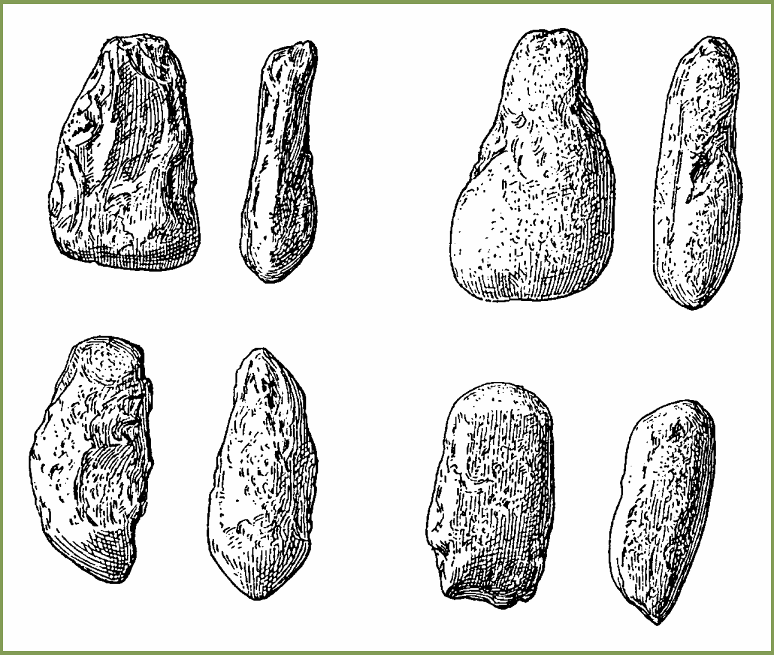
North Carolina Archaeology



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FABLES OF THE RECONSTRUCTION: MORLEY JEFFERS WILLIAMS AND THE EXCAVATION OF TRYON PALACE, 1952–1962

by
Thomas E. Beaman, Jr.

Abstract

From 1952 until 1958, Morley Jeffers Williams conducted extensive archaeological investigations at Tryon Palace in New Bern, North Carolina. These excavations provided information that guided the interior and exterior restoration and reconstruction of the buildings and other architectural features. This study presents a textual portrait of Williams and summarizes his archaeological investigations conducted at the Palace. Special attention is given to the excavation methods used, the structural remains uncovered, and how this information was important in the restoration of Tryon Palace as an historic site. The importance of these excavations in the history of archaeology in North Carolina is also discussed.

"Friends, Romans, countrymen, lend me your ears; I come to bury Caesar, not to praise him. The evil that men do lives after them, the good is oft interred with their bones." — William Shakespeare (*Julius Caesar*, III, ii, 79–82)

It could be said that historical archaeology in North Carolina began as a practice in the late nineteenth century with Talcott Williams searching for the location of the sixteenth-century Roanoke settlements and James Sprunt digging at Russellborough near Brunswick Town. However, it wasn't until the mid-twentieth century, from 1947 to 1969, that historical archaeology flourished in North Carolina. This 22-year period is represented by the first generation of experienced and professionally trained archaeologists who excavated historic sites with formal, scientific excavation methods. Archaeological investigations for the purpose of restoration and for the development of public historic sites were paramount. J.C. Harrington excavated at Fort Raleigh National Historic Site; William Tarlton, trained under Charles Fairbanks, dug with Harrington at Somerset Place; Milton Perry investigated areas within Fort Macon; and Frank Albright tested numerous lots within Old Salem. In 1955, Tarlton became the head of what eventually would be known as the Historic Sites Section (N.C. Division of Archives and History, Department of Cultural Resources) and was later responsible for recruiting Stanley A. South to excavate Brunswick Town and many other North Carolina historic sites during the 1960s (Beaman et al. 1998:2–13). These men were either professionally trained or were career archaeologists, and all had previous excavation experience before these projects.

It was also during this era that Morley Jeffers Williams conducted the archaeological investigation of Tryon Palace, the opulent pre-Revolutionary, Palladian-villa style home of loyalist governors William Tryon and Josiah Martin in New Bern, North Carolina (Figure 1). Once

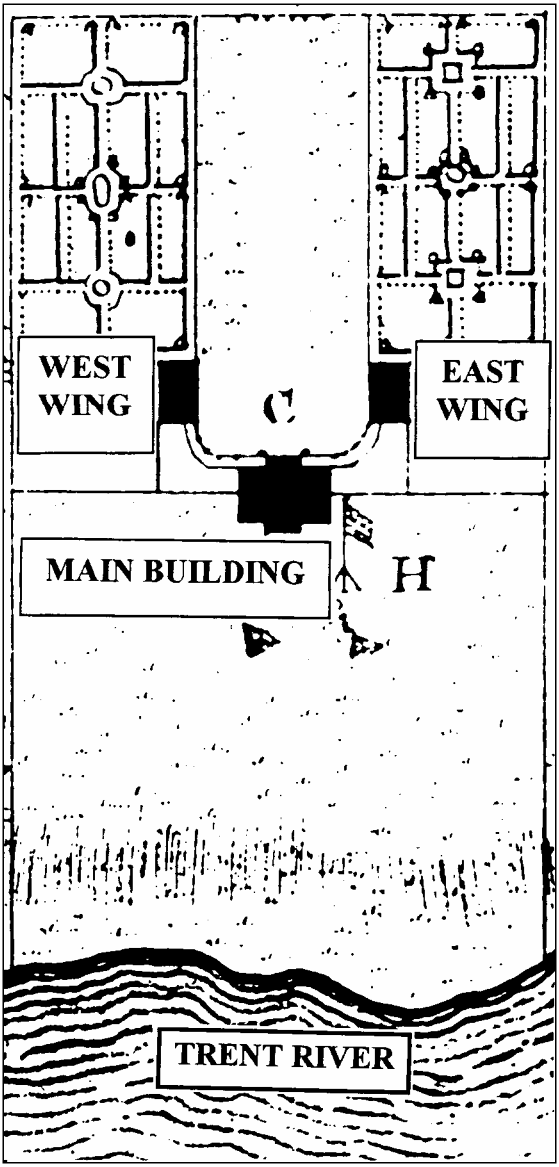

Figure 1. Tryon Palace, excerpted from the 1769 map of New Bern by Claude Joseph Sauthier. Labels added. Copy on file, North Carolina Division of Archives and History.

described as "a substantial, quick-speaking man with a brown moustache and a generally brown tweed appearance" (Keene 1934), Williams was a former Harvard University professor of Landscape Architecture who utilized archaeology as a methodological tool in researching the historic landscapes of Stratford Hall and Mount Vernon in Virginia during the 1930s. Based on his research and interpretation experience of historic sites, he was hired to conduct the archaeological excavation of Tryon Palace prior to its restoration. He worked from 1952 until 1962 to identify archaeological information pertinent to the structural and interior restoration of the Palace.

These excavations, however, have remained the most enigmatic among the early archaeological projects conducted on historic sites in North Carolina because no technical summary or public report was ever prepared. To date, there are only two known drawings by Williams of excavated foundations, and there has never been a clear understanding or recounting of Williams' archaeological findings at the Palace. As recommended by Clauser (1981:3) and Zawacki (1997:111–116), using information compiled from daily work reports, correspondences, meeting minutes, and other documents, this study presents a consideration of his extensive archaeological investigations and how these finds were integrated into the restoration and reconstruction of Tryon Palace.

Who Was Morley Williams?

Before discussing Morley Williams' archaeological investigations at Tryon Palace, it is relevant to present a brief synopsis of his career to understand his qualifications and experience. With a background in civil engineering and landscape architecture, Williams was involved with the research and restoration of a number of historic sites in Virginia during the early 1930s, including Stratford Hall, Monticello, and Mount Vernon. His strong knowledge of historic landscapes and gardens, as well as his practical experience with documentary and archaeological research, made Williams a natural choice to conduct the initial stages of "physical research" for the restoration of the Palace.

Morley Williams was born on August 1, 1886, in Tillsenburg, Ontario, Canada. He attended the Engineering School at the University of Toronto in 1910 and 1911. Williams left Toronto for employment as a bridge construction inspector with the Canadian Pacific Railroad, and in 1912 was hired by the Montreal-Port Arthur District of the Canadian Northern Railway as the acting engineer of bridge site surveys and bridge construction inspector. He eventually became the resident engineer in charge of roadbed grading and track laying.

Williams moved to Kingsville, Ontario, where in 1914 he acquired half-ownership in a grain elevator and began operating 300 acres of cropland, specializing in seed grades of corn, small grains, and grasses. In 1922, Williams took over the farm operations of Mr. Vincent Massey (then president of Massey-Harris Farm Machinery Company) in Port Hope, Ontario. As part of his duties, he consulted on the buildings and layouts of private farms. This job was probably Williams' initial experience with landscape design.

In 1925, at the age of 38, Morley Williams completed a BSA in Horticulture at the Ontario Agricultural College in Guelph, Ontario. He immediately enrolled in Harvard University's School of Design where, in 1928, he received his Masters of Landscape Architecture in City Planning. His thesis, a study that illustrated how to introduce gardens and greenery into an urban landscape, was completed under the advisement of Henry Hubbard, Arthur Comey, John Nolen, and Arthur Shurcliff (Williams 1928). Williams was awarded a year-long Sheldon Travelling Fellowship in 1929, which he spent studying landscape design in Europe and North Africa. In 1930, Williams officially joined the faculty of the Harvard School of Design as an assistant professor.

In March 1931, Williams received a grant from the Clark Fund for Research in Landscape Design to investigate "American Landscape Design as Exemplified by the Plantation Estates of Maryland and Virginia, 1750 to 1860." Two months later, he traveled throughout Virginia and Maryland making topographical surveys of historic plantations, including Gunston Hall, Woodlawn, and Mount Vernon. His 1931 survey of George Washington's Mount Vernon was significant because of the archaeological discovery of four early outbuilding foundations near the main house. This survey was the first time Williams used archaeological evidence to formulate ideas on the development of historic landscapes. The results of this survey also prompted Williams (1932a) to suggest that the Mount Vernon landscape was consciously designed to resemble the shield in Washington's coat of arms.

Based on his surveys and archaeological discoveries the previous summer, in 1932 The Garden Club of Virginia asked Williams to complete earlier research, begun by Arthur Shurcliff, on the landscape of Stratford Hall, home of the Lees of Virginia. With data from Shurcliff's previous investigations and new archaeological excavations supervised by Harvard graduate student Charles Pinkney, Williams (1932b) identified the layout, walls, and terraces of the East Garden. He was further able to document the original approach to the mansion and the historic view from the mansion to the Potomac River (Armes 1936:506–511). From these findings, Williams (1933) was asked to draw up plans for the restoration of the East Garden, which was reconstructed based on his designs. Also during the summer of 1932, Williams (1934) conducted a landscape survey of Thomas Jefferson's home, Monticello, in which he located the serpentine walk and several planting beds on the West Lawn.

In 1934, Williams and Pinkney conducted additional archaeological investigations at Stratford Hall to determine the extent of westward development from the main house. Williams and Pinkney then oversaw the restoration of "God's Acre" in Harvard Square in Cambridge, Massachusetts. Additionally, Williams continued the exploration of the four foundations he had discovered at Mount Vernon in 1931. In 1935, Williams returned to Mount Vernon where he conducted more archaeological investigations and supervised the restoration of the kitchen garden. That same summer, he was asked by the Olmsted brothers to research the history of the White House grounds as background information for a possible redesign of the landscape.

Morley Williams resigned from the faculty of the Harvard School of Design in May 1936 to be the Director of Research and Restoration at Mount Vernon. Over the next three years, Williams continued to supervise the investigation of archaeological features and to conduct documentary research necessary to begin the restoration of the property as depicted in Samuel Vaughan's 1787 drawing. The focus of his research was to identify the construction date of buildings and landscape features, which were an integral part of the historic landscape (Pogue 1988; Williams 1938). In 1939, Williams left Mount Vernon after the appointment of Cecil Wall as Director, a position Williams had long coveted.

During 1940 and 1941, Williams conducted independent research on eighteenth-century manuscripts and newspapers. During this period, he and his new wife Nathalia Uhlman (b. 1910) had two children, Richard MacKinsey (Mack) and Brooke Curtis. Nathalia was also a trained architect who had studied at the Massachusetts Institute of Technology and the School of Architecture at Fontainbleau, France. From 1941 until 1947, the Williamses jointly operated a private practice in Bluemont, Virginia. In September 1947, Morley Williams joined the faculty of the North Carolina State College (now University) School of Design as a professor of Landscape Architecture. The following year he succeeded Professor E. G. Thurlow as head of the Landscape Architecture Department. It was while Williams was at North Carolina State College that he was offered the opportunity to conduct excavations and other physical research on Tryon Palace prior to its restoration.

The Archaeology of Tryon Palace, 1952–1962

Background History

One of the foremost items on Royal Governor William Tryon's domestic agenda was the establishment of a permanent capital. In 1766, a bill was introduced into the Assembly to construct a permanent residence for the Governor in New Bern, as it offered the most convenient location to the largest portion of the population. British architect John Hawks was contracted to build this residence, and he oversaw its construction between 1767 and 1770. Tryon termed it "the Palace" but occupied it only for a year (1770). Between 1771 and 1775, Royal Governor Josiah Martin resided at the Palace and made a number of improvements to the property (Dill 1955:163). Due to threat of the American War of Independence, Martin abandoned the property in 1775. From 1777 until 1779, State Governor Richard Caswell used the Palace only intermittently as a residence. Later, Abner Nash, Caswell's successor, was inaugurated at the Palace but never occupied it (Dill 1955:242–244).

Due to a lack of supplies for repairs and abandonment, the Palace began to deteriorate. In the 1790s, the New Bern Academy and the Masonic Lodge intermittently met in abandoned rooms in the deteriorated structure (Dill 1955:253–254). What remained of "the Palace" caught fire and burned on February 27–28, 1798. After the Palace burned, the General Assembly ordered the property subdivided into lots and sold. In addition, a wide highway (George Street) was later extended over the former location of the Main Building. From the early 1800s until the early 1950s, generations of people and numerous houses and other buildings occupied these lots (Figure 2). By the time there was any discussion of restoring Tryon Palace, only the walls of the Palace's West Wing, which served as the eighteenth-century stables, remained extant.

Possibly as a result of the Historic Sites Act of 1935, public interest in reconstructing Tryon Palace steadily grew during the late 1930s. Fiske Kimball, Director of the Philadelphia Museum of Art, took great interest in the project. In March 1939, Kimball wrote to Miss Gertrude Carraway of New Bern (who was then heading the campaign to rebuild the Palace), "What a thing it would be to reestablish everything about the palace, with the aid of these [Hawks'] drawings and of excavation on the site" (Kimball 1939). As a result of Carraway's diligent efforts, the first archaeological investigations planned for Tryon Palace became part of a statewide Works Progress Administration (WPA) project in the early 1940s. The goal of this proposed excavation was to determine whether or not the planned reconstruction could be built on the original Palace foundations. However, this excavation was never undertaken. By the time the preliminary planning and arrangements were completed, the United States had become involved in the Second World War. Interest in the Palace project waned and the WPA was diverted to primarily defense projects. Yet the potential for excavating the Palace was not forgotten, and the stage was set for Williams' investigations a decade later (Brook 1997:42; Robinson 1978:26).

The Second World War did not diminish the enthusiasm for restoring the Palace. Philanthropist Maude Moore Latham established a large trust fund in 1944 for the project. The Tryon Palace Commission was formally established in 1945 by Governor R. Gregg Cherry, with Mrs. Latham elected as chairperson. Following Latham's death in 1951, her daughter, May Gordon Kellenberger, was elected chairperson of the Commission. Mrs. Kellenberger and her husband, John A. Kellenberger, administered the funds and became a driving force behind the restoration effort. It was also in 1951 that William Graves Perry, of the Boston architectural firm Perry, Shaw, and Hepburn, Kehoe and Dean, was contracted to restore and rebuild the Palace. Perry was a noted restoration architect who had overseen the restoration of Historic Williamsburg, Virginia, in the 1920s and 1930s (Brook 1997:61; Robinson 1978:29–61).

Dr. Christopher Crittenden, director of the North Carolina Archives and History Section, and George Ross, director of the State Department of Conservation and Development, recommended Morley Williams to William Perry as a logical candidate to conduct the initial physical

Figure 2. Aerial photograph taken January 3, 1956, of the Palace during reconstruction. Though many homes had been moved prior to this photograph, many more were torn down or relocated before the restoration was completed. Courtesy of North Carolina Division of Archives and History.

research for the Palace project. Though it is not known how Crittenden and Ross knew Williams, all were active members in the North Carolina Society for the Preservation of Antiquities, an organization that strongly supported the restoration of the Palace (see Brook 1997). Perry (1952a) expressed his enthusiasm for the recommendation to the Kellenbergers, noting that Williams' "experience at Mount Vernon, Stratford, and elsewhere seems to qualify him admirably for this important preliminary work."

