Archaeological Investigations, LiDAR Aerial Survey, and Compositional Analysis of Pottery in Edgefield, South Carolina

George Calfas, Chris Fennell, Brooke Kenline, and Carl Steen

The first innovation and development of alkaline-glazed stoneware pottery in America occurred in the "Old Edgefield District" of South Carolina in the early 1800s (Figure 1). It remains an enduring mystery as to how these new ceramic methods were developed in that place and time, and how the techniques of clay choice, temper, and glaze developed over the following century (Greer 1981; Horne 1990). These potteries employed enslaved and free African-American laborers in the 19th century, and the stoneware forms also show evidence of likely African cultural influence on stylistic designs (Baldwin 1993; Koverman 1998; Vlach 1990a, 1990b). Edgefield potteries thus present fascinating research questions of understanding technological innovations and investigating the impacts of African cultural knowledge and racial ideologies on a craft specialization during the historic period in America. This project entails an interdisciplinary, collaborative, and archaeological study of the first development in America of alkaline-glazed stoneware pottery forms, the development of that South Carolina industry over time, and the impacts of racism and African cultural influences on those processes.

The technological innovation of alkaline-glazed stoneware pottery was introduced in North America by potteries operated by Abner and John Landrum in the Edgefield area in the first decades of the 19th century. These technological developments by entrepreneurs of Scots-Irish heritage played out in a landscape shaped by racial difference. Numerous African-American laborers, including "Dave the Potter" who added inscriptions to his vessels, worked at these production sites (Figure 2). Advertisements in local newspapers in the early decades of the 1800s listed enslaved laborers with skills in pottery production. African Americans most likely participated in all phases of the production process, such as: building and maintaining the kilns; digging and transporting clay; working and grinding raw clay in "pug" mills; chopping wood for fuel; preparing glaze mixtures, tempers, and clay pastes; turning the pottery wheels and shaping the vessels; loading and unloading the kiln firings; and work in transporting and marketing the wares.

As local historians Holcombe and Holcombe (1989:22) observed, the "District's ceramic entrepreneurs would never have been able to manufacture such large quantities of Edgefield wares without the slave participation." Indeed, in the period of 1800–1820, the recorded number of enslaved African Americans in the surrounding area had increased to comprise half of the Edgefield District's population. An illegal transport of enslaved laborers on the ship Wanderer delivered newly-captive Africans to the Edgefield District in 1858. The production of remarkably shaped "face vessels" at local potteries have also been analyzed as presenting evidence of the influence of stylistic traditions from cultures of West Central Africa (Figure 3) (Todd 2008; Vlach 1990a, 1990b).

This project seeks to undertake detailed archaeological investigations of principal sites in Edgefield, conduct archival research, and start a multi-year community engagement and education program related to these subjects. Archaeological field schools and research teams at such pottery sites can explore both the production facility remains and the residential sectors for the enslaved and free African-American laborers. Primary research questions include: (1) examining the distribution of work areas and residential locations in each pottery site and analyze the degree of spatial segregation due to the impacts of slavery and racism; (2) understanding differential uses and development of those work and residential spaces, as reflected in archaeological features and artifact distributions, and the degree to which variations correlate with different racial categories associated with the occupants;

