Title

From Colonization to Domestication: Population, Environment, and the Origins of Agriculture in Eastern North America

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From Colonization to Domestication: Population, Environment, and the Origins of Agriculture in Eastern North America

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Human behavioral ecology (HBE) is a staple in California and Great Basin archaeology. It can be characterized primarily as an exploration of shifts in subsistence, landscape use, and demography using floral and faunal remains. HBE provides a framework for developing testable hypotheses grounded in quantitative models that ask how humans *should* act based on a known set of parameters. Like any set of models employed to investigate human behavior, HBE has its shortcomings. In the first chapter of this book, Miller quotes Box and Draper (1987:424): "Essentially, all models are wrong, but some are useful." Archaeologists working in the Great Basin know how useful models can be in understanding adaptive strategies through time. In eastern North America, arguably the most significant shift came with plant domestication. But southeastern archaeologists are hampered by the relatively poor preservation of organic materials. Instead, Miller examines the organization of bifacial technology and the distribution of archaeological sites during the Paleoindian and Archaic periods in the lower Tennessee and Duck River drainages to assess whether population pressure and resulting changes in mobility played a role in the origins of agriculture.

Delving into the cultural history of eastern North America can be daunting, but in Chapter 2, Miller offers an overview to familiarize the reader with the region and create a foundation upon which he can build his hypothesis. He explains how temporally-diagnostic biface technology evolved in the context of local environmental manifestations of global climate changes (e.g., Younger Dryas). Using data from stratified multi-component sites and Bayesian statistical analysis of radiocarbon dates, Miller is able to group diagnostic projectile points into sets that correlate with major environmental and cultural trends. In this way, the model is not constrained by the temporal span of any one projectile point type.

With this link between biface morphology, environment, and culture in mind, Miller advances a model in Chapter 3 that considers the relationship between the size, shape, and condition of bifaces and the intended prey. By framing projectile points as "patches of utility" (Kuhn and Miller 2015), the frequency of stone tool production, use, and discard can be explored using the marginal value theorem. An artifact should be abandoned when immediate returns fall below the expected yield of a replacement artifact. Rates of artifact attrition vary with prey size, and prey size can be taken as an indicator of hunting returns.

Miller uses two archaeological case studies as examples in which access to raw material is held constant, and changes in resharpening and discard may be attributed to fluctuations in hunting returns. In brief, he finds that tool maintenance was favored when prey size decreased and diet breadth widened (i.e., hunting returns decreased), but resharpening rarely occurred when hunting returns were exceptionally high. These results form the basis for his hypothesis that, as environmental changes create shifts in available resources, biface technology will reflect a consequent shift in hunting returns in the Southeast.

In Chapter 4, Miller generates a series of expectations as to how bifacial technology should change over time given what is known about the local environment in the lower Tennessee River valley. Because of the abundance of lithic sources in the study area, access to raw material can be held constant as required by the model. Miller collected and digitized data for over 5,200 bifaces from 87 sites in two counties, creating a robust data set from which he was able to assess whether proxy measures for resharpening varied over time. This is the most technical and quantitative of the chapters, and those dispassionate about biface morphology are encouraged to continue reading through to the discussion section. Miller discovers three "breaks" in biface organization, two of which he contends correlate with changes in subsistence at the end of the Paleoindian period and during the transition from the Early to Middle Holocene. The third break, during the Late Archaic, does not correspond with an environmental change—but it does coincide with the region's earliest known domesticated plants.

Population pressure is the focus of Chapter 5, where Miller uses the ideal free distribution model to undertand prehistoric landscape use in the Duck River drainage. He breaks the Duck River drainage into a series of habitats based on elevation, and hypothesizes when ancient populations should have moved into or out of these habitats as environmental conditions changed. By combining information from the Tennessee State Archaeological Site Files and the Paleoindian Database of the Americas, Miller makes use of powerful, but underutilized, specific locational data for over 2,200 sites in the Duck River drainage. After accounting for biases in research intensity and taphonomy, he finds a difference in habitat exploitation up until the end of the Early Holocene, when every habitat in the drainage is occupied—presumably due to increased population and demographic packing.

Miller's volume ends with an argument for a boom-bust model leading to the adoption of agriculture in the Southeast. He deftly weaves the environmental, technological, and landscape data he has gathered into an overarching theory of how people responded to changes in hunting returns. From the Early to Middle Archaic, warming led to a boom in high-ranked resources like deer and hickory nuts. During the bust in the Middle Archaic, people were unable to expand their diet by moving into new environments because those territories were already occupied. Instead, they tried to extract as much as possible from their resource catchment by investing in technology like ground stone tools and storage containers.

Miller's writing style is engaging and his boom-bust scenario is compelling. One of the significant aspects of the analysis is its potential applicability to a variety of settings. Miller's book joins a growing collection of research that employs HBE as a tool for addressing big archaeological questions with lithic technology (e.g., Surovell 2009), and it will be useful for archaeologists no matter where they work.

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