At the age of 65, Williams left academia in 1952 to conduct the research and restoration of Tryon Palace. He was hired as the local representative of Perry, Shaw, and Hepburn, Kehoe and Dean to conduct the initial physical research on the Palace and to oversee the day-to-day site operations. From 1952 until 1955, Williams primarily supervised the excavation of the Main Building and East Wing of the Palace and other related structural features encountered during the investigation. Williams was then asked by the Tryon Palace Commission to design and oversee the construction of a period formal landscape for the property, which he did from 1955 until 1958. As the landscape was developed, more archaeological features were encountered, which Williams ensured were excavated prior to the ground being disturbed during construction. From 1958 until 1962, Williams continued to consult with the Tryon Palace Commission, but was primarily resigned to identification of the artifacts from the excavation.

It is presumed that no technical reports were ever written on the excavation of the Tryon Palace. Only one photographic album with captions on the restoration of the East Wing exists, and it contains little information on the excavation of that structure (Williams 1961). Fortunately, some information on Williams' excavation methodology and discoveries, and their integration into the restored and reconstructed buildings, have been compiled from daily work reports (PDR) filed by Morley Williams' office in New Bern with William Perry. General correspondences between the Kellenbergers, Perry, and Williams, as well as minutes from Tryon Palace Commission meetings, also supplement the information contained within the daily reports. Other important documents that discuss archaeological data are the written comments made by William S. Tarlton (of Archives and History) and Robert G. B. Bourne (of the State Budget Office) after reviewing archaeological evidence related to the architect's plans for the restoration in November, 1954 (Tarlton 1954). Williams' archaeological methods, a brief description of the architectural features uncovered, and which discoveries were integrated in the restoration and reconstruction will each be considered below.

Excavation Methodology

The methodology Williams used in the excavation of Tryon Palace was remarkably similar to the ones he employed at Stratford Hall and Mount Vernon (Pogue 1988; Sanford 1999). His primary excavation technique was to hand dig shallow trenches. Trenching was a very cost-effective way to cover large areas while searching for remnants of structural walls and archaeological features (Figure 3). Perry also remarked that diagonal trenching was initially employed in "less-promising areas" to "test out methods and the capacities of laborers"

Figure 3. Photograph taken ca. 1953–1954 of the archaeological excavations conducted prior to the reconstruction of the Main Building. A pattern of systematic trenching to uncover structural and archaeological features is visible in the background. The east foundation wall of the Main Building is in the foreground. Courtesy of North Carolina Division of Archives and History.

(Perry 1952b). Williams continued to use trenching to trace out walls to their completion. "Dig holes" that functioned similarly to excavation units were also used. For example, dig holes were placed in the corners of the Main Building to discover the relative locations of the earlier road surface within the level of the basement (PDR 60 and 61). Stratigraphic layers were recognized and recorded, but the daily reports do not say whether they were excavated as such.

A methodological difference between Williams' excavation at Tryon Palace and his earlier investigations was his use of screens at Tryon Palace to recover artifacts (Figure 4). Another purpose for conducting archaeology at the Palace was to discover decorative interior details that could be used in the reconstructed building. Several of Williams' trenches were encountered in two recent archaeological searches for the

Figure 4. African-American crew member screening for artifacts, taken ca. 1952–1954. Another crew member is visible in the background loading excess dirt and bricketage to be removed from the site. Courtesy of North Carolina Division of Archives and History.

location of the original Palace gardens (Kelso et al. 1994; East Carolina University 1999 Archaeological Field School). These trenches contained few, if any, artifacts, unlike several of Williams' trenches recently re-excavated at Stratford Hall and Mount Vernon which contained numerous artifacts (Charles R. Ewen and Patricia Samford, personal communication 1999; Pogue 1994 and personal communication 1999; Sanford 1999 and personal communication 1999).

Perry (1952b, 1952c) makes note of a grid system that Williams established at the site in August 1952 (PDR 43). He recorded that certain interesting artifacts were plotted *in situ*, and a measured map of all excavated foundation walls was drawn at a scale of 1/4" to 1 ft. Unfortunately, at present, no evidence contained within any documents or photos provides a clue to the grid system that Williams used, or how artifacts may have been plotted within that grid. Even though Brooke Williams reported in September 1981 that all of her father's notes, documents, and slides from the restoration project were on file at Tryon Palace (cited in Clauser 1981), there still remains hope that a "Rosetta Stone" will be discovered to decipher Williams' grid and link the surviving artifacts to a proper archaeological context.

In Williams' previous archaeological investigations at Mount Vernon, graduate students from the Harvard School of Design comprised his field crew. Yet a research project of this magnitude required a larger crew than several graduate students. In many large archaeological projects during and following the Depression Era, local, unskilled African-Americans were hired to conduct the majority of the fieldwork (e.g., Shurcliff's and Williams' excavations at Stratford Hall [Sanford 1999], the excavation of Irene Mound in Georgia [Claassen 1999], and South's excavations at Brunswick Town [South 1994; Beaman et al. 1998]). The crew that Williams hired to help with the physical research and excavation was composed primarily of eight to twelve African-American males from the New Bern area. Williams trained these men in excavation techniques, though archaeology was only a small part of their jobs. Their other duties were to clear debris from the site, cut grass, unload lumber, assist carpenters and masons, and haul dirt and brickbats off-site. On rainy days the crew washed artifacts recovered from the excavations.

Uncovering Physical Features

Basic descriptions of many structural remains can be pieced and compiled from the daily work reports, correspondences, and meeting minutes. This section contains brief descriptions of what Williams' archaeological investigations conducted at Tryon Palace between 1952–1958 revealed.

Main Building. The Main Building of Tryon Palace not only served as the residence of the royal governor and his family, but also housed the Council Chamber. As a result of vandalism and the salvaging of building materials prior to its destruction by fire in 1798, and the later construction of George Street over its former location, much of the foundation of the Palace's Main Building was reduced to brick rubble. This brick debris was noted during the 1952–1953 investigation and removed off-site. The structural remnants are shown on a measured field map of the Main Building's foundation that Williams drafted in December 1953 (Figure 5). It is likely that Williams intended to finalize and include it in an album on the restoration of the Main Building, as he did with the East Wing (Williams 1961); however, such an album was never completed for the Main Building.

What remained of the original foundation were the eastern and western brick walls at the basement level. The eastern foundation wall is visible in Figure 3. Remnants of interior east–west wall partitions were also discovered, as was a portion of the base of a stairway landing. The basement door jamb that separated the hall from the library was

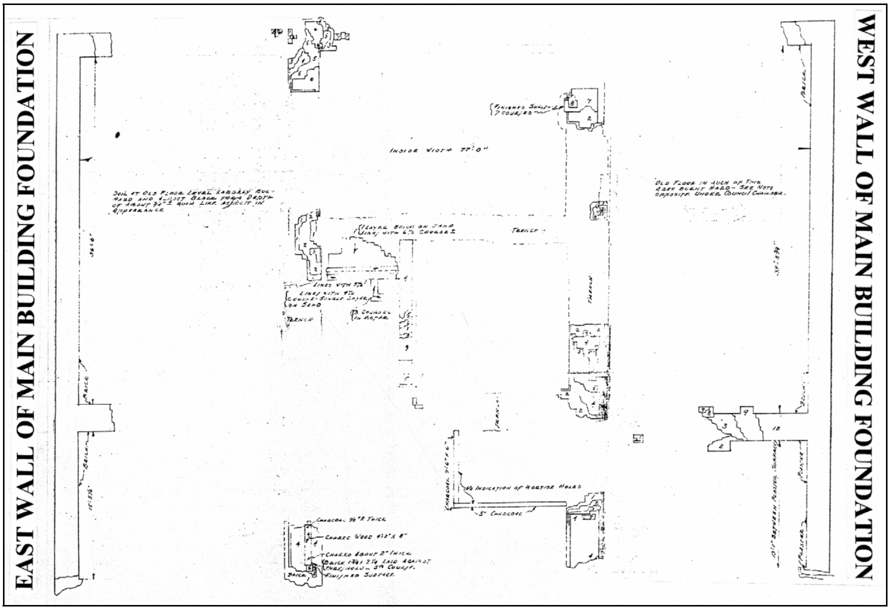

Figure 5. Field plan of the excavated Main Building Foundation. Drawn by Morley Williams, December 19, 1953. Labels added. Courtesy of Tryon Palace Historic Sites and Gardens.

uncovered, and Williams noted that it appeared to be made of pine (PDR 238). The southeast and southwest rooms of the basement had earth floors that were "burnt hard and almost black for a depth of about ¾ inch" as a result of the 1798 fire (notes on Williams' 1953 plan; Tarlton 1954). Intact stone fragments at the north entrance of the building were found to delineate the plan and profile of the front steps (Perry 1953).

East Wing. The East Wing of Tryon Palace originally served as the kitchen and secretary's office. The excavation of the East Wing in 1952 and 1953 revealed few remnants of the original structure, but enough to verify its size and location. William Perry (1954a:2) noted that "evidences of the original walls (though scant), and of the disturbed soil were sufficient to establish the expected similarity of the size and shape of the East Wing and the West Wing and to mark its symmetrical location and also to verify the Hawks drawings." The height of the surviving bonded brickwork was approximately two feet, located approximately two feet below the 1952 ground level (PRD 103). A completed map of the physical research on the East Wing was drafted by Williams based on the results of the excavation (Figure 6), and it reveals what little remained of the original structure. In the key to this map, Williams (1961) noted that original wall footings at the northwest and southwest corners "made it possible to determine the precise position of the original building."

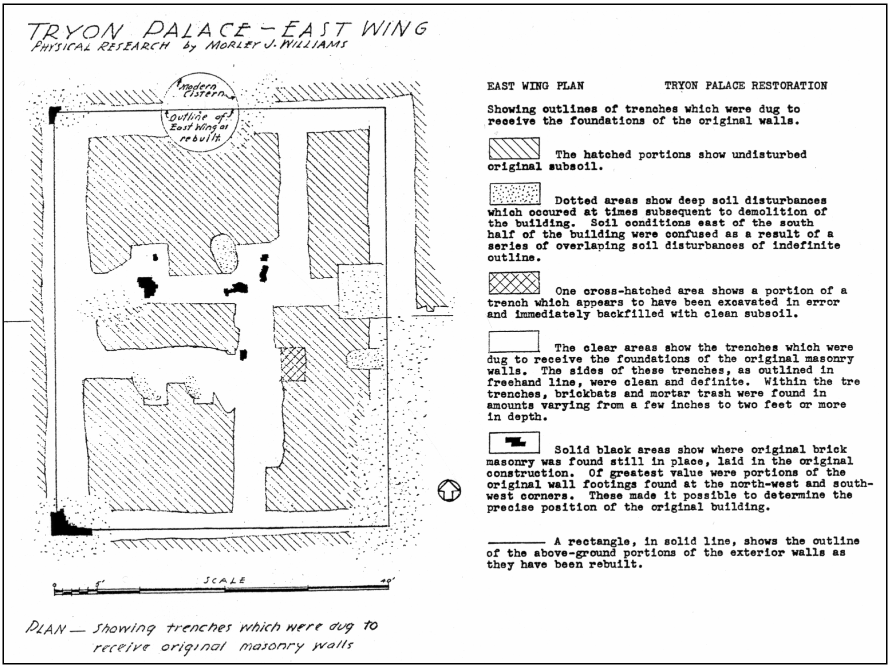

Figure 6. Plan and key of the excavated East Wing of the Palace. The solid black represents the structural remnants of the original East Wing. From Williams' Site Report of the East Wing (1961). Courtesy of Tryon Palace Historic Sites and Gardens.

West Wing. Because the original West Wing was an extant structure at the time of the restoration, it did not require extensive archaeological excavation. Williams began his investigations with a trench near this structure in August 1952, but no records indicate that the building's interior was excavated. It is more likely that the base of the foundations was unearthed after June 1953, when the brick was being repointed as part of the restoration, rather than when it was first excavated.

Colonnades and Palisado. Tryon Palace was designed to have two dependency wings linked to the Main Building by colonnades, with quarter circle, iron-paling fences (palisados) to match the colonnades to the north. The walls that supported the columns of both the east and west colonnades were excavated and found to be of "a different type of wall brick" than the foundation of the Main Building (PDR 62). Later, a hole was cut into the basement of the Main Building to investigate its junction with the west colonnade (PDR 86). Although not shown on Sauthier's 1769 depiction of the Palace (Figure 1), the original walls which supported the palisados were located and the surviving portions were excavated in August of 1952 (Perry 1952b).

Outbuildings. Governor Josiah Martin contracted with John Hawks to add several outbuildings to the Palace: a smokehouse, a pigeon house, and a poultry house (Dill 1955:163). As of July 1956, Perry (1956:1–2) noted that no evidence of their locations had been found. He wrote, "I do not expect to find masonry foundations for a poultry house or a pigeon house but normally smoke houses stood upon such foundations. Thus while drawings can be prepared, it is possible that one or another of them may have to be revised should the foundations be later uncovered." There is no documentation to indicate that any evidence of these outbuildings was ever found.

Privies. Williams' crew unearthed evidence of two five-sided, brick privy structures and one foundation wall of another potential privy pit that dated to the Palace period. The locations of the two Palace privies are symmetrically aligned, each approximately 10 ft to the south of the East Wing and West Wing. The dimension of the west privy structure, excavated in August and September 1952, was given as 6 ft on a side (PDR 55). A brick and concrete bottom had been placed approximately 6 ft below ground surface in the west privy. After the bottom was removed, additional excavation was conducted (PDR 55, 56). The soil from this privy was screened, and the sifters noted "turning up bits of glass, bone, and strap iron most often" (PDR 57).

The east privy structure was discovered in October 1952, but was not excavated until January 1953. Williams noted the structure had a concrete bottom, with cement-plastered interior, and a modern brick top (PDR 103). When it was found, Mrs. Duffy (a local resident) said her family once used the structure as a cistern (PDR 103). It seems highly questionable that a privy would be converted into a cistern, a reservoir used to hold potable water. Perhaps Mrs. Duffy was incorrect or was misquoted. The plaster and cement were removed from this structure as part of its restoration (PDR 176–179). A complete understanding of the east privy structure remains elusive.

Williams (1958) encountered a foundation wall made of "palace brick" in 1958 while excavating in the area of the planned smokehouse restoration. The exposed wall measured 13 inches thick and extended 5 ft below the smokehouse floor. A complete north-south wall of the feature was measured to be 8 ft 8 in. Fragments of "palace bottle glass" and "one piece of Queen's ware" were found. Based on the depth of the feature, Williams interpreted it to be a "toilet pit" from the Palace period.

Wells. Williams identified the locations of two wells on the Palace property. The first well, located to the north of the West Wing, was discovered in September 1952 and excavated in October 1952. The square structure measured 5 ft 3 in (PDR 69). An article in the October 29, 1952 issue of the New Bern *Sun-Journal* described the well as lined with ballast stones. A number of artifacts found in this well were mentioned in the daily reports, and "bits of china, glass, crockery, and old bottles" were recovered through screening (PDR 80). Fragments of leather, an oak bucket, an iron pot, and a gold button with the bust of King George III were recovered from the bottom of the well (PDR 91). An oak barrel was also found in the bottom of the well (PDR 91). The use of wooden barrels in the bottom of wells has been noted on other eighteenth-century archaeological sites, as they were often added to support the stone or brick structure that was weakened as a result of the dirt being removed through both drawing water and periodic cleanings (Kelso 1984:159–160).

The second well was located in 1957, during the landscaping of the grounds. Correspondence from Mrs. Kellenberger (1957) to the members of the Executive Committee of the Tryon Palace Commission, dated March 29, requested a vote for more archaeological excavations on the eastern portion of the Palace property, at Metcalf Street. A letter from Gertrude Carraway (1957) to the Kellenbergers, dated June 7, reported the excavations were underway. This letter also noted that Williams was prepared to excavate what he believed was an "old well," though no records exist that this well was actually excavated. It is believed to have been located on the eastern portion of the property.

Cistern. A cistern, which likely dates to the nineteenth century, was located to the north of the East Wing in January 1953. Cinders (refuse from coal burning) were found during the excavation of this feature (PDR 169). This cistern was labeled "modern cistern" on Williams' map of the East Wing excavation (Figure 6). No features positively identified as cisterns that dated to the Palace period were noted during the investigations.

Drainage System. Elements of the original drainage system designed for the Palace by John Hawks were located, and they were discovered to be mostly intact (PDR 98–99). Portions of original brick storm drains were located to the north of the Main Building. Williams noted the main cesspool or 'reservoir' was more to the northeast of the Main Building than illustrated in Hawks' drawings of the feature. The original brick catch basin for the reservoir, which Williams described as being "a large domed brick chamber," was found approximately 66 ft north of the Main Building, east of the central axis, and 3 ft below the present ground level (PDR 98; Perry 1955).

Original Road Surface. A 7 ft x 12 ft section of what Williams termed the "surface of the original Palace drive" was uncovered in February 1953. It was located in the center of George Street, a few feet inside the northern boundary fence. This surface was located 1 ft 3 in below the modern level of George Street and was described as being a layer of shell approximately two inches thick (PDR 189).