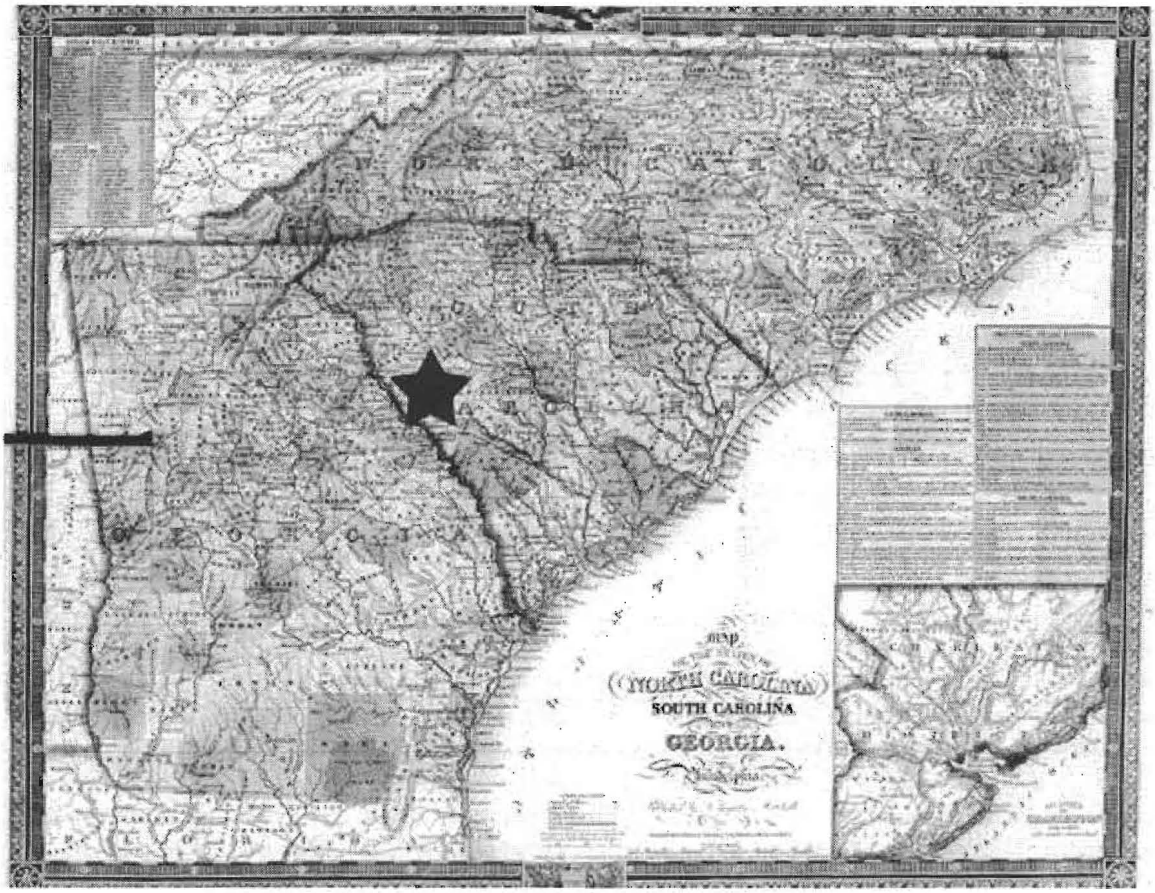

Figure 1. Mitchell 1835 map of North Carolina, South Carolina, and Georgia, with the Edgefield district highlighted with a star. Courtesy of Hargrett Library Digital Collections, University of Georgia.

Figure 2. Storage jar made by Dave Drake, Edgefield, SC. Philadelphia Museum of Art collections.

Figure 3. Mid-19th century face vessel produced in Edgefield, SC. Smithsonian collections.

(3) analyzing faunal and botanical remains to explore and contrast dietary and health patterns between residential sites and the degree to which variations correlate with different racial categories associated with the occupants; and (4) understanding the development and changes over time in the technologies of pottery production at these manufacturing sites.

Archaeological Field School

A six-week archaeological field school in 2011 will focus on the site of Pottersville (earlier called "Landrumsville"), where Abner Landrum started the first stoneware production facility in the Edgefield district in the early 1800s (Figure 4). We will excavate the kiln and related production areas and conduct surveys to locate the house sites of the craftspeople and laborers who created the Pottersville village surrounding that manufacturing facility. Instructors will include the authors of this article. In 2009, Calfas launched a project of compositional analysis of the differential elemental contents of clay sources and ceramic sherds from several Edgefield potteries, and he plans to continue this project during the 2011 field season. A collaborative group of researchers, advisors, consultants, and community members provide guidance for our research activities and plans, including (among others) Vernon Burton, Beth Cali, Chris Espenshade, Leland Ferguson, Stephen and Terry Ferrell, Joe Joseph, Ken Kelly, Jill Koverman, Ethan Lasser, Robert Marcom, Carol McDavid, Carrie Monday, Jon Prown, Bettis Rainsford, Edward Redman, Tim Scarlett, Stan South, Sean Taylor, Robert Farris Thompson, Leonard Todd, John Michael Vlach, and Terry Weik.

This field school will provide training in the techniques of excavation, mapping, controlled surface surveys, artifact classification and contextual interpretation. Students will work in supervised teams, learning to function as members of a field crew, with all of the skills necessary for becoming professional archaeologists. Laboratory processing and analysis will be ongoing during the field season. Evening lectures by project staff, visiting archaeologists, and historians will focus on providing background on how field data are used to answer archaeological and historical research questions. The instructors and students will stay in local housing in the Edgefield area during this six-week field school, and visit nearby archaeology sites and museums on weekend trips. Additional information and updates on the field school are available online at http://www.histarch.uiuc.edu/Edgefield/ (Also see the Notes from the Field Section for an update on the 2011 field work).

