008: 31): "Successful overseas migrants were traditionalists by instinct and improvisers of necessity." European colonizers in the Chesapeake invaded a landscape that

was dynamic and long managed by native communities. Settlers learned from native land managers and then displaced them, bringing further ecological change and the emergence of entirely novel human ecological systems. As observed by Carson et al. (2008: 37): "Farmers, food crops, livestock, and weed seeds ... soon converted the regional ecology of the Chesapeake into a dynamic open-woodland agricultural system that was part English, part Indian, part raw nature, and part improvisation."

Migration is a central theme in all of the articles in this issue, even when the theme is unstated. The contributions all address the environmental impacts of European colonialism, one of the largest-scale migrations in human history. In particular, Hall addresses the likely environmental impacts of domesticated animals on Chesapeake landscapes, independent of the known substantial environmental impact of tobacco cultivation. Although tobacco cultivation is often blamed as the prime mover of ecological change in the Chesapeake region, Hall argues that roving herds of foraging cattle and swine, seen in the zooarchaeological record at two plantations in Anne Arundel County, contributed to soil erosion and plant-community alteration well before the widespread adoption of tobacco cultivation. Moving up in time, Janesko explores the impact of the Civil War on agricultural practices at one of the same farmsteads. Using statistical analyses of census data and farm schedules, she identifies a steady and significant decline in agricultural production after the Civil War. The most significant decrease occurred in the production of tobacco, a labor-intensive crop that was only economically viable within systems of enslaved labor. Oat production, on the other hand, continued at roughly the same levels before and after the Civil War. This crop was used primarily as livestock feed, suggesting continuity in the importance of domesticated animals over time. Lee's research on zooarchaeological remains from the Burch House in Port Tobacco suggests that 19th-century diet was surprisingly diverse, making use of abundant aquatic resources, including fish and waterfowl. The lengthy occupation of the house also allows for the observation of change over time likely due to differences among the various homeowners and stability in diet.

The contributions by Biuk and Grady demonstrate the scalar challenges of environmental archaeology in recent contexts. Biuk uses archaeological, documentary, and oral-history evidence from the Delmarva Peninsula to trace the decoupling of the shell-button industry from its source material. While the late 19th-century button industry was drawn to the Midwest to take advantage of abundant local shellfish resources, 20th-century button factories were drawn to the Eastern Shore of the Chesapeake for other reasons. The Delmarva button factories, despite their location in a region known for oystering, were entirely reliant on imported shells, primarily from the South Pacific. Chesapeake shells were mostly useless for button manufacturing. Biuk's research challenges assumptions regarding the localization of raw-material acquisition and demonstrates the global connectivity of even small-scale local industries. Grady uses soil characteristics and sedimentology to demonstrate the substantial impacts of a single homestead on localized erosion, which, scaled up to a regional view, add up to substantial environmental change. Although the effects of agriculture on soil erosion are well known and documented, the research presented by Grady suggests that even house construction, remodeling, and driveway construction can cause significant soil erosion.

Clifford's contribution in this issue addresses landscape construction as a mirror to social communication. Examining the characteristics of 17th- and 18th-century plantation landscapes, Clifford establishes an architectural "grammar" through which plantation owners reinforced their social status. She argues that landscape architecture functioned as part of a living "job interview" for white planters seeking greater political power in the growing colonies. The shared architectural language of highly visible Georgian architecture—elevation

above the surrounding landscape, terracing, the presence of exotic plants, and the orientation of dependencies—was used by 18th-century Maryland slave owners to convey a sense of control, order, productivity, and wealth.

Conclusions

Despite the intellectually separate origins of environmental and historical archaeology, the authors in this issue build on a growing body of recent research that places all humans within ecosystems and understands humans as drivers and indicators of ecological change. The last 500 years have witnessed dramatic changes in human/landscape interactions through forced and elective migration, the global exchange of plants and animals, and the extraction of natural resources at an unprecedented scale, leading to alterations in global climate and ecosystem processes. Historical archaeology as a subdiscipline has elevated the importance of research on recent time periods, emphasizing both structure and agency in the unfolding of colonialism. Environmental archaeology provides archaeologists with the tools necessary to explore changes in human/environment relationships wrought by colonialism. The integration of these fields, while not without challenges, has yielded far more nuanced and reliable insights into the role of migration in human history, the importance of scale in archaeological scholarship, and landscapes as cultural constructions imbued with cultural meaning. With an emphasis on more recent time periods, and with the benefit of written documentation, historical environmental archaeology addresses not just the ways in which complex societies exploited and modified the natural world, but also human cultural understanding of the natural world and the construction of cultural landscapes. Both historical and environmental archaeology have opened doors to new archaeological perspectives, methodologies, and practitioners—greatly enriching the understanding of the human past.

The scholars in this issue are also the products of the program in Citizen Science at the Smithsonian Environmental Research Center, located on Chesapeake Bay. The authors are all committed to the mission of the Smithsonian Environmental Research Center—to explain environmental science and human/environment interactions in a way that will promote sustainability and stewardship in the present. They are also all emerging scholars, either currently enrolled in, or recently graduated from, archaeology graduate programs. The authors are well practiced at communicating their research and archaeological scholarship in general to public audiences. This is a positive indicator for the future of archaeology—emerging professionals who value the involvement of the public in the appreciation and production of archaeological knowledge.

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