Gardens. There has been much recent interest in locating and identifying the design of the original Palace Gardens through archaeological investigation (Joy 1997; Kelso et al. 1994; 1999 East Carolina University Archaeological Field School). Unfortunately, there is no recorded evidence that Williams discovered any traces of the Palace Gardens. Although he focused primarily on structural remains, Williams' experience investigating the East Garden at Stratford Hall (Williams 1932b) and the kitchen garden at Mount Vernon (Williams 1938) likely would have given him the expertise to recognize archaeological traces of the gardens. The lack of archaeological evidence for gardens prompted Williams to redesign the Palace Gardens based solely on English plans of picturesque, naturalistic landscapes of the 1760–1770 period (Robinson 1978:82, 158).

Ballast Stone Foundation. There are only two references to the discovery of an early ballast stone foundation. The first mention of this feature was from the daily report of December 11, 1953 (PDR 446), which noted a stone foundation being uncovered 3 ft underground, about 55 ft southwest of the southwest corner of the Palace. Slightly more information is found in an addendum to William Tarlton's (1954) observations made on a visit to the Palace in November 1954. He noted that the cellar was in the southwest corner of the project area and "was found to be walled with ballast stone laid up with mud and to contain numerous Indian relics as well as trade items of European origin." Tarlton speculated that the cellar dated to New Bern's earliest settlement and declared that it had no connection to Tryon Palace. It is interesting to note that Tarlton (1954) also raised the question of whether or not the ballast stone foundation should be developed into a public exhibit on the first settlement of New Bern in conjunction with the reconstructed Palace. A decision was made to keep the focus on the period of the original Palace and the foundation was reburied in November 1954 (PDR 735).

Restoration and Reconstruction

William Perry's philosophy of restoration guided the reconstruction of Tryon Palace. He noted that "[t]he nature of the 'Restoration' requires that all sound portions of original walls be preserved. Exposed surfaces are visible after construction is completed. This has been the essence of the work at Williamsburg" (Perry 1954b). The West Wing of Tryon Palace was still a sound standing structure, so it was repaired and restored to its original function as a stable. But how much of the original foundations of the Main Building and East Wing, as well as other original architectural features discovered through archaeological research, were restored and incorporated into the reconstructed historic site?

The east and west foundation walls were the only structural remains of the Main Building considered durable enough to use in the reconstructed Main Building. The east wall was leveled at the sixteenth brick course and the west wall was leveled at the eighteenth brick course. These walls were then repointed and damp-proofed, and the trenches outside the walls were subsequently backfilled. Additional courses of brick were later added to protect the original foundation walls before reconstruction began. These two original foundation walls are still visible inside the reconstructed Main Building. The remaining architectural features were deemed too weak to be used in the restoration and were removed. No original brick features were used in the reconstruction of the East Wing. Of the other original architectural features discovered through archaeological research, only the colonnades and palisado walls, privy foundations, and Hawks' drainage system were repaired and restored (Perry 1954a, 1954c, 1955). The pigeon house and gardens were rebuilt without archaeological evidence.

Additional insight into how archaeological data were used in planning the restoration and reconstruction of Tryon Palace can be found in comments made by William S. Tarlton (1954) regarding the architects' plans. These plans originally lacked the two five-sided privy buildings. Moreover, they showed a different arrangement of how the palisado joined the sentry houses. The plans also illustrate a different configuration of stone steps for the north entrance of the Main Building than the archaeological evidence revealed. A cement floor was planned for the southeastern and southwestern basement rooms, which originally were dirt. Of the pieces of marble recovered during the excavation, the percentages and types did not correspond to the plans proposed for the marble floor of the main foyer. Sherds of the original window glass were greener and more irregular than the window glass planned for use in the reconstruction. Recovered fragments of the original plaster revealed only plain struck molding, while the plans allowed for the use of floral, foliated, egg and dart ornamentation, dentils, triglyphs, medallions, rosettes, and other elaborate geometric designs in plaster.

These comments highlight a contrast in the restoration philosophies of the era: Should the restoration be done as it actually *was* or as it was believed Governor Tryon would have *wanted* it to be? Architect William Perry favored the latter, while Christopher Crittenden favored the former. Crittenden believed the restoration should carried out as closely as possible to the original building. Tryon Palace Commission member and Highway Chairman, A. H. Graham, stated that Perry should be allowed to go as far with the restoration "as his architectural conscience will permit him to go" (from an editorial in The Raleigh *News and Observer*, July 6, 1954). Morley Williams (1954) came to Perry's defense by noting that the issue was not "the simple matter of asking for more money to create more beauty. It is rather the problem of drawing the line at some point between the austere and the lavish" (see Robinson 1978:71–78 for a full discussion of the debate).

At a meeting of the Tryon Palace Commission Executive Committee in February 1955, a revised set of plans for a less ornate Palace was unanimously approved. The two privy buildings were added to the plans and built in the winter of 1956 (Robinson 1978:94). It remains unclear how much of the other archaeological evidence that Tarlton observed was taken into account in the revised plans. This topic of the interior decorations obviously merits further study. What can be stated with certainty is that archaeological data of interior furnishings, as well as structural remains, were carefully considered while planning the restoration.

Conclusion

Due to almost continual disagreements, by 1962 the association between the Tryon Palace Commission and Morley Williams had dissolved. Many of these disagreements involved unfinished reports on the restoration and the large number of unprocessed artifacts from the excavations. Sensational speculation still exists that Williams destroyed many of the field notes and reports related to archaeological investigations of the Palace, though this is highly unlikely. The daily reports generally served as field notes, and drawings of the two excavated building foundations do exist. Numerous photographs on file at Tryon Palace Historic Sites and Gardens well document the excavation and site restoration. Based on existing records for the archaeological investigation, it is more likely that Williams, at the age of 75 when he left the Palace project in early 1962, never completed these reports.

Morley and Nathalia Williams never fully retired; they continued to research and restore historic houses and gardens, such as the Samuel Smallwood House in New Bern. They divided their time between New Bern, North Carolina and Lottsburg, Virginia. Morley Williams died of congestive heart failure and was cremated on December 1, 1977 in Lottsburg. Nathalia passed away in New Bern in November 1995.

The reconstruction of the buildings and landscape at Tryon Palace represents one of the largest restoration projects in North Carolina's history. The physical research conducted by Morley Williams prior to the restoration, including the archaeological investigations, was an integral part of gathering data on architectural details and interior furnishing of the original buildings. These excavations certainly attracted a great deal of attention from the public and archaeologists alike. The New Bern Historical Society hosted the Twenty-first Annual Meeting of the Archaeological Society of North Carolina in February 1954, which included a presentation by Williams on archaeology at the Palace and a tour of the excavated foundations. Other featured speakers included: Lawrence Lee, on the potential of conducting excavations at Brunswick Town; William S. Tarlton, on the archaeological investigations and restoration of Somerset Place; and Curator of Fort Macon David W. Jones, on the research and restoration of Fort Macon (ASNC 1954a, 1954b; New Bern *Sun-Journal*, February 8, 1954). Jones' predecessor, Milton Perry, conducted archaeological investigations as part of the restoration of Fort Macon in 1952–1953 (see Beaman and Mintz 1999). Milton Perry had consulted with Williams on a number of matters, including the use of the archaeology lab at the Palace to process artifacts recovered from the fort (FMAR July 29, 1952) and what type of brick to use when reconstructing the "hotshot" furnace (FMAR December 17, 1952). Williams also provided Milton Perry with a number of antique locks to use in the Fort Macon restoration (FMAR March 2, 1953).

A focus of future research should be to continue documenting the stories of early archaeological investigations on historic sites in North Carolina (Beaman 1999). This effort should entail the location, proper curation, conservation, and research into previously excavated collections, as they offer tremendous potential to learn about the past without additional excavation. In conjunction with reassessing the early archaeological research, it is equally important to document the stories of the early archaeologists. Now it is more important than ever, since three prominent figures from this first generation of scientific archaeological research recently have died—Lawrence Lee in 1996, J.C. Harrington in 1998, and Frank Albright in 1999. These people were primary resources, and their recollections of their excavations are irreplaceable. Though Morley Jeffers Williams died in 1977, it is hoped that this article will serve to enlighten the present generation of North Carolina archaeologists about him and about his important archaeological research which contributed to the restoration of Tryon Palace.

Notes

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This article is dedicated to Robert Spivey, Harper Taylor, and the other African-American men who conducted the excavation and development of Tryon Palace under Williams' direction.

Disclaimer. The author assumes full responsibility for any factual errors and the interpretations presented in this article.

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HEALTH AND SAFETY ISSUES IN ARCHAEOLOGY: ARE ARCHAEOLOGISTS AT RISK?

by
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Abstract

Archaeology is a relatively dangerous profession. The dangers associated with doing archaeology are not necessarily what one might expect after viewing certain Hollywood productions, but certainly there are things and situations out there that pose potential hazards. This paper discusses health and safety issues that occur in the archaeological field and laboratory settings, including physical, chemical, biological, and social hazards. Preventive measures to decrease the potential for injury or illness also are discussed.

Archaeologists work throughout any given year within a wide range of settings. In many of these environments, certain alterations used to create a safe work place might adversely impact or contaminate the archaeological record. Workplace safety in contract archaeology (CRM) has been discussed by Garrow (1993) and Niquette (1997). Garrow (1993) notes that standards established by the U. S. Department of Labor, Occupational Safety and Health Administration (OSHA), legally apply to archaeological projects and constitute an ethical issue which is frequently overlooked. This oversight can, and sometimes does, put individuals at risk.

Federal and state laws mandate workplace safety (e.g., Federal PL 91-596, which mandates that "each employer - shall furnish to each of his employees employment and a place of employment which are free from recognized hazards"). To implement these laws, numerous rules and regulations apply to a wide range of occupational situations (e.g., 29 CFR 1910, 29 CFR 1926, and 29 CFR 1960). Ignorance or disregard of these regulations can lead to serious injuries and punitive actions by state and federal officials (Niquette 1997). OSHA has provided a major set of implementing federal regulations that have particular application to archaeological projects in the form of 29 CFR 1926 (in particular 29 CFR 1926, Subpart P, Excavations). The various laws and implementing regulations are extensive and beyond the scope of this paper; however, they can be easily reviewed within the government documents sections of most major university libraries or by contacting OSHA directly.

One good source available to help archaeologists fulfill federal law is the *Safety and Health Requirements Manual* assembled by the U.S. Army Corps of Engineers, EM 385-1-1 (USCOE 1996). A copy of this manual can be obtained through the U.S. Government Printing Office, Superintendent of Documents, SSOP, Washington, DC 20402-9328 (ISBN 0-16-048877-X).

In addition to federal regulations, individual states often have laws and regulations regarding workplace safety. Information regarding these issues can be gained by contacting the Department of Labor of any given state.

The discussion below will focus on a wide range of potential hazards associated with doing archaeology. These hazards can be categorized as physical, biological, chemical, and social. These hazards exist both in fieldwork and in laboratory analysis of the collected material. The information below is related primarily to archaeological work in the United States.

Field Safety and Health Hazards

Safety hazards related to archaeological fieldwork are as numerous as the number of individuals involved in the discipline. Any combination of individual(s), random events, carelessness, and placement within the time-space continuum can result in an injury. This discussion will identify numerous health and safety issues applicable to the field and offer suggestions which may help reduce the risk to crew members.

Physical Hazards

Safety hazards in the field include dangers related to the use of heavy equipment (particularly backhoes), the use of power and hand tools, work in trenches and excavations (including encounters with underground utilities), underwater work and the use of boats, work along transects and on steep slopes, and work in inclement weather.

Heavy Equipment. The two pieces of heavy equipment most often associated with archaeological fieldwork are backhoes and graders. These machines are frequently used to facilitate deep excavations and help clear disturbed soils from sites. Serious injury and/or death can result from mishaps involving these two pieces of equipment, mainly from being either struck or run over by the machinery.

Under no circumstances should anyone be allowed to work underneath or in front of these machines while loads are being removed, loaded, or pushed. If individuals are to follow behind machinery, particularly graders, the machine operators should be aware at all times of the locations of those individuals working around them. Individuals on the ground should maintain frequent eye contact with the machinery and remain aware of its speed and direction of movement. These individuals should also use hand signals to communicate with the operator while the machine is in use (see USCOE 1996:114–115). Personnel should wear hard hats, safety shoes, orange or red vests, and hearing and eye protection. Specific safety regulations regarding heavy equipment can be found in the EM 385-1-1 (USCOE 1996:247–298).

Power and Hand Tools. The power tools most frequently used to clear heavily vegetated sites for excavation are chain saws and leaf blowers. The major risks associated with these pieces of equipment are abrasions and lacerations, amputations, eye injury, damage to hearing, and respiratory illness from inhalation of dust and biological microbes thrown up by leaf blowers. It is imperative that all power tools are well maintained and in good condition before use. Chain saws should be operated only by those individuals with experience in their use. As with heavy equipment, other personnel should maintain a safe distance from the operator and trees or brush being cut. Minimal protective gear when operating a chain saw should include, gloves, hard hats, safety shoes, leg chaps, snug fitting clothing, eye protection (including a face shield if necessary), and hearing protection.

Eye and hearing protection, along with a dust mask, should be worn when using a leaf blower. The use of a dust mask will reduce the risk of inhaling fungal spores and viral or bacterial organisms (some are pathogenic) which occur naturally in the soil. This simple precaution may help prevent serious respiratory infections (John Davis, personal communication to Lawrence Abbott 1998).

The hand tools most often used to clear vegetation and conduct excavation include bush axes, machetes, axes, bow saws, augers, trowels, and shovels. The major risks associated with these pieces of equipment are contusions, muscle strains, eye injuries, abrasions, lacerations, and amputations. Hand tools should be well maintained and in good repair. Individuals should have experience using tools such as bush axes, machetes, axes, bow saws. Those who do not have experience should be instructed in proper use and closely supervised while working. General safety measures regarding tree and brush removal can be found in the EM 385-1-1 (USCOE 1996:561–572).

Shovels and trowels that have been sharpened to facilitate excavation should be treated the same as the other blade tools discussed above. The greatest danger using shovels is the risk of crew members accidentally striking each other with the blade when moving dirt either to wheel barrows, buckets or directly into screens. This risk is increased when crew members are working in close proximity within excavation units. Crew members should be aware at all times of their relative positions to each other before using a shovel. Communication among crew members is also important when working in close proximity.

The greatest danger in using a sharp trowel is the risk of injury to oneself. Sharpening and using a trowel is no different than what would be expected with a knife. Carelessness in sharpening or using a trowel can result in serious lacerations, generally to the hand. Special care should be used when transporting a sharpened trowel. The safest place is generally within a backpack rather than in one's back pocket, especially if there is any risk of falling.

All tools, when not in use, should be placed within specific, secure areas of the site and not left in a haphazard manner around the site or an excavation unit. Tools, while in periodic use around excavation units (e.g., shovels), should be placed a minimum of two feet from the edge of the unit while personnel are at work. Tools should be secure within an enclosed tool box when being transported within a vehicle. Tools such as bush axes, machetes, axes, and bow saws should have individual blade covers when in transport or not in use. Most of the safety regulations regarding power and hand tools can be found in EM 385-1-1 (USCOE 1996:217–226).

Trenches and Excavations. Trench and excavation safety is probably the most frequently overlooked issue regarding risk in archaeological fieldwork (Niquette 1997). Safety hazards involve slumping or partially collapsing walls, general cave-ins, accidental ruptures of utility lines, falling debris, water seepage, hazardous gases or atmospheres, and individuals falling into open excavations. Federal safety requirements connected with excavations are presented by OSHA in 29 CFR 1926, Subpart P. Some general procedures for fulfilling the requirements established by OSHA are presented by Foster Wheeler Environmental Corporation (1995) and USCOE (1996:435–447). Some of the general procedures are as follows:

1. The areas surrounding open excavations should be clear of spoil and other debris (including tools and equipment) for a distance of at least two to three feet.

2. Underground power and phone lines, water and sewer lines, and other utilities should be located and marked before excavation begins. Contact power and telephone companies along with specific city or county utilities commissions to have utility locations marked on the ground surface.

3. Any excavation greater than five feet in depth (USCOE 1996:436) should be benched, sloped or supported in accordance with OSHA standards 29 CFR 1926.652, Appendices B, C, and D.

4. Any excavation greater than four feet in depth should have a means of exit available to crew members. This may be in the form of a ladder, stairway, or ramp. The distance between means of exit should not exceed 25 feet.

5. Crew members should wear hard hats and not be allowed under machinery (including the full extent of a backhoe blade) while in operation or while loads are being extracted from the excavation.

6. An appropriate form of barricade should be erected around an excavation to serve as a warning system for machinery and to prevent debris, hand equipment, and personnel from falling into the unit.

7. Walkways with standard railings should be established if personnel are to cross over any excavation.

Other safety aspects associated with trenches and excavations include water seepage, hazardous atmospheres, and the stability of adjacent structures. These issues should also be considered when working in wells, privies, shafts, and deep pit features, or on urban and industrial sites. Information regarding procedures to fulfill these safety requirements can be found in the EM 385-1-1 (USCOE 1996) and Foster Wheeler Environmental Corporation (1995:5–8).