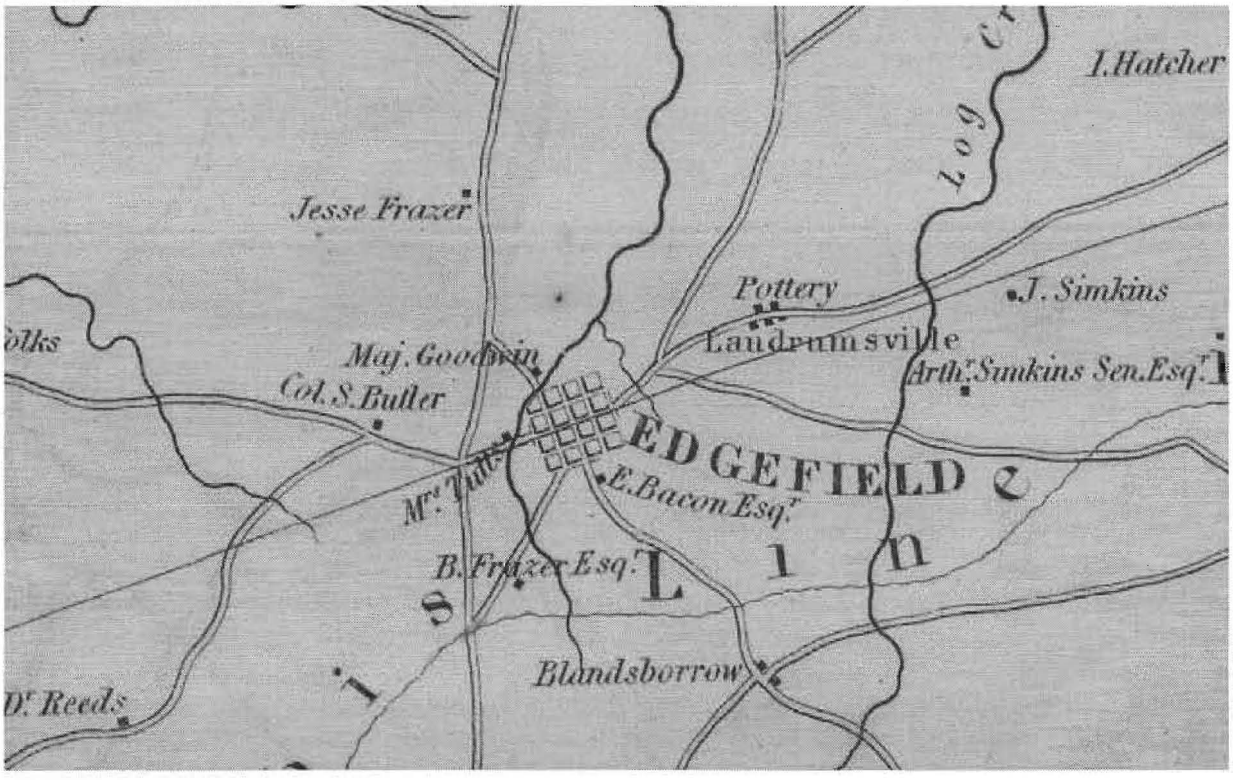

Figure 4. Excerpt of a map of the Edgefield District of SC surveyed by Thomas Anderson in 1817 and printed in the Robert Mills Atlas in1825. Courtesy of the Library of Congress.

LiDAR Aerial Survey

The University of Illinois has provided funding support to conduct a low-altitude aerial survey using Light Detection and Ranging (LiDAR) technology to determine the actual spatial extent and contours of the Pottersville production center and surrounding cultural landscape. This first pottery center expanded rapidly to meet a strong demand by neighboring agricultural producers for large, durable storage vessels, and produced a high volume of utilitarian stoneware vessels over several decades. Success of Pottersville stoneware led to the development of the working village around the kiln site. Documentary evidence in 1826 indicates that the complex included 16 to 17 laborer residences, and facilities for preparing clay, turning and shaping the vessels, and firing ceramics in a cross-draft, "groundhog" style kiln. This production center, with its associated village of laborers, operated at least through the 1850s, with a succession of owners and managers (Castille et al. 1988; Mills 1826; Vlach 1990b). The site of the Pottersville kiln is already recognized as nationally significant based on historical, documentary evidence, and is listed on the National Register of Historic Places (NPS 2009). However, no in-depth archaeological investigations have been undertaken there. Archaeological reconnaissance surveys conducted in 1987 demonstrated that the kiln site is intact, but no surveys have been undertaken of the surrounding area that contained the craft village (Castille et al. 1988; Steen 1994).