Underwater Work and Use of Boats. The major risk involved with underwater archaeology and the use of boats to access sites is the risk of drowning. Underwater archaeologists should follow the safety measures discussed in EM 385-1-1 (USCOE 1996:545–551) for contract diving operations. When using boats to access sites, the minimal safety requirements should include a boat in good condition and maintenance, an experienced pilot, a safe level of occupancy within the boat, and fire protection (an operational fire extinguisher) (USCOE 1996:332–333). The use of life vests is essential with any boating activities. Life vests should meet the standards suggested by the EM 385-1-1 (USCOE 1996:49–53).

Divers must make sure their tanks have not been contaminated by toxic gases when the tanks are being filled. Divers also need to be aware of the medical complications that may occur from diving. These include barotrauma to various internal organs, decompression sickness, cerebral arterial gas embolism, chokes, compression pains, and nitrogen narcosis. If diving in the ocean, the archaeologist must be cognizant of dangerous sea life such as sharks, jellyfish, and sea snakes (Thalmann 1997:617–641). OSHA has developed regulations for commercial divers (29 CFR 1910, Subpart T).

Work Along Transects and on Steep Slopes. Many accidents connected with fieldwork occur along the landscapes that archaeologists frequently must pass through to conduct a reconnaissance or survey, or access a site to do excavation. It is here that many of the random, unforeseen mishaps occur. These range from abrasions and lacerations on barbed wire to encounters with snakes, wasps, and ticks, and serious injuries from falls.

Falls while in the field can occur almost anywhere on slopes or rock outcrops, in thickets, or crossing streams. Falls can also result from almost any action such as stepping on wet, slick tree limbs, roots, or gravel surfaces; tripping on rocks or vines; stepping in holes (either animal burrows or tree falls); and falls into open wells or cisterns. Frequently, these mishaps result only in embarrassment, abrasions, or bruises. Sometimes, unfortunately, falls result in serious lacerations, back and other muscle and joint injuries (sprains and strains), fractured bones, and concussions. Any of these injuries may be life-threatening, depending on the situation surrounding the mishap.

There is no set of safety procedures which will insure that falls do not occur, particularly while traveling overland during survey or while accessing remote site locations. The best safety technique is personal awareness on the part of individual crew members. Individuals should always be alert in the field and maintain constant attention to their surroundings. Avoid stepping on exposed tree roots or limbs. Slick wood will frequently cause one to lose their footing. Avoid walking straight down any sloped surface; rather, alternate going parallel to the direction of the slope with descending at an angle to the slope. Avoid loose rocks and branches on slopes. Do not attempt to scale or descend vertical or near verticals slopes without the proper training or equipment. Lastly, never work or allow anyone to work alone, particularly when overland travel is necessary.

Work During Inclement Weather and Environmental Condition. Most archaeological fieldwork takes place outside. As a result, one will be exposed to inclement weather and environmental extremes in terms of hot and cold air temperatures.

The greatest threats to those working in the field from inclement weather include heavy rains, lightning, damaging winds, tornadoes, hurricanes, and floods (particularly flash floods). Two major threats to personal safety are lightning and flash flooding from heavy rain. Personnel should leave the field at the first sign of lightning. If a crew is working within low areas such as arroyos, floodplains, or narrow stream valleys, personnel should leave the area at the first sign that heavy rain may occur. Failure to leave before the onset of heavy rain could block the exit route with rising water levels. A small, easily crossed stream may quickly become impassable with the runoff from heavy rain, trapping a crew within a low and flooded landscape. Field supervisors should be informed of the daily weather forecast and monitor the sky for signs of impending severe weather.

Extremes in hot and cold temperatures pose another threat to crews. In hot weather, field workers are at risk of heat-related illness. The most common problem is sunburn which may be painful and cause blister formation in sun-exposed areas. In some individuals, excess sun exposure may trigger reactivation of herpes virus resulting in “fever blisters” on the lips. The risk of developing skin cancer from chronic sun exposure is well recognized. The best prevention is the proper use of sunscreens, wearing long pants and long sleeved shirts, and wearing a hat. While we realize that this is often impractical, minimizing sun exposure from 10 AM to 3 PM, when the solar rays are the most intense, is also recommended. The use of sunglasses is recommended as long-term exposure to ultraviolet radiation from the sun may cause cataracts. Other heat-related illnesses include prickly heat, heat cramps, heat edema, heat syncope, heat exhaustion, and heat stroke. Adequate amounts of fluids, shady rest areas, frequent work breaks, acclimatization to the work environment, and frequent supervisory observation of the crew are methods to prevent heat-related illnesses (Cohen 1997:70–76).

Cold injuries may involve freezing or nonfreezing of body parts, especially the fingers, toes, ears, nose, and cheeks. Types of injuries that may occur include frostnip, chilblains, frostbite, and hypothermia (Cohen 1997:67–69). Hypothermia is often fatal and frostbite may result in the loss of fingers and toes. In cold weather, individuals should dress appropriately for the conditions. Clothing should be layered and all extremities should be covered. It is a good general rule to pack a dry change of clothing in the field during cold weather, particularly if there is any risk of getting wet. In areas where wind chill may be a factor, some form of wind shielding is a good precaution around excavation units. Supervisory personnel should carefully monitor the weather in regards to temperature, wind speed, and moisture level. Individuals who get wet should get dry and change their clothing as soon as possible. Detailed information regarding inclement weather and environmental hazards can be found in the EM 385-1-1 (USCOE 1996:87–91).

Biological Hazards (Animal Bites, Stings, and Disease Transmission)

Encounters with harmful animals while engaged in archaeological fieldwork is inevitable. Bites, stings, and scratches from dogs, wild mammals, snakes, wasps and bees, mosquitoes, flies, and arthropods (spiders, ticks, chiggers, etc.) can be very painful as well as potentially dangerous in terms of the transmission of various diseases.

Dogs and wild animals should be avoided if possible. Do not approach any of these animals. When approaching residential areas, a visual inspection by the supervisor should be made for unleashed dogs. If approached by an aggressive dog do not attempt to run or make sudden motions; but, slowly back away and protect yourself (if needed) as best you can. Dogs, in general, are very territorial and will usually stop pursuit once an individual is out of their space. Seek medical attention immediately for anyone bitten by a dog or wild animal. In addition, local authorities should be contacted with information regarding the incident.

Venomous snakes are another major threat. Those venomous snakes most common to the United States include copperheads, rattlesnakes, coral snakes, and water moccasins. Some of these snakes may be active throughout the year, dependent on where one happens to be within the country. Some of the best advice is to wear heavy leather boots whenever doing fieldwork. Never wear tennis shoes or low cut styles of footwear which are soft and expose one's ankle and lower leg. If one needs to wear soft shoes in an excavation unit, carry them to the site and put them on before entering the unit. Wear snake leggings in areas where snakes are likely to be encountered.

Be careful and observe any area before you sit down or stop to work. Avoid old logs and rocky areas where possible. Be observant when crossing streams and look for snakes on low branches and around the water. Always check an excavation unit before entering to work. Snakes and other creatures sometimes fall into units, even those that are covered, during the night or during periods when the units are unattended. If you encounter a snake of any kind, do not try to pick it up. Avoidance is the best way to deal with any snake. Walk away and around any snake noted. If avoidance is not possible (if there is a snake in an excavation unit), use extreme caution to remove the snake. In some cases, if left alone a snake will leave voluntarily. If someone is bitten by a snake, keep the individual calm and seek medical attention as quickly as possible. Do not apply ice to the wound or attempt to cut the area.

Stings from bees, wasps, and hornets are also highly likely at some point in one's career. Again, observe any area for signs of these insects. Where possible, avoid the general areas in which they are nesting. Always carry topical medication designed for stings in a first aid kit. A major factor in regard to these types of insects is to identify any individual who may have an allergic reaction to stings. Individuals with a history of severe allergic reaction to an insect sting must carry an anaphylactic kit with them at all times. Additional information on prevention of insect stings can be found in EM 385-1-1 (USCOE 1996:62–63).

Numerous infectious diseases may be contracted while doing fieldwork. Fortunately, these events are not frequent, as many of these illnesses may be serious. Table 1 presents a list of infectious diseases to which an archaeologist may be exposed.

To lessen the likelihood of contracting an infectious disease while doing fieldwork, one can use insect repellants containing DEET or permethrin. DEET can be applied to the skin (avoid mucus membranes) or the clothing, while permethrin is applied to the clothing. One should avoid using flea and tick collars as protective tools. These devices are designed for use on pets and not humans (Murdock 1992).

One should inspect himself/herself frequently throughout the day for ticks and remove them as soon as possible. The longer the tick is attached, the higher the likelihood is for transmitting a disease (Murdock 1992). If a tick is found attached to the body, Murdock (1992:2) suggests that it should be removed immediately with a pair of tweezers. The tweezers should be placed as closely as possible to the head of the tick and pulled slowly to remove it from the skin. One should avoid grasping the tick's abdomen during the removal process. Once the tick is removed, the bite should be cleaned with alcohol and the hands should be washed and disinfected. The date of the bite should be noted on a calendar and one should watch for the development of any illness over the next month. Work clothes should be removed as quickly as possible and isolated within one's room or house. Work clothes and any ticks contained within can easily be isolated by placing them in plastic garbage bags and storing the bags in a safe, isolated area.

Avoid drinking water directly from streams, rivers, and untested wells. Proper hand washing and personal hygiene are keys to avoiding most infectious agents. Do not make physical contact with wild or even domestic animals. Certain vaccines are available to prevent infections. Depending on where you are working, vaccination may be indicated. Treat all bites and wounds immediately. Wash with soap and water and apply topical antiseptics. Any bites from mammals should be evaluated by medical personnel, as rabies may occur in any mammal.

One potentially fatal disease transmitted through contact with rodents is Hantavirus. Most of the work related to Hantavirus in the United States has been carried out on reported cases in the southwestern United States (Fink 1994a, 1994b, 1994c; Fink and Engelthaler 1996; Zeitz et al. 1995); however, outbreaks of the disease have recently been identified in the eastern United States (Brackett et al. 1994; Centers for Disease Control

Table 1. Infections in the Field.

Disease	Agent*	Arthropod/ Vector	Illness	Vaccine
Acanthamoebiasis	A		Meningitis	No
Aeromoniasis	B		Wound Infection, Gastroenteritis	No
Anthrax	B		Pneumonia, Sepsis Skin Lesions	Yes
Babesiosis	B	Tick	Sepsis with Hemolytic Anemia	No
Blastomycosis	F		Skin Lesions, Pneumonia, Disseminated Disease	No
California Encephalitis	V	Mosquito	Aseptic Meningitis, Encephalitis	No
Campylobacteriosis	B		Gastroenteritis	No
Colorado Tick Encephalitis	V	Tick	Encephalitis	No
Cryptococcosis	F		Pneumonia, Meningitis Disseminated Disease	No
Cryptosporidiosis	B		Gastroenteritis	No
Cutaneous Larvae Migrans	P		Skin Lesions	No
Dirofilariasis	P	Mosquito	Cysts in Organs	No
Eastern Equine Encephalitis	V	Mosquito	Encephalitis	No
Echinococcosis	P		Cyst in Organs	No
Ehrlichiosis	B	Tick	Rash, Flu-like Illness	No
Epidemic Typhus	B	Louse	Rash, Headache	No
Giardiasis	B		Gastroenteritis	No
Hantavirus	V		Pneumonia, Hemorrhagic Shock	No
Histoplasmosis	F		Skin Lesions, Pneumonia, Disseminated Disease	No
Leptospirosis	B		Conjunctivitis, Hepatitis Meningitis	No
Lyme Disease	B	Tick	Skin Rash, Arthritis, Cardiac and Neurologic Disease	Yes
Murine Typhus	B	Flea	Rash, Fever, Headache	No
Naegleriasis	A		Meningoencephalitis	No
Pasteuellosis	B		Cellulitis, Pneumonia, Meningitis, Sepsis	No
Plague	B	Flea	Lymphadenitis, Pneumonia, Sepsis	Yes
Psittacosis	B		Pneumonia	No
Rabies	V		Encephalitis	Yes
Rocky Mountain Spotted Fever	B	Tick	Headache, Rash Multisystem Illness	No
Salmonellosis	B		Gastroenteritis	No
Sporotrichosis	F		Soft Tissue Infection	No
St. Louis Encephalitis	V	Mosquito	Meningitis, Encephalitis	No
Tetanus	B		Muscle Contractions	Yes
Tularemia	B	Deer Fly, Tick	Lymphadenitis, Pneumonia, Conjunctivitis	No
Vibriosis	B		Wound Infection, Gastroenteritis, Sepsis	No
Venezulan Equine Encephalitis	V	Mosquito	Encephalitis	Yes

Table 1 continued.

Disease	Agent*	Arthropod/ Vector	Illness	Vaccine
Visceral Larval Migrans	P		Cough, Abdominal Pain, Eye Lesions	No
Western Equine Encephalitis	V	Mosquito	Encephalitis, Meningitis	No
Yersiniosis	B		Gastroenteritis, Sepsis	No

*Agent: A - Amoeba; B - Bacteria; F - Fungus; P - Parasite; V - Virus

and Prevention 1994a, 1994b; Fink and Engelthaler 1996; Hjelle et al. 1995; Morzunov et al. 1995). Additional guidance to prevent fungal infections and Hantavirus infections can be obtained from the following federal agencies: Centers for Disease Control and Prevention, National Institute for Occupational Safety and Health, and USDA Forest Service (Lenaway et al. 1999; Lenhart et al. 1997; USDA 1996; Werner et al. 1972).

A question that often arises among archaeologists studying human remains is what is their risk of contracting smallpox or parasitic infections from eggs. Based on extrapolations, if numerous bodies were in the same grave and numerous cases of smallpox occurred in the victims, it is theoretically possible for the smallpox virus to be viable for 100 years (Baxter et al. 1988; Kennedy 1994; Meers 1985). Parasite eggs that are infectious to humans may remain viable in the environment up to 20 years (James R. Lichtenfels, U.S. Department of Agriculture, National Parasite Collection, personal communication to Ricky Langley, 1999). However, certain microbial agents that produce spores may remain dormant for decades (e.g., anthrax) or even hundreds of years (e.g., thermophilic actinomyces) and still be cultured under proper environmental conditions (Benenson 1995; Seaward et al. 1976).

Biological Hazards (Harmful Plants)

One of the most frequently encountered hazards to archaeologists is contact with harmful plants (e.g., poison ivy, poison oak, and poison sumac). Exposure to these plants can occur by direct contact with the leaves and vines or by digging and handling the roots in screens. As a result, archaeologists can contract the itching, blistering, and widely spread rashes any time of the year. The EM 385-1-1 recommends the following protective measures:

1. removal or destruction of plants, where practical;
2. appropriate protective clothing such as gloves;
3. protective ointments;

4. soap and water for washing exposed parts;
5. approved first aid remedies; and
6. instruction in recognition and identification of the plants (USCOE 1996:63).

In spite of every effort, coming down with a case of poison ivy is almost synonymous with doing fieldwork in the United States. Individuals can help protect themselves by observing where the plants are located and avoiding those areas as much as possible. At the most basic level, an individual should wear gloves and use soaps or ointments designed to help remove the poisonous oils from the skin (Garner 1999). A doctor should be consulted if the rash spreads, large blisters develop, or any area becomes infected.

Chemical Hazards

Encounters with dangerous chemicals and wastes pose a potentially serious threat to individuals involved in fieldwork. Contact with these agents can occur almost anywhere and under quite unexpected circumstances (McCarthy 1994). An entire crew could be digging and handling soils laced with very dangerous chemicals and organic wastes without any indication of their presence or the risks involved.

McCarthy (1994), citing the *Historical Hazardous Substance Data Base* provided by the Illinois State Museum (1992), provides a partial list of industrial-era industries and their waste products to graphically illustrate the types of substances archaeologists may encounter in the field. According to McCarthy (1994:1), these include:

1. *leather tanning and finishing* - amyl acetate, sulfuric acid, lead, chromium, manganese, benzene, arsenic, and mercury;
2. *paper making* - lead, arsenic, alum, chromium, and mercury; and
3. *steel making and founding* - hydrogen chloride, benzol, tar, carbon bisulphide, benzene, fluorene, naptha, nitrobenzene, phenol, toluene, and xylene.

These chemicals are, among other things, carcinogens, caustic substances, poisons, or combinations of all three. All are potentially hazardous and put a crew at risk, particularly those individuals who may be pregnant or have specific medical conditions. In addition, work within or around historic structures can expose crew members to lead in old paints, asbestos, fuel oil, rusted metals, glass fragments, and garbage dumps. Soils from industrial sites should be tested before commencement of fieldwork to determine the presence of contaminants and levels of toxicity.

The excavation of historic cemeteries can also expose personnel to hazardous chemicals. Recent work by Meyers et al. (1998) suggests a potential hazard from arsenic poisoning when excavating historic cemeteries dating from circa 1860 to 1910. Arsenic was used as an embalming fluid during this period until its use became illegal in 1910. Arsenic can occur as a residual in the excavated soil and may be potentially hazardous to archaeologists. Meyers et al. (1998:3) note that the best precaution to take regarding suspected arsenic contamination within cemeteries is to test the soil prior to commencement of work. As a result, Louis Berger and Associates, Inc. have created a set of guidelines to test for arsenic contamination at historic cemeteries (Meyers et al. 1998:3–5).

Another potential hazard, particularly for contract archaeologists, is seepage from septic tanks. Many waste-water outfall lines follow the natural drainage patterns of the landscape and flow based on gravity. This often leads archaeologists on corridor survey through the backyards of residential areas which may contain leaking septic tank systems (often the survey being conducted is to facilitate the connection of these residences into municipal or county waste-water lines). In many cases the sight and smell is unforgettable; however, this is not always the case. Individuals should be observant in residential areas for septic tank seepage and avoid digging in these areas until the waste has been removed by professionals (if warranted).

Other hazardous chemicals resulting from agricultural practices may also be encountered. Unhealthy levels of pesticides and herbicides can become concentrated in the soil over time. There are still many questions regarding the long-term effects of exposure to these substances; however, serious allergic reactions can occur in some individuals, even with minimal contact (J.H. Brothers personal communication to Lawrence Abbott, 1999).

Fieldwork on lands under the control of the Department of Defense expose individuals to a special set of hazards. The rules and regulations regarding work on military installations are very detailed and specific regarding safety. The military is adept at minimizing most of the risks to civilians working within their installations. Individuals (i.e., explosive ordnance disposal personnel) are specially trained to locate, remove (or mark), and/or dispose of any unexploded ordnance and other dangerous substances that may be present on post ranges prior to the commencement of any fieldwork. Regular communication between archaeologists and range control personnel (often through two-way radio) is usually mandatory.

Despite all the efforts to make a military post safe for work, some hazards still exist. Strands of barbed wire and discarded communication wire (for land lines) are frequently encountered in the field. These can cause lacerations and falls if not seen and avoided. Other hazards include buried wastes from bivouacs and unit training areas that may be unmarked by the military, and unspent rounds from small arms and automatic weapons (many are generally training rounds, but are also dangerous to handle). The primary rule while working on any military post is "don't pick anything up." Any type of discarded equipment or hardware that appears to be associated with military training should be left alone, and all perceived hazards should be reported to range control personnel.

The general rule regarding digging through any area or on any site that may contain hazardous wastes is that no amount of caution is too much. Any area where hazardous wastes are suspected should be tested prior to the commencement of fieldwork by professionals with the necessary training. In addition, at least one of the supervisory staff should have formal training in the recognition of hazardous materials and the procedures to follow in the event of exposure. All of the crew should be instructed in the potential dangers of hazardous materials and report anything suspicious to supervisory personnel. The EM 385-1-1 (USCOE 1996:499–522) contains an extensive section on hazardous materials and the procedures for dealing with these substances.

Laboratory Safety Hazards

Not all workplace dangers are in the field. Health hazards can also be found in the laboratory. If not properly identified, some of the dangerous substances noted by McCarthy (1994) and Meyer et al. (1998) can find their way into the lab on artifacts or human remains and within soil samples or feature fill. In addition, the range of acids and caustic chemicals employed by laboratory personnel to conserve, process, or identify archaeological materials for study pose major hazards if improperly used or stored. A list of chemicals used on National Museum of Natural History collections is shown in Table 2 (Makos and Dietrich 1995:235). Ethnobotanical and faunal specialists also face risks processing and handling organic materials, particularly from historic contexts. Risks associated with the chemicals used in processing samples for some forms of analyses (e.g., phytolith analysis) extend to both prehistoric and historic contexts (Lentfer and Boyd 1999).

Health hazards in a laboratory setting can also come from unexpected sources. In the past, arsenic was used to treat manuscripts for insect pests (i.e., worms and other paper-eating insects) (James Brothers personal communication to Lawrence Abbott, 1999). This may pose a risk of poisoning to those individuals who handle these materials (Hawks and Williams 1986:1–4; Williams and Hawks 1986:21–49).

According to Coy (1978:14–15), faunal materials are generally safe to handle. Some bones from historic sites (those associated with the nineteenth and twentieth centuries) can pose a slight health risk to analysts. She notes that anthrax is a potential danger to archaeologists who handle animal bone, since it can survive in soil and bone for at least 60 years (Coy 1978:15).

Coy (1978:15) concludes that the risks from handling archaeological faunal materials are slight. Others have reported upper respiratory infections after handling bone and other fill material from late nineteenth to early twentieth century urban privies (Lisa D. O'Steen personal communication to Lawrence Abbott, 1999).

Table 2. Chemicals Used on National Museum of Natural History Collections.*

Substance	Chemical Content
Alcoholic solution of oil of bitter almonds	Hexane
Alcoholic solution of oil of red cedar	Hydrocyanic acid
Alum	Kaolin
Arsenic	Kerosene
Arsenic trioxide	Mercuric chloride
Benzene	Menthol
Borax	Methyl bromide
Camphor	Mineral spirits
Carbolic acid	Naphthalene
Carbon disulfide	Paradichlorobenzene
Carbon tetrachloride	Petroleum ether
Corn cob dust	Renuzit™
Cornmeal	Sawdust
Dichlorodiphenyltrichloroethane (DDT)	Sodium fluorosilicate
2,2 Dichlorovinyl dimethyl phosphate (DDVP)	Strychnine
Ethylene dichloride	Sulfuryl fluoride
Formaldehyde	Thymol
Gasoline	Trichloroethane

*Adapted from Makos and Dietrich (1995:235)

The greatest health risk to a faunal analyst may be in the assembly of a comparative collection (Coy 1978:15; Irvin et al. 1972). Building a comparative collection from road kills and other chance findings of wild animal carcasses is potentially hazardous, exposing an individual to risks involving rabies and other diseases (Lisa D. O'Steen personal communication to Lawrence Abbott, 1999). If a comparative collection is built in this manner, basic precautions should minimally include wearing gloves and face mask, isolation and proper disposal of putrefied materials, proper storage of processed bone, and good personal hygiene (Lisa D. O'Steen personal communication to Lawrence Abbott, 1999). Consideration should also be given to obtaining tetanus and rabies vaccinations.

Some molds found in libraries, archival collections, and archaeological labs (e.g., *Aspergillus fumigatus*) can be a serious health hazard to susceptible individuals (Conservation Center for Art and Historic Artifacts 1994). Mold outbreaks in a lab or within collections can cause respiratory symptoms, skin and eye irritation, and, rarely, infections. Individuals who suffer from certain allergies or asthma, and those who take steroids, may be more adversely affected.

In the past, mold outbreaks were treated by fumigation with ethylene oxide. Other fumigates included thymol crystals, orthophenyl phenol, and formaldehyde. All of these chemicals are hazardous to humans and presently are not used in the treatment of molds (Northeast Document Conservation Center 1993).

If a mold outbreak is noted in archaeological collections, a professional mycologist should be consulted to insure that the mold species is not toxic (Conservation Center for Art and Historic Artifacts 1994:2; Northeast Document Conservation Center 1993:4). In the event a toxic species is detected, the collections will require the attention of professionals trained in cleaning molds. If the outbreak is a non-toxic variety, the following safety measures are recommended for cleaning mold from collections:

1. Use a respirator with a particulate filter, not a dust mask;
2. Wear disposable plastic gloves;
3. Wear coveralls or laboratory coats, preferably disposable;
4. Wear foot and head covers for a very dirty situation;
5. Remove coveralls, laboratory coats, and protective gear in a designated "dirty" area; and
6. Periodically disinfect nondisposable gear. Wash laboratory coats, coveralls, and other washable items in hot water and bleach. Wipe respirators with isopropanol (rubbing alcohol), or Lysol™, and change particulate filters regularly (Conservation Center for Art and Historic Artifacts 1994:3).

The best defense against mold is environmental control. Labs should maintain low humidity levels and be prepared to isolate any small outbreaks of mold in plastic garbage bags and separate storage areas (Conservation Center for Art and Historic Artifacts 1994). Air conditioning units or HVAC systems should be maintained and in good repair at all times. Any leaks in a system should be repaired immediately, as molds thrive in moist environments.

Routine inspections of a lab for toxic chemicals, molds, and other hazards will help reduce the risk to personnel. While no method is fail-safe, precaution and prevention still are the best methods of defense against health risks in the lab.

Social Hazards

Archaeologists often work for extended periods of time in many different places, frequently living in motels, field camps, or rental properties. Over time, this sort of lifestyle can cause relative degrees of stress which may manifest adversely in certain individuals.

Alcohol Abuse

Alcohol consumption is almost synonymous with archaeology. We have all heard (or even contributed to) some of the near-epic tales of nightly drinking marathons around the campfires during the famed Projects X, Y, and Z. In reality, chronic alcohol abuse can lead to serious problems. In addition to the long term health hazards associated with alcohol abuse, there are potentially serious risks in the field associated with accidents and disorientation.

Individuals who are intoxicated or severely “hung over” constitute a major hazard in the field. These individuals risk injury to themselves and others on the crew in terms of accidents associated with tools or machinery and injuries associated with falls and other mishaps. On survey transects, there is also the potential for an intoxicated individual to become disoriented and/or lost. In addition, valuable field time can be lost dealing with individuals for whom alcohol abuse is an issue. In the event that these people show signs of intoxication, they should not be allowed to work. Under no circumstances should they be allowed to drive work vehicles or use other machinery and hand tools.

Drug Abuse

The use of illicit drugs by archaeological crew members is a legal as well as safety issue. The general safety issues are basically the same as discussed above for alcohol abuse. These issues may also apply to the abuse of legal prescription and over-the-counter drugs, especially if mixed with too much alcohol.

A project manager or director is also culpable if drug use by crew members is known or suspected and not stopped. The discovery of illicit drugs by law enforcement agents can result in arrests and the seizure of property. Property seizure could include anything from field equipment to vehicles and bring a given project to a screeching halt. A situation of this nature may also result in the revocation of grants or contracts and lead to problems obtaining future funding of any sort.

Robbery and Assaults

Unfamiliarity with local settings, particularly within the first few weeks of a project, can put some individuals at risk. Field crews should use a little common sense in strange or new settings (particularly in urban areas). Simple precautions such as going out in groups, making no ostentatious public displays of money or other possessions, and avoiding potentially dangerous areas or situations will help minimize the risk of assault. Project managers should consider providing transportation to stores and restaurants for those crew members who lack vehicles. This could be accomplished through the use of carpools or a designated driver of a company or field vehicle. Field crew should also consider the use of a buddy system in potentially dangerous areas.

Summary

Maintaining a healthy and safe work environment for archaeologists is mandated by federal law (Garrow 1993). Rules and regulations developed by OSHA apply to archaeological projects and all archaeologists should make an effort to increase workplace safety. A few basic steps can help in this matter.

We feel that all archaeologists should have some basic training in first aid and become certified in CPR. Work areas should be inspected prior to the commencement of fieldwork to identify any hazardous conditions. Any identified risks should be addressed in an appropriate manner and field crews and lab personnel should be informed of potential safety hazards in the workplace. Individuals with special health conditions such as allergies, diabetes, heart problems, or others should be confidentially identified before the commencement of fieldwork and provided opportunities to communicate with field supervisory personnel and emergency responders. Any conditions within the workplace that might adversely effect these individuals should be identified and communicated to them. No one should be allowed to work alone. In the case of survey in remote areas, the establishment of a "buddy system" is a good idea. All crews should maintain an adequately stocked first aid kit, both in the lab and field (see USCOE 1996:21). Centrally located first aid kits should be easily accessible to crews involved in excavation. Individual crews doing survey work should each be supplied with a kit.

All crew members should have the telephone numbers of the nearest rescue squad or emergency medical facility. In addition, each individual should be aware of how to physically get to the nearest medical facility. While in the field, it is important to take advantage of modern technology and carry a cell phone in the case of an emergency. In remote areas, additional cell phones and two-way radios for crew members may be appropriate. Any accident or injury should be reported to supervisory personnel immediately. Never hesitate to seek professional medical assistance during an emergency.

Something that all archaeologists should do is to develop a safety policy and implementing safety plan. This policy and plan should be communicated to each crew member and placed on a job site within easy access. A basic outline for a safety plan can be found in EM 385-1-1.

All archaeologists should be familiar with the federal and state laws, along with the implementing rules and regulations, that apply to workplace safety. Publications, such as the EM 385-1-1, should be obtained and consulted to insure that a given project is conducted in a safe manner and in compliance with federal law. Niquette (1997) suggests that

> SAA, ACRA, SHA and other organizations, perhaps in cooperation with the Corps of Engineers, the National Parks Service, and the Forest Service, should attempt to enter into a dialogue with OSHA. If realistic archaeological workplace safety standards could be developed and presented to OSHA, I am certain that we would all profit from the effort.

Once established, these standards could be extended to the individual states in a dialogue with individual state departments of labor and SHPO offices. An extended dialogue of this nature would fully encompass the legal requirements (both state and federal) regarding workplace safety. If successful, these dialogues would address both the special needs and circumstances surrounding the study of the archaeological record, and provide us all with a safer work environment.

Notes

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THE SINK HOLE AT BANDANA: AN HISTORIC BLUE RIDGE MICA MINE REVEALS ITS PAST

by
Peter R. Margolin

Abstract

Aboriginal mining activity in the Blue Ridge Mountains during the Woodland period is a neglected aspect of North Carolina prehistory. Abundant evidence of such activity was still visible in the nineteenth and early twentieth centuries, before modern mining obliterated it. From published reports of this evidence, it appears that Woodland mining activity in the Blue Ridge was devoted largely, if not exclusively, to the extraction of a single mineral, mica, and its transport to centers of Adena and Hopewell culture in the Ohio Valley. Evidence for future study consists of tools and artifacts in museum collections. A cursory inspection of one such collection shows that much material is available, only awaiting renewed interest in the subject. A review of the literature and visits to a prehistoric mining site, the Sink Hole mica mine in Bandana, North Carolina, suggest future lines of inquiry, chief among these being the identity of the prehistoric miners.

Intermittently, for a period of over two millennia, large clear sheets of mica—the isinglass of previous generations—have been extracted from deposits in North Carolina's mountains. The prehistoric inhabitants of North America used sheet mica in ways very different from modern civilization. Whereas modern uses have been strictly utilitarian, ancestral Native Americans found ritual and ornamental uses for mica. Nevertheless, the aboriginal mining industry corresponded to its modern counterpart in two significant respects: (1) both prehistoric and modern miners invested large amounts of time and energy extracting sheet mica from the same deposits, excavating many tons of rock in the process; and (2) both transported their product hundreds of miles from mine to user.

In 1913, when the Smithsonian Institution's William Henry Holmes came to Spruce Pine to investigate ancient mica mining in Mitchell County, evidence could still be seen where countless generations of prehistoric miners had extracted huge quantities of mica from the area's many deposits. Although his discussion of this prehistoric industry betrays no awareness that Woodland period inhabitants of the region might have used mica themselves (Holmes 1919), later archaeological work at places such as the Warren Wilson site in Buncombe County and the Garden Creek site in Haywood County has resulted in the discovery of mica funerary objects (e.g., Dickens 1976; Wilson 1986), but in quantities that pale in comparison with those found in the Ohio Valley mounds. Mica is soft but the large sheets that the miners prized, up to three feet in diameter, occur in the form of thick, heavy crystals. Thus, preparing the mineral and transporting it hundreds of miles away required a great expenditure of time and effort.

This article was written in hopes of directing renewed interest in this neglected aspect of North Carolina prehistory. Toward that end, it: (1) records early speculations on the origins of ancient workers at a mica mine in Mitchell County; (2) describes two Ohio Valley burial mounds in which large quantities of mica from western North Carolina were discovered and the circumstances of its discovery; and (3) describes how the Woodland people of the Ohio Valley used this mica. A secondary aim is to present, in broad outline, the 2,000-year history of what may well be the oldest mine in the southern Appalachians.

Mica mining has a venerable history in the New World. Among the many mineral deposits exploited by prehistoric Native Americans, few were worked over a longer period than the mica veins of North Carolina. The State's many historic mica mines, now abandoned, were first opened 2,000 years ago. By contrast, historic records of mica mining extend back barely two centuries, to 1803 when the mineral was first mined in New Hampshire.

Much of North Carolina's prehistoric mining activity was centered in an area known in historic times as the Spruce Pine mining district. Until the 1950s, mica mining was an important industry in the district, supplying much of the domestic mica used in electrical and electronic applications.

At the beginning of the twenty-first century, some 2,000 years after work began there, none of these mines offers better documentation of this vast span of history than the Sink Hole, located in the Mitchell County community of Bandana. Taking the period of prehistoric activity into account (and bearing in mind the distinction between mining minerals and quarrying rock), this may be among the oldest mines in North America. Its location is noted by an historical marker four miles northeast of the site on U.S. 226, between Spruce Pine and Bakersville. The latter, the county seat, is six miles northwest of the mine.

Earliest Descriptions

In 1868, rumors of Spanish silver mines gave General Thomas Lanier Clingman the idea to sink a shaft on the site of some ancient excavations in Bandana, located 15 mi upstream from where North Carolina's Toe River flows into Tennessee and becomes the Nolichucky River. He hoped to find silver ore there; instead, he found sheets of mica as large as any he had ever seen (Clingman 1877).