This remote-sensing aerial survey will provide a micro-topographic map of the landscape surface for a five-square-mile area surrounding the Pottersville kiln. This high resolution, three dimensional surface map will reveal surface contours shaped by the buried remains of the surrounding pottery production facilities and neighboring residential locations of the enslaved African-American laborers, none of which have been located to date. These cultural features will be subject of archaeological investigations in a multi-year project in Edgefield, which will include archaeological field schools and future applications for larger-scale grant support.

The use of low altitude aerial surveys with high-resolution LiDAR imaging has been applied successfully at prehistoric and historic-period sites in the United States (Harmon et al. 2006; Petzold et al. 1999; Riley 2009). LiDAR technology transmits a stream of high-resolution laser light to the ground surface and records the differential time with which each pulse is reflected back to a receiving device (Figure 5). This high-resolution survey method records a three-dimensional elevation map of the micro-topography of the ground surface, accurate to mere centimeters of spatial resolution. Importantly, the stream of laser pulses penetrate beneath any vegetation coverage to measure the underlying undulations of the ground surface, producing a high-resolution, "bare earth," micro-topographic map of features impacting the ground surface contours. LiDAR surveys have been used successfully on other sites to detect historic-period roads, pathways, and site contours not readily visible on the surface. LiDAR surveys can also detect the surface manifestations of buried archaeological remains of structures and activity areas that were otherwise obscured from visibility by vegetation cover (Ackermann 1999; Harmon et al. 2006; Petzold 1999).

LiDAR will be collected across five-square-miles of landscape, centered on the Pottersville kiln site, with multiple points per square meter and elevation resolution with an error factor of no more than 15 centimeters for each data point. The LiDAR survey will provide a micro-topographic data set across the contours of that area with surface contours measured to bare earth levels. LiDAR data will be acquired using aircraft equipped with an Optech Gemini Airborne Laser Terrain Mapper sensor array or comparable Leica ALS system. These systems utilize variable pulse and scan rates that enable the sensors to adapt immediately to varying topography and ground cover. This multipulse technology thus provides the data acquisition benefits of acquiring maximum point density in the most cost-effective manner.

Employment of such LiDAR surveys from low-altitude aerial platforms is particularly valuable when the resulting data are incorporated into a Geographic Information Systems (GIS) database and compared and contrasted with other types of archaeological and remote sensing data (Ackermann 1999; Harmon et al. 2006). In this project, the LiDAR data will be incorporated into a GIS database and evaluated in comparison with visible-spectrum aerial photographs, satellite images, plat maps, geological surveys, and historic-period maps. The results of this LiDAR survey will also provide a template for planning ground-based excavations scheduled for 2011.

Future Plans

In our larger-scale research initiative, we seek to understand how European Americans and enslaved African Americans negotiated the impacts of racism and the institution of slavery in the unique setting of the Edgefield pottery district. In those craft communities, African Americans worked in an array of skilled occupations to produce a remarkable volume of ceramic wares. This project will contribute to understanding facets of the changing meanings of racism in particular periods and locations by investigating the ways in which racial ideolo-