Clingman first visited Bandana in 1867 to investigate reports of ancient silver mines, according to William H. Holmes. Holmes was Chief of the Bureau of American Ethnology at the Smithsonian Institution from 1902 to 1909. His description of Clingman's work at Bandana was included in the earliest and possibly only comprehensive study of prehistoric Native American mining ever attempted (Holmes 1919) (Figure 1).

When General Clingman visited Bandana, evidence of mining there consisted of a series of overgrown pits dug into hillsides opposite what is

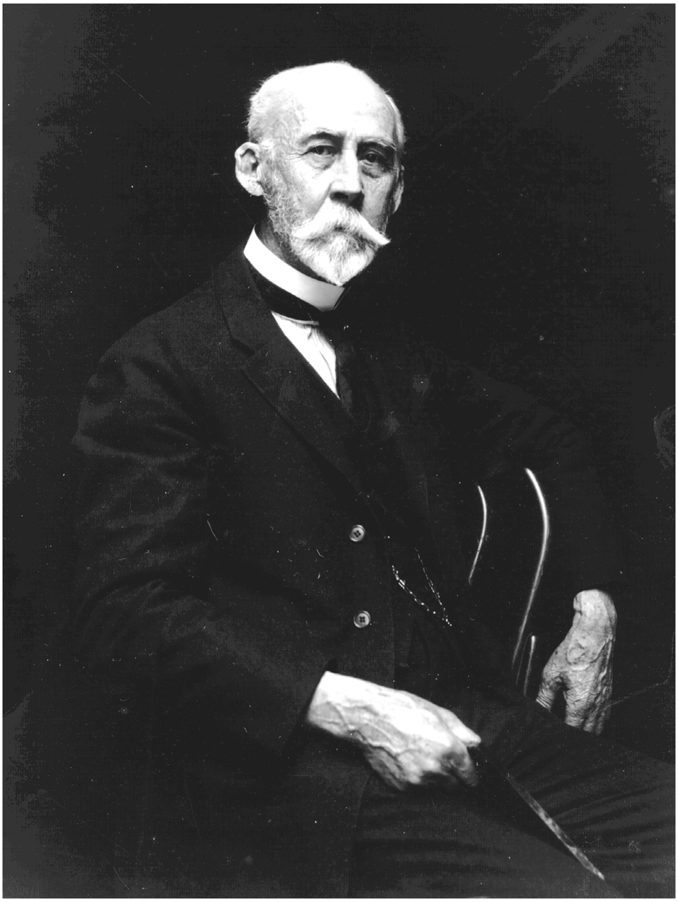

Figure 1. William H. Holmes, taken during the period when he was Chief of the Smithsonian Institution's Bureau of American Ethnology. Courtesy of the Smithsonian Institution.

now known as Sink Hole Creek. The diggings coincided with a band of outcrops of pegmatitic rock stretching a total distance of about 1,600 ft in a northeast-southwest direction and averaging 8–12 ft in width. (Pegmatite is an igneous rock, similar to granite in composition, consisting of uncommonly large crystalline masses of three minerals: feldspar, quartz, and mica.) Clingman thus became one of the first to record how the Bandana workings looked centuries after they had been abandoned, and before their disruption by nineteenth- and twentieth-century mining.

On the north side of the creek, on land belonging to a farmer named William Silvers, Clingman observed a line of excavations that extended some 400 yds uphill onto a ridge crest. A similar but shorter line was visible on the south side, over the hilltop and about 1000 ft away. As

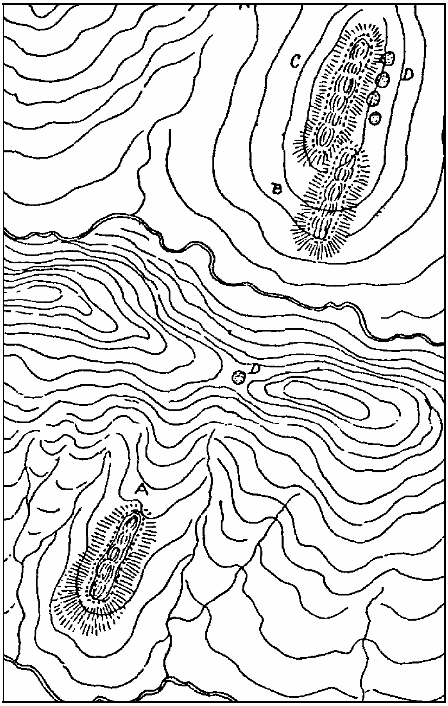

Figure 2. Sketch map of the Sink Hole Mine in 1913 (from Holmes 1919:Figure 116): B and C – Sink Hole; A – Robinson; and D – aboriginal mica workshops. Sink Hole Creek meanders from east to west across the middle of the map area. (north to top)

Clingman described the excavations, it appeared as though a large number of miners had been at work there for many years (Clingman 1877). Although Clingman gave no estimate of the depth of the workings, Holmes, who saw them in 1913, described the diggings as having reached depths of 30 to 40 ft (Figure 2).

Clingman's first inclination, believing the stories that had brought him there, was to credit the men of De Soto's expedition with the mining. The conquistadors had trekked through the Carolinas looking for precious metals in 1540. Having studied mineralogy with Professor Elisha Mitchell at Chapel Hill 35 years previously, Clingman regarded the waste material lying in piles around the pits at Bandana as resembling "Mexican silver ore." Thus, in 1868, he decided to sink a shaft there and had two tunnels dug beneath the old excavations (Figure 3). Instead of silver, though, Clingman found an abundance of "large mica of good quality."

As Clingman observed, the size of the trees then growing on waste material heaped up around the pits suggested that the work had been done hundreds of years earlier. In a letter from Asheville, North Carolina,

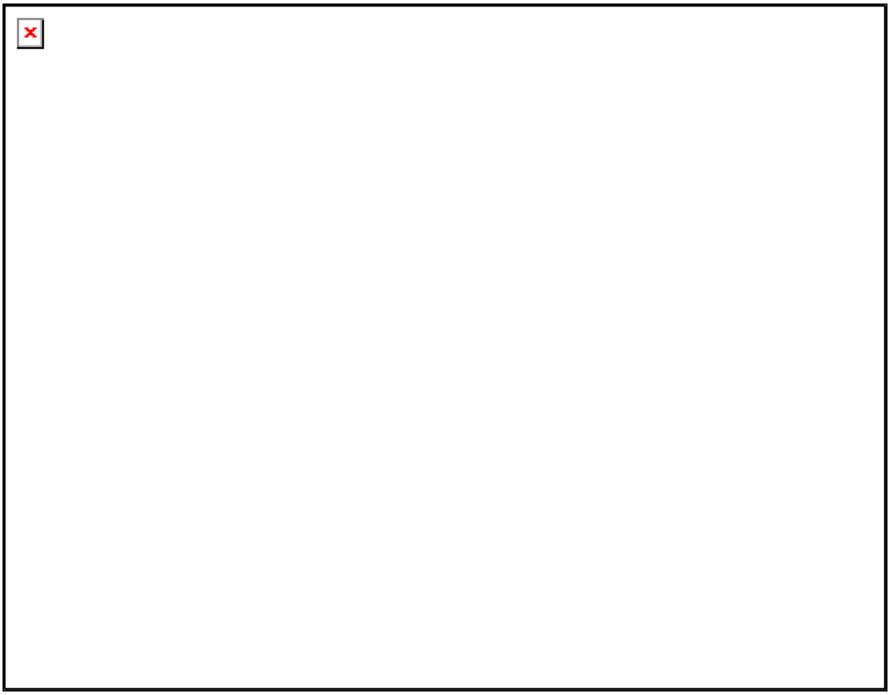

Figure 3. Plan of openings at the Sink Hole Mine in 1940, including the location of Clingman's shaft (from Olsen 1944:Plate 5). Note: State Highway 104 is now NC 80.

dated April 8, 1873, he speculated: "It does not seem improbable that a former race of Indians – possibly the 'Mound-Builder,' who used copper tools, made these excavations for the purpose of procuring the mica."

Clingman was not alone in venturing a guess as to the origin of the prehistoric miners at the Sink Hole. In 1880, W. C. Kerr, State Geologist of North Carolina, wrote as follows concerning North Carolina's ancient mica mines: "I have stated elsewhere, several years ago, that these veins were wrought on a large scale and for many ages by some ancient peoples, most probably the so-called Mound Builders" (Kerr 1880:457).

Kerr summarized his observations of aboriginal work at a number of mica mines in western North Carolina as follows:

> They opened and worked a great many veins down to or near water level. . .as far as the action of atmospheric chemistry had softened the rock so that it was workable without metal tools. . . . Many of the largest and most profitable mines of the present day are simply the ancient Mound Builders' mines reopened and pushed into the hard undecomposed granite by powder and steel. Blocks of mica have often been found half imbedded in the face of the vein, with the tool-marks about it, showing the exact limit of the efficiency of those prehistoric mechanical appliances [Kerr 1880:457].

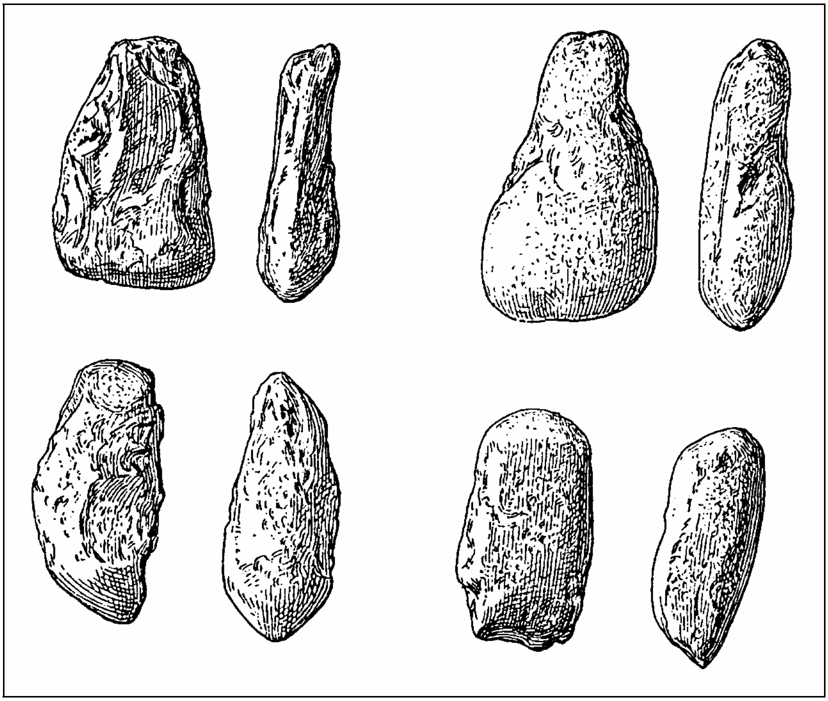

Figure 4. Drawings of prehistoric mining implements (one-fourth acutal size) recovered from a deep pit near upper end of the Sink Hole Mine (from Holmes 1919:Figure 115).

Examples of the "appliances" Kerr referred to were illustrated by drawings that appeared in Holmes' 1919 report (Figure 4).

Kerr had also heard the stories of old Spanish silver mines. He visited the prehistoric diggings at Bandana in the same year that Clingman sank his shaft; however, his *Report of the Geological Survey for 1875* made no mention of Clingman's presence or activities there. The geologist described "a dozen or more open pits 40 to 50 feet wide, by 75 to 100 long, filled up to 15 or 20 feet of depth" (Kerr 1875:300). He went on to relate that two years after his visit to Bandana (by 1870), he had learned that "mica was of common occurrence in the tumuli of the Mound Builders" and that "cut forms similar to those found in the mounds were occasionally discovered among the rubbish heaps about and in the old pits" (Kerr 1875:300). This latter piece of information Kerr (1875:300) took as revealing "unmistakably the purpose and date of these works [the pits at Bandana]." If it could be verified, it would have a direct bearing on the question of where the ancient miners originated.

Among Kerr's general comments on North Carolina mica mines in 1875 were the following observations regarding prehistoric work:

> Since the development of mica mining on a large scale in Mitchell and adjoining counties, it has been ascertained that there are hundreds of old pits and connecting tunnels among the spurs and knobs and ridges of this rugged region; and there is no doubt that mining was carried on here for ages, and in a very systematic, skillful way. . . . The pits are always open "diggings," never regular shafts, and the earth and debris often amounts to enormous heaps. . . . The tunnels are much smaller than such workings in modern mining, generally only three to three and a half feet in height and considerably less in width. Some have been followed for fifty and a hundred feet and upwards [Kerr 1875:300].

A year after Kerr's visit and Clingman's departure, two stove merchants from Tennessee, J. G. Heap and E. B. Clapp, began mining mica at what by then was known as the Sink Hole Mine. They established in Bandana the headquarters of what grew to be a large, profitable enterprise, producing mica from many properties within the district. The economic value of their product was based on its transparency, its resistance to fire and heat, and the ease with which it could be split into thin flexible sheets that could be trimmed to any size or shape. These qualities made mica eminently suited for stove and furnace windows, lanterns, and lampshades.

Within a few decades, by the turn of the century, it became apparent that mica would play an even more important role in industry. This new role depended upon an additional quality, mica's dielectric properties, which made it a peerless electrical insulator. "Until a few years ago, almost the only commercial use of mica was in the doors or windows of stoves and furnaces. To a less extent it was used in lanterns and the portholes of naval vessels, where vibrations would demolish the less elastic glass. . . . Since the introduction of the present system of generating electricity, there has risen a considerable demand for it in the construction of dynamos and electric motors" (Merrill 1901:290).

The Historical Period of Mica Mining

The workings at Bandana eventually grew to include over 30 shafts and 2,000–3,000 ft of drifts and stopes. The deepest shafts were connected below by a 900-ft tunnel which drained water that otherwise would have filled the underground workings. The tunnel extended under the paved road that is now N.C. Highway 80 (Figures 5 and 6).

In the latter decades of the nineteenth century, the Sink Hole was known as a source of the highest grade of flat stove mica. In the twentieth century, when electrical and electronic applications overshadowed older uses, the Sink Hole became renowned as the source for a variety of reddish brown muscovite mica, known as "ruby" in the trade, that was regarded as possessing the highest dielectric properties and therefore preferred by industry.

Activity at the mine fluctuated over a 90-year period. When sheet mica was in demand, the selling price rose and fell depending on the amount imported from abroad (chiefly India) and the needs of the defense industry. After a 20-year interruption following the First World War, new

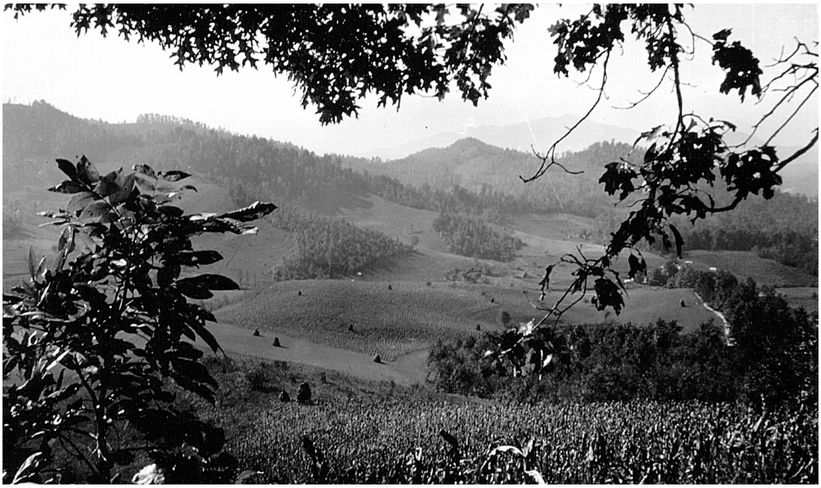

Figure 5. The vicinity of the Sink Hole Mine in 1936 (view to south) The mine is to the right (not in picture). Photograph by Joffre L. Coe. Courtesy of the Research Laboratories of Archaeology.

Figure 6. View in 1936 of "ancient" workings at the Sink Hole Mine. Photograph by Joffre L. Coe. Courtesy of the Research Laboratories of Archaeology.

shafts were sunk in 1941 a short distance southwest of Clingman's original shaft (see Olson 1944:Plate 5), as America prepared once more to go to war. In 1942, the U.S. Government established the Colonial Mica Corporation, headquartered in Asheville with an office in Spruce Pine, in order to encourage local miners by offering to buy all the mica they could produce and to help finance the purchase of mining equipment.

With peace, work came to a halt in 1945, only to be revived again by the Korean War. The buying program was reestablished in 1952, when the government began stockpiling mica to ensure against interruptions in overseas supplies. During the 10-year period from 1952 to 1962, the mine produced over 200,000 pounds of sheet mica (Lesure 1968:68). When the federal buying program ended in 1962, so did activity at the Sinkhole Mine.

Ancient Miners

When Clingman and Kerr visited Bandana, signs of prehistoric activity there consisted of deep pits and trenches with stone tools left lying in the bottom. The actual identity of Bandana's prehistoric miners is a matter of conjecture; however, questions about why the mica was mined, how it was used, and where it was used was solved by the excavation of burial mounds hundreds of miles away in the Ohio River Valley of Ohio, Kentucky, and West Virginia.

In 1913, some four decades after Clingman searched for silver there, W. H. Holmes visited Bandana to investigate reports of aboriginal tools found in mica mines of the Spruce Pine district. He arrived at a time when modern work had not quite obliterated the ancient diggings.

Holmes appears to have been the second archaeologist to investigate the diggings. In the report he published in 1919, Holmes mentioned a reconnaissance in 1893 by De Lancey Gill, also of the Smithsonian Institution's Bureau of American Ethnology, made under his direction. According to Holmes, the results of that work were never published. However, Gill may have collected some aboriginal mining tools in 1893, because Holmes mentions that by the time of his 1913 visit, the U.S. National Museum already had a dozen artifacts from the Spruce Pine area in its possession (Figures 7 and 8).

While Holmes did not do any digging in 1913, he did visit two mines in the vicinity of Spruce Pine (the Deake and an unnamed mine), one near Bakersville (the Clarissa mine), and the Sink Hole at Bandana. Judging from the information he published in 1919, Holmes devoted most of his time and attention to the workings at Bandana. Supplementing his description of the Sink Hole was a topographic map sketched in the field (see Figure 3). In addition to showing the locations of the various pits and trenches, the map indicates the sites of what he described as mica workshops. One, a wooded hummock situated on a ridge top immediately south of Sink Hole Creek, can still be seen. A review of the literature suggests that these are the only features in North Carolina that have ever been identified as such.

When Holmes reported the results of these and other investigations in 1919, he credited Clingman with having been the first to "bring to light. . .the sources of supply" of the mica found in Ohio Valley burial mounds. To Holmes, there was no question that mica unearthed in the graves of the Mound Builders came from deposits in North Carolina. This conclusion appears incontestable, for although they are hundreds of miles

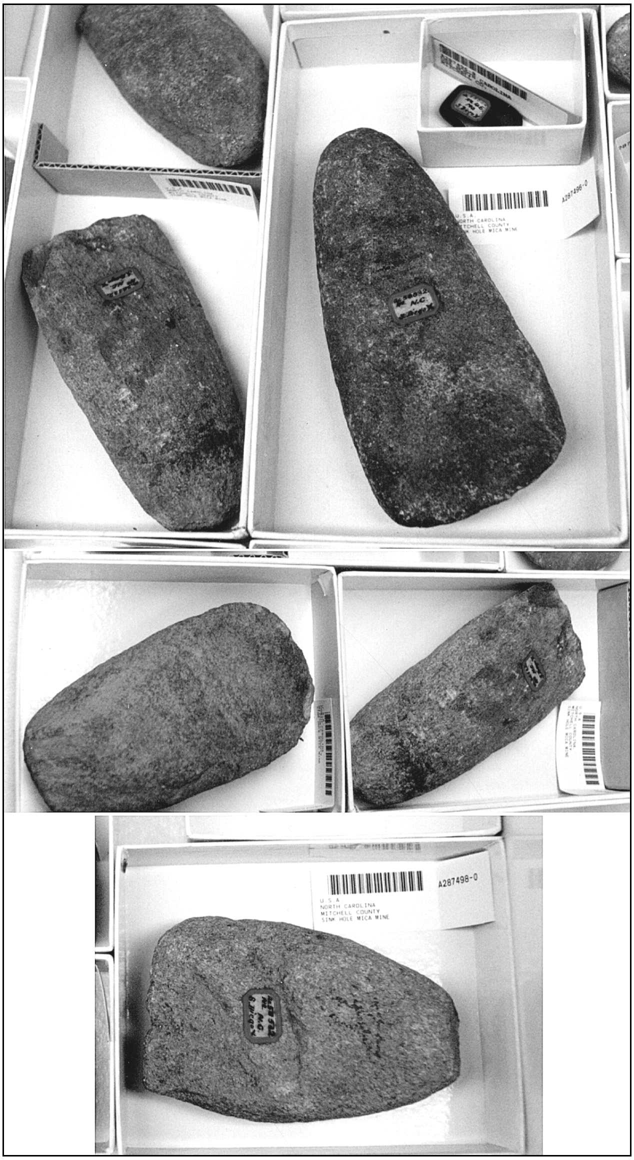

Figure 7. Stone mining implements recovered from the Sink Hole Mine and curated by the Smithsonian Institution. Photograph by Elizabeth Hunter.

apart, North Carolina deposits are nearer to the mounds than any others available to the prehistoric miners. The identity of the miners themselves, however, remains open to conjecture.

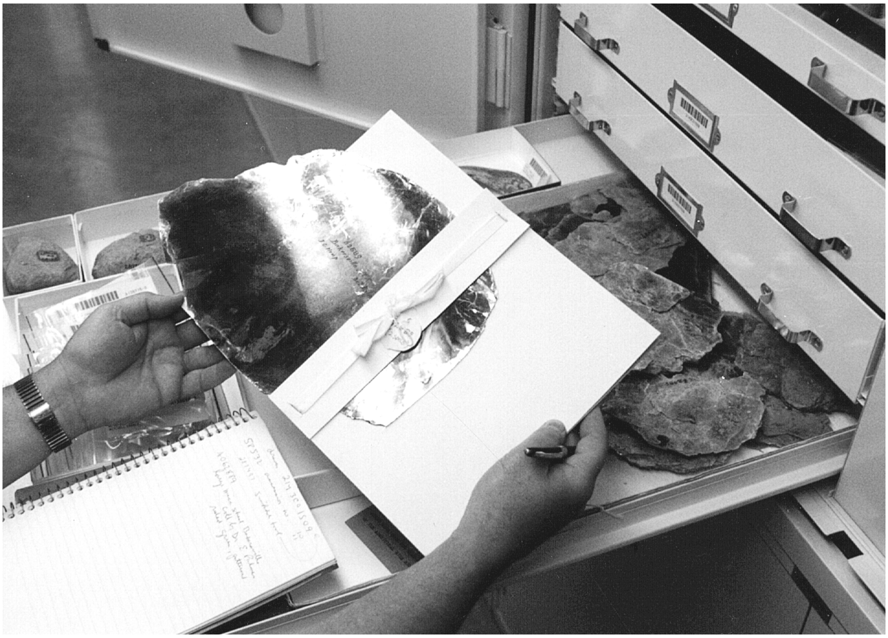

Figure 8. Green sheet mica mined by prehistoric Native Americans and collected by I. G. Heap from one of his mica mines in the Bakersville area of Mitchell County. Curated by the Smithsonian Institution. Photograph by Elizabeth Hunter.

North Carolina Mica in Ohio Valley Burial Mounds

The earliest Ohio Valley burial mounds are over 2,000 years old, firmly within the context of the Woodland period. Radiocarbon dating of organic remains found in the mounds indicates that they were constructed over a period of hundreds of years, beginning around 200 B.C., by a people in the early stages of adapting to a settled, agricultural existence.

By the early nineteenth century, when the Ohio Valley was first being settled by people of European descent, the Native Americans whom the settlers found living there could shed no light on the identity of the people who had raised the mounds, people who had preceded them by more than a thousand years. The earthworks of these vanished people were excavated by amateurs as early as the 1840s (Squier and Davis 1848). In the decades that followed, professional archaeologists, faced with the necessity of attaching labels, assigned the names Adena and Hopewell to the Woodland people who built the mounds.

Archaeologists who excavated Adena and Hopewell burial mounds discovered an unusually rich array of artifacts, including images cut from tortoise shell, copper, and large smooth sheets of mica. The latter included stylized human torsos, hands, claws and talons, and geometric figures.

Other mica artifacts found in the mounds included large numbers of perforated disks as well as elliptical forms that may have served as mirrors.

Several hundred mica disks were found in one of a group of two dozen mounds called Mound City, near Chillicothe, Ohio, in what is now Hopewell Culture National Historic Park (see Holmes 1919). Holmes and others have speculated that the disks and others like them were strung together to form part of the costume of a medicine man or shaman. Adena and Hopewell mica artifacts such as these now reside in the collections of the Museum of the Ohio Historical Society in Columbus, Ohio, and in the Smithsonian Institution.

The author, accompanied by Elizabeth Hunter, visited the Smithsonian Institution's Museum Support Center (a storage and curatorial facility in Suitland, Maryland) in order to examine the stone tools and mica that Holmes and presumably Gill had collected from the Sink Hole and other mines in Mitchell County. This visit also served as an opportunity to examine some of the Smithsonian's collection of Hopewell and Adena artifacts made of mica, copper, and stone that came from various mounds in the Ohio Valley.

Holmes and Gill collected more than just stone mining tools at the Sink Hole. The Smithsonian collection of artifacts from Mitchell County also includes large elliptical sheets of mica, possibly retrieved from a cache left behind by the ancient miners. Discoveries by C. D. Smith at prehistoric mica mines in Macon County established that the miners commonly stored their mica in pits, especially dug for this purpose, until it was time to transport it westward (Smith 1877).

One of the conical mounds at Hopewell Culture National Historic Park was named the Mica Grave because of the great quantity of the mineral found when the mound was excavated in 1846 by amateur archaeologists Ephraim G. Squier and Edwin H. Davis (1848) (Figure 9). During a later, more systematic excavation by William C. Mills and Henry C. Shetrone in 1920 and 1921, workers uncovered 13 graves at a depth of 20 ft. One was decked with thick sheets of mica. Mills (1922) described the sheets as having been cut into rectangular shapes of up to 10 inches by 14 inches and completely covering an area 8 ft by 4 ft. Until 1997, when it was closed at the request of contemporary Native Americans, perhaps descendants of the Hopewell, the Mica Grave was on public display with a short tunnel providing entrance into the dimly lit interior.

At Seip Mound, located 20 mi west of Mound City, archaeologists unearthed the foundations of two workshops, the floors of which were littered with mica trimmings and blades used in the cutting process (Baby and Langlois 1979:18) (Figure 10). Here, presumably, Hopewell artisans cut mica sheets into designs of ritual significance, the sheets having been split from heavy books at mine sites such as the Sink Hole.

The oblong Seip Mound, originally 30 ft high and the focal point of a complex of mounds enclosed by a 10-ft high earthen embankment, was found to contain 122 burials when thoroughly excavated between 1926 and 1928 (Shetrone and Greenman 1931). In addition to mica from North

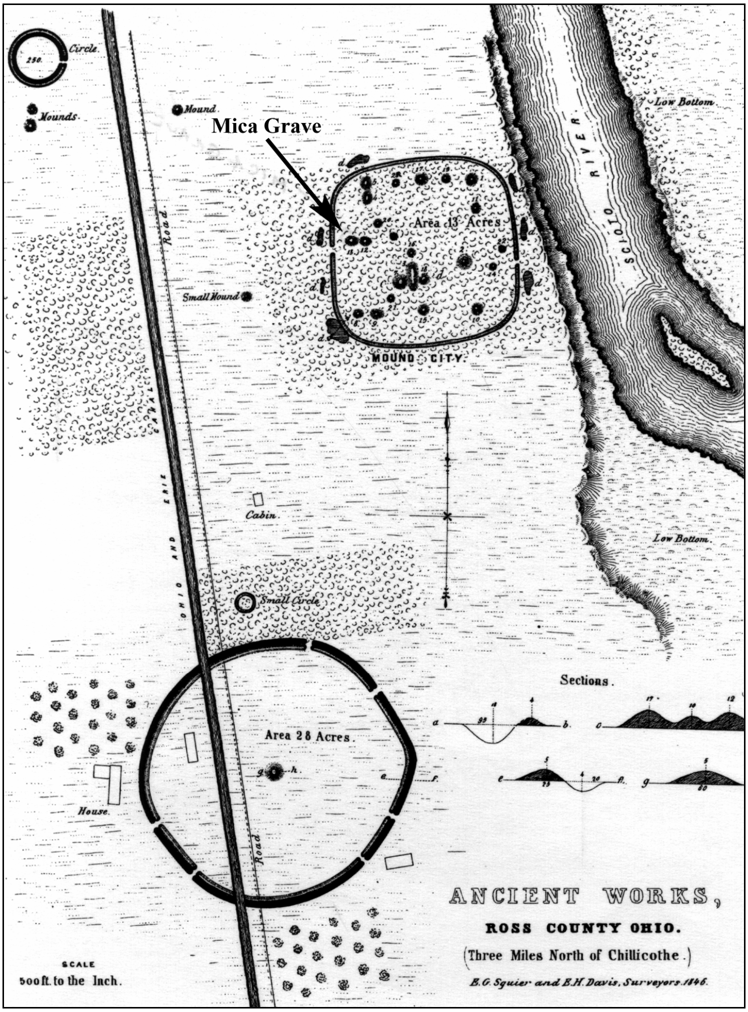

Figure 9. Map of the earthworks at Mound City, Chillicothe, Ohio, showing the location of the Mica Grave (from Squire and Davis 1848:Plate 19, label added).

Carolina and copper from Michigan, the graves contained thousands of freshwater pearls, estimated in 1960 to have been worth as much as $2 million when new and in good condition (Woodward and McDonald 1986:93–95). Burial mounds such as Seip are characteristic of the Middle Woodland culture of the Ohio Valley which also produced large earthwork enclosures laid out in geometric designs, including squares, circles, and octagons.

Figure 10. View of the Seip Mound, Ross County, Ohio. Photograph by Elizabeth Hunter.

What distinguishes the Woodland people of the Ohio Valley as much as monumental earthworks is the richness of their grave goods. These consist of artifacts crafted from a wide variety of materials, including not only mica but also copper, gold, silver, galena, flint, obsidian, pipestone, and saltwater shells. Such variety is remarkable considering that only flint is native to the valley region. The other materials were brought from sources hundreds of miles distant, without the aid of wheeled conveyances or beasts of burden. Copper, for example, came from aboriginal mines on the shores of Lake Superior, over 600 mi north of the Hopewell heartland. Were the Hopewell and Adena exclusively traders, bringing flint and ceramics to North Carolina's mountains to exchange for mica, or could they have done some of the mining themselves?

Acknowledgments

Note. This article could not have been written without the support and encouragement of the author's companion, Elizabeth Hunter, and his friend Boyd Mattison, who supplied copies of many of the published materials from which this history was pieced together.

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PLANT AND ANIMAL SUBSISTENCE AT THE COWEETA CREEK SITE (31MA34), MACON COUNTY, NORTH CAROLINA

by
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Abstract

Faunal and floral analyses have been moving in exciting directions, beyond basic descriptions of subsistence patterns to discussions of the cultural contexts of foodways. Foodways studies can address topics such as ritual, feasting, gender, status differentiation, and sociopolitical change. These studies rely on sound data. Without systematic collection and analysis of subsistence remains, interpretations of foodways would be speculative at best.

This paper provides such data. We offer a basic analysis of the faunal and botanical assemblages from the Coweeta Creek site, a seventeenth-century Cherokee village. These data add to a growing body of knowledge about the site, and supply much needed subsistence information for the region during the Protohistoric period as well. Subsistence trends are discussed at the site level, but we also provide tables reporting taxon counts by context (feature, townhouse floor, mound fill). We have used these data to address issues of feasting and the gendered use of animal and plant foods at the site (VanDerwarker 1998; VanDerwarker and Detwiler 1999, 2000), and intend to expand these initial efforts.