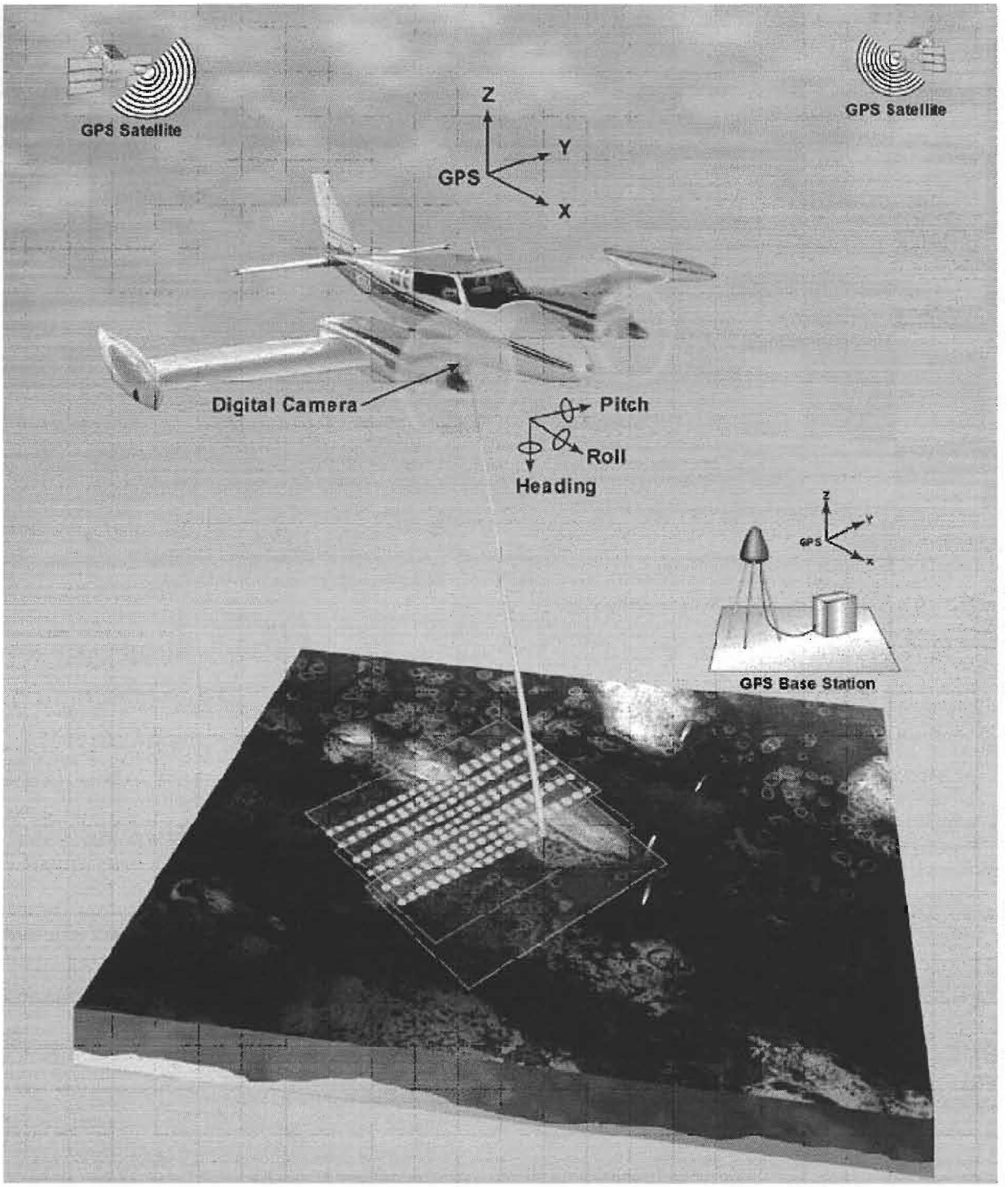

Figure 5. This illustration from the U.S. Geological Survey web site details the main components and process for collecting LiDAR aerial survey data. Courtesy of the U.S. Geological Survey.

gies were created and maintained or at times subverted and dissipated. This research will also contribute to a growing, comparative set of studies addressing the contours of racism, slavery, and economic enterprise in the periods of slavery and in post-emancipation developments of the later 19th century (e.g., Burton 1985; Fennell et al. 2009; Ferguson 1992; Leone et al. 2005; Omi and Winant 1994; Upton 1988).

References Cited

Ackermann, Friedrich
1999 Airborne Laser Scanning – Present Status and Future Expectations. *Journal of Photogrammetry and Remote Sensing* 54:64-67.

Baldwin, Cinda K.
1993 *Great & Noble Jar: Traditional Stoneware of South Carolina.* University of Georgia Press, Athens.

Burton, Orville Vernon
1985 *In My Father's House are Many Mansions: Family and Community in Edgefield, South Carolina.* University of North Carolina Press, Chapel Hill.

Castille, George J., Carl Steen, and Cinda Baldwin
1988 *Archaeological Survey of Alkaline-Glazed Pottery Kiln Sites in the Old Edgefield District, South Carolina.* McKissick Museum and South Carolina Institute of Archaeology and Anthropology, University of South Carolina, Columbia.

Fennell, C., with contributions from A. Agbe-Davies, M. Bailey, J. Brown, G. Calfas, S. Collins, M. Davila, E. Deetz, K. Fay, T. Hailey, B. Haley, K. Hardcastle, M. Hargrave, C. Martin, T. Martin, A. McCartan, A. Morris, P. Shackel, C. Sumter, E. Sylak, and C. Valvano
2009 New Philadelphia 2008 archaeology report. Report on the 2008 excavations sponsored by the National Science Foundation Research Experiences for Undergraduates (Grant No. 0752834). Urbana, IL: University of Illinois. Electronic document, http://www.anthro.uiuc.edu/faculty/cfennell/NP/2008ReportMenu.html, accessed May 13, 2009.

Ferguson, Leland
1992. *Uncommon Ground: Archaeology and Early African America, 1600-1800.* Smithsonian Institution Press, Washington, DC.

Greer, Georgeanna
1981 *American Stonewares, the Art and Craft of Utilitarian Potters.* Schiffer Publishing, Exton, PA.

Harmon, James M., Mark P. Leone, Stephen D. Prince, and Marcia Snyder
2006 LiDAR for Archaeological Landscape Analysis: A Case Study of Two Eighteenth-Century Maryland Plantation Sites. *American Antiquity* 71(4):649-670.

Holcombe, Joe L., and Fred E. Holcombe
1989 South Carolina Potters and Their Wares: The History of Pottery Manufacture in Edgefield District's Big Horse Section, Part I (ca. 1810-1825). *South Carolina Antiquities* 21(1&2):11-30.

Horne, Catherine W. (Ed.)
1990 *Crossroads of Clay: The Southern Alkaline-Glazed Stoneware Tradition.* McKissick Museum, University of South Carolina, Columbia.

Koverman, Jill B. (Ed.)
1998 *"I Made This Jar . . ." The Life and Works of the Enslaved African-American Potter, Dave.* McKissick Museum, University of South Carolina, Columbia.

Leone, Mark P., Cheryl J. LaRoche, and Jennifer J. Barbiarz
2005 The Archaeology of Black Americans in Recent Times. *Annual Review of Anthropology* 34:575-598.

Mills, Robert
1826 *Statistics of South Carolina.* Hurlbut & Lloyd, Charleston, SC.

National Park Service (NPS)
2009 Pottersville, Edgefield County. South Carolina Record No. 141573, National Register Information System No. 75001698, Jan. 17, 1975. National Register of Historic Places, National Park Service, Washington, DC.

Omi, Michael, and Howard Winant
1994 *Racial Formation in the United States from the 1960s to the 1990s.* Routledge, New York.

Petzold, Bettina, Peter Reiss, and Wolfgang Stossel
1999 Laser Scanning – Surveying and Mapping Agencies are Using a New Technique for the Derivation of Digital Terrain Models. *Journal of Photogrammetry and Remote Sensing* 54:95-104.

Riley, Melanie A.
2009 Automated Detection of Prehistoric Conical Burial Mounds from LiDAR Bare-Earth Digital Elevation Models. Unpublished M.A. Thesis, Department of Geology and Geography, Northwest Missouri State University, Maryville, MO.

Steen, Carl
1994 *An Archaeological Survey of the Pottery Production Sites in the Old Edgefield District of South Carolina.* Diachronic Research Foundation, Columbia, SC.

Todd, Leonard
2008 *Carolina Clay: The Life and Legend of the Slave Potter Dave.* W. W. Norton, New York.

Upton, Dell
1988 White and Black Landscapes in Eighteenth-Century Virginia. In *Material Life in America, 1600-1800*, edited by Robert Blair St. George, pp. 357-369. Northeastern University Press, Boston, MA.

Vlach, John M.
1990a *The Afro-American Tradition in Decorative Arts.* University of Georgia Press, Athens.

1990b International Encounters at the Crossroads of Clay: European, Asian, and African Influences on Edgefield Pottery. In *Crossroads of Clay: The Southern Alkaline-Glazed Stoneware Tradition*, edited by C. W. Horne, pp. 17-39. McKissick Museum, University of South Carolina, Columbia.

South Carolina Antiquities

Volume 43

Jodi A. Barnes, Editor

CONTENTS

BOOK REVIEWS