The Coweeta Creek (31Ma34) site was excavated by the University of North Carolina's Research Laboratories of Anthropology from 1965 to 1971, under the supervision of Bennie Keel, Brian Egloff, and Joffre Coe (Figure 1). The site is situated near the confluence of Coweeta Creek and the Little Tennessee River in Macon County, in the southwestern portion of the state. The spatial layout of the site consists of a low accretional mound and village area separated by a cleared area or plaza (Dickens 1976; Egloff 1971). This mound represents the culmination of the destruction and rebuilding of six public townhouses (Egloff 1971) (Figure 2). The townhouses were roughly 40 square feet and are represented archaeologically by a series of stacked floors and hundreds of postmolds. After the final townhouse was dismantled, the mound was sealed with a white clay cap (Egloff 1971; Rodning 1999). Flanking the townhouse and adjacent to the plaza was a rectangular pavilion, roughly 20 ft by 40 ft. Other features at the site include pit features, hearths, burials interred in house floors, and several domestic structures delineated by postmolds. In terms of social activities, the townhouse served as a residence for unmarried and older men, a meeting place for men's councils, and a locus for rituals (Perdue 1998; Schroedl 1986). The plaza adjacent to the townhouse, indicated by a relative lack of artifacts during excavation, served as a public area. The surrounding village area would have been a

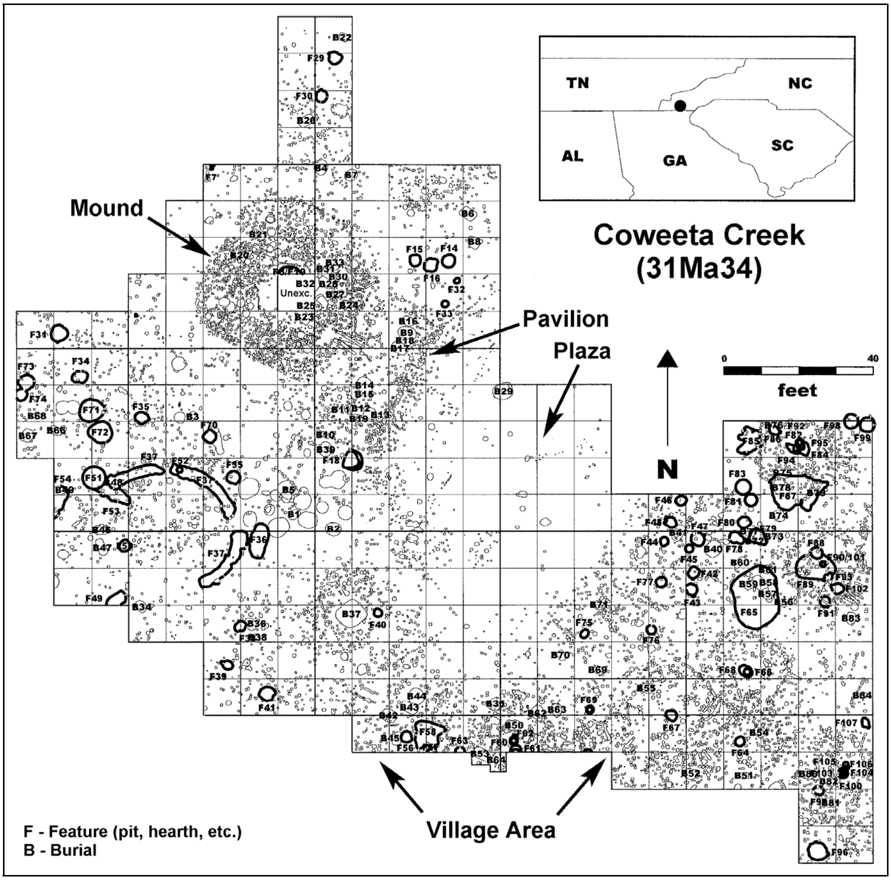

Figure 1. The Coweeta Creek site (map courtesy of UNC Research Laboratories of Archaeology and illustrated by Christopher B. Rodning).

setting for many of the daily activities of women and children (Perdue 1998).

The Coweeta Creek site dates to the late Qualla phase in the late seventeenth century, after European contact, but before the Cherokees became deeply involved in exchange and direct interaction with European colonists (Dickens 1976). The later floors of the townhouse show some minimal evidence, in the form of glass beads, kaolin pipe stems, and peach pits, of encroaching European trade networks. Most features, structures, and burials at the site, however, lack these items. In terms of subsistence economy, Dickens (1976) characterizes the Qualla phase with reference to maize-bean-squash cultivation supplemented by hunting, fishing, and collecting. The data presented here support this characterization.

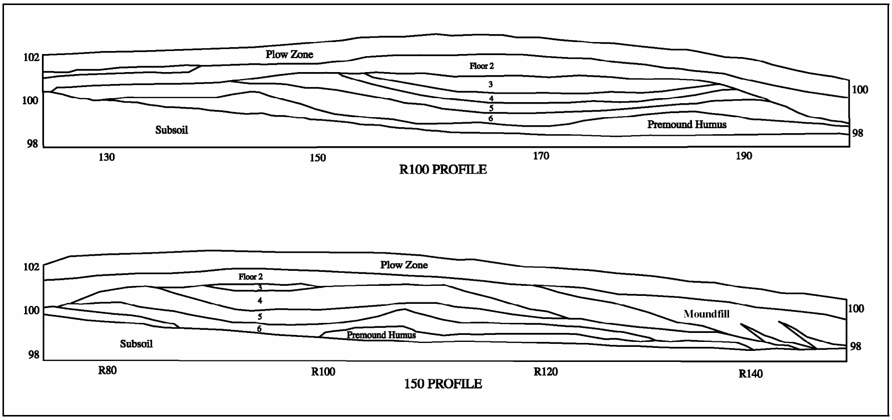

Figure 2. Profile of the townhouse mound at the Coweeta Creek site (adapted from Egloff 1971).

Sampling and Taphonomy

The Coweeta Creek site was excavated before the widespread use of flotation. Hence, flotation was not conducted at the site. Instead, all deposits were waterscreened through 1/16-inch mesh. While the recovery of bone using this technique is adequate, the plant assemblage is likely biased towards larger, more durable plant remains. Recovery was still sufficient, however, to yield numerous small seeds of fruits and weedy plants.

Samples were analyzed from all pit features yielding faunal and floral remains. While faunal materials from the entirety of the townhouse floors were analyzed, only two 10-ft squares excavated within the townhouse were sampled for botanical remains.[1] Only floors 2 through 6 contained either faunal or floral materials. Bones, but not plants, were analyzed from the fill capping the townhouse.

A total of 24 pit features yielded animal bones. The quantity of bone recovered varied from feature to feature. Generally, pit features near the townhouse yielded higher bone densities (as measured by the ratio of bone weight to pit volume) than pit features in the village area (Table 1). Of the 43 botanical samples, 22 derive from townhouse floors and 21 are from pit features.

Natural and cultural processes of deposition, preservation, and recovery affect the composition of floral and faunal assemblages. For example, the by-products of plant food processing, such as nutshells and corn cobs, are more likely to be deposited than food items like nutmeats and corn kernels. In addition, large, dense plant materials preserve more readily than small, fragile ones, and thus are more likely to be recovered during excavation (Pearsall 1989; Popper 1988; Yarnell 1982). Faunal assemblages are greatly affected by natural taphonomic processes, such as wetting, drying, sun damage, and carnivore ravaging (Lyman 1994). Such

Table 1. Measurements for the Coweeta Creek Site Pit Features.

Feature No.	Diameter (ft)	Depth (ft)	Bone Weight (g)	Volume (ft)	Bone Density
14	3.5	.2	14.9	1.57	9.45
15	3.4	.55	17.4	3.54	4.91
16	3.5	.5	45.5	2.37	19.19
18	5.65	2.35	100	34.78	2.87
32	1.5	.9	9.7	1.13	8.58
33	1.7	.45	7.8	1.02	7.64
36	1.25	.25	184.9	1.18	155.99
41	4.25	.6	1.3	6.23	.21
46	2.4	.6	4.8	1.41	3.40
47	3.6	.65	23.5	5.30	4.43
55	3.5	.8	16.9	4.07	4.15
56	2.75	2.37	87.4	13.44	6.50
65	12	1.2	7,510.5	65.98	113.83
70	3.5	.95	23.7	4.82	4.92
71	2.9	.5	249.1	1.64	151.22
72	3.25	.75	643.9	3.54	181.86
73	2.15	.4	8.3	.73	11.39
74	1.55	.25	45	.23	192.17
76	2.2	3	5.4	19.03	.28
87	2.5	1.8	24.6	8.83	2.79
96	5.2	1.7	371.5	19.87	18.69
98	3.75	.3	.2	3.31	.06
102	3	1.45	15.9	10.24	1.55
107	1.4	2.2	14.9	3.38	4.40

processes can result in unidentifiable bones and the deletion of less preservable skeletal materials, such as the bones of small animals or porous bones from larger animals (Lyman 1994).

While all samples were subject to the same methods of recovery and analysis, they derive from several different contexts with distinct depositional histories. As such, they were likely subject to different taphonomic biases. Pit features, which were associated with larger household units, yield remains that probably derive from nearby domestic activities. Fill deposited in these features was likely secondary refuse, accumulated over varying lengths of time. The length of time that the pits remained open has ramifications not only for what was deposited in the pits, but also for what was preserved. Plant remains enter the archaeological record as the result of accidental burning, which occurs at a roughly steady rate when averaged over long periods of time (Yarnell

1982). All things being equal, a slowly-filled pit will receive more carbonized plant remains than a quickly-filled pit, simply because more accidents would have occurred during the use of the former. As larger samples tend to yield a wider range of taxa, we would expect pit features that filled slowly to contain more plant taxa than pits which filled rapidly. Preservation is also affected by the length of time that a pit is open. Bone preservation should be better for pits which filled rapidly, as bones would not be subject to sun damage, constant wetting and drying from rain, and scavenging by carnivores (Lyman 1994). Such disturbance and fluctuation in moisture is detrimental to floral preservation as well (Pearsall 1989).

Materials from townhouse floors were probably a mix of primary and secondary refuse. These may have accumulated due to accidental loss, spillage, or charring during the course of everyday activities within the townhouse, as well as during activities related to the townhouse rebuilding episodes (VanDerwarker and Detwiler 2000). There is some indication that the townhouse was burned during these episodes, so much of the charcoal may derive from these events (VanDerwarker and Detwiler 2000). Much of the faunal material appears to be secondary refuse. Bones and ceramics were relatively large in size and exhibited little incidence of burning or abrasion (VanDerwarker and Detwiler 2000; Wilson et al. 1999). In contrast, faunal material recovered from the fill capping the townhouse was smaller in size, was comprised of a greater percentage of unidentifiable bones, and exhibited a higher rate of burning. This indicates that the fill capping the mound was probably secondary and/or tertiary in nature—that is, it probably represents a combination of soil and refuse that had already been deposited in midden dumps or pit features surrounding the townhouse.

Methodology and Results

Faunal Analysis

The faunal remains from the Coweeta Creek site were initially analyzed and reported by Jeanette Runquist as part of her doctoral dissertation project (Runquist 1981). Runquist's (1981) dissertation focused on generalized subsistence patterns at the site level and the reconstruction of zoological populations. As a result of this focus, she aggregated her data at the site level and took an environmental approach. Prompted by renewed interest in the Coweeta Creek site, the lead author became interested in answering questions related to the spatial and gendered uses of food at the site. These fine-grained questions required smaller scales of data aggregation, and it became necessary to reanalyze the Coweeta Creek faunal assemblage. The results of these spatial analyses have been presented elsewhere (VanDerwarker 1998; VanDerwarker and Detwiler 2000). In this report, we tabulate the data by feature and townhouse floor, and discuss animal resource use at the site.

Faunal materials were identified with reference to the comparative collection at the University of North Carolina's Research Laboratories of Archaeology.[2] Specimens were identified by provenience, taxon, element, side of element (if applicable), completeness, portion present, age (when determinable), fragment size (in millimeters), weight (in grams), and modification, whether environmental or cultural (*sensu* Reitz and Wing 1999). Data were entered into a spreadsheet, and values for NISP (Number of Identified Specimens) and MNI (Minimum Number of Individuals) were calculated (Grayson 1984). MNI was calculated by feature, townhouse floor, and for the fill capping the mound by tabulating the number of recurring elements while adjusting for side, age, and portion present. MNI calculations may be inflated, as elements from a single animal may have been deposited in different features by village inhabitants (Grayson 1984).

The total recovered faunal assemblage from the townhouse and sampled features consists of 18,002 specimens, of which 12.4% were unidentifiable (Tables 2, 3, and 4). Mammals and amphibians dominate the sampled assemblage at 44.7% and 37.1% of NISP, respectively. While the high percentage of amphibians is unusual, they come from one feature (Feature 65) representing a single fill episode (VanDerwarker 1998). To adjust for this skewed distribution, animal class percentages were recalculated to exclude amphibian remains (Table 4). The resulting percentages reveal an emphasis on the exploitation of mammals (71.1%). Birds represent 4.9% of sampled remains, while reptiles and fish represent 3.7% and 0.4%, respectively.

All contexts yielded mammalian remains, and 10 taxa were identified. White-tailed deer (*Odocoileus virginianus*) was most numerous, with an NISP of 1517 and an MNI of 43. The second most abundant mammal at the Coweeta Creek site was black bear (*Ursus americanus*), with an NISP of 161 and an MNI of 15. Other mammals in the sampled assemblage include dog/coyote (*Canis* sp.), bobcat (*Lynx rufus*), cougar (*Felis concolor*), beaver (*Castor canadensis*), raccoon (*Procyon lotor*), opossum (*Diedelphis virginiana*), rabbit (*Syvilagus* sp.), squirrel (*Scurius* sp.), and woodchuck (*Marmota monax*). These smaller mammals were less abundant than bear or deer, and probably contributed only minimally to the diet of the site's inhabitants.

Bird remains were recovered from the townhouse floors, the fill capping the townhouse, and four features. Eleven taxa were identified. Wild turkey (*Meleagris gallopavo*) was the most abundant, with an NISP of 146 and an MNI of 19. The remaining birds were recovered from either the townhouse or Feature 65. Canada goose (*Branta canadensis*) was recovered from both Feature 65 and townhouse contexts. Hawk (*Buteo* sp.), duck (*Anas* sp.), and passenger pigeon (*Ectopistes migratorius*) were derived from Floor 5 of the townhouse, whereas bobwhite quail (*Colinus virginianus*), ruffed grouse (*Bonasa umbellus*), rufous-sided towhee (*Pibilo erythropthalamus*), mourning dove (*Zenaida macroura*), white-throated sparrow (*Zonotricia albicollis*), and robin (*Turdus migratorius*) were recovered from Feature 65. All species of

Table 2. Number of Identified Specimens (NISP) / Minimum Numbers of Indiviuals (MNI) for Pit Features at Coweeta Creek.

Category	F-14	F-15	F-16	F-18	F-32	F-33	F-36	F-41	F-46
Mammals									
Bear	-	-	-	3/1	-	-	-	-	-
White-tailed deer	1/1	2/1	6/1	9/2	-	-	5/1	-	-
Dog/Coyote	-	-	-	-	-	-	-	-	-
Beaver	-	-	-	-	-	-	-	-	-
Rabbit	-	-	-	-	-	-	-	-	-
Squirrel	-	-	-	-	-	-	-	-	-
Woodchuck	-	-	-	-	-	-	-	-	-
Rodentia	-	-	-	-	-	-	-	-	-
Large mammal	-	-	-	36/–	3/–	3/–	26/–	-	10/–
Medium-large mammal	-	-	-	-	7/–	3/–	-	-	-
Medium mammal	-	-	-	-	-	1/–	-	-	-
Small mammal	-	1/–	-	-	-	-	-	-	-
Unidentifiable mammal	-	9/–	28/–	106/–	3/–	-	88/–	4/–	-
Birds									
Wild turkey	-	-	-	-	-	-	-	-	-
Canada goose	-	-	-	-	-	-	-	-	-
Bobwhite quail	-	-	-	-	-	-	-	-	-
Ruffed Grouse	-	-	-	-	-	-	-	-	-
Rufous-sided towhee	-	-	-	-	-	-	-	-	-
Mourning dove	-	-	-	-	-	-	-	-	-
White-throated sparrow	-	-	-	-	-	-	-	-	-
Robin	-	-	-	-	-	-	-	-	-
Large bird	-	-	-	-	-	-	-	-	-
Unidentifiable bird	-	-	-	-	-	-	-	-	-
Amphibians									
Hellbender	-	-	-	-	-	-	-	-	-
Toad	-	-	-	-	-	-	4/1	-	-
Frog	-	-	-	-	-	-	-	-	-
Reptiles	-	-	-	-	-	-	-	-	-
Box turtle	-	4/1	-	-	-	-	7/1	-	-
Mud turtle	-	-	-	-	-	-	-	-	-
Snapping turtle	-	-	-	-	-	-	-	-	-
Unidentifiable turtle	-	-	-	-	-	-	-	-	-
Unidentifiable snake	-	-	-	-	-	-	-	-	-
Unidentifiable reptile	-	-	-	-	-	-	-	-	-
Fish									
Unidentified fish	-	-	-	-	-	-	-	-	-
Unidentifiable	-	-	1/–	-	-	-	-	-	-
NISP Totals	**1**	**16**	**35**	**154**	**13**	**6**	**131**	**4**	**10**

Table 2 continued.

Category	F-47	F-55	F-56	F-65	F-71	F-72	F-73	F-74
Mammals								
Bear	-	-	-	92/4	-	2/1	-	1/1
White-tailed deer	-	1/1	4/1	834/7	23/1	53/2	2/1	3/1
Dog/Coyote	-	-	-	14/1	1/1	-	-	-
Beaver	-	-	-	1/1	-	-	-	-
Rabbit	-	-	-	14/1	-	-	-	-
Squirrel	-	-	-	33/3	-	-	-	-
Woodchuck	-	-	-	1/1	-	-	-	-
Rodentia	-	-	-	16/–	-	-	-	-
Large mammal	-	-	-	214/–	103/–	-	-	94/–
Medium-large mammal	-	2/–	-	173/–	1/–	247/–	-	-
Medium mammal	-	-	6/–	3/–	-	-	-	-
Small mammal	-	-	-	40/–	-	-	-	-
Unidentifiable mammal	1/–	-	52/–	1,126/–	-	481/–	1/–	-
Birds								
Wild turkey	-	-	1/1	52/2	-	1/1	-	-
Canada goose	-	-	-	4/1	-	-	-	-
Bobwhite quail	-	-	-	2/1	-	-	-	-
Ruffed Grouse	-	-	-	3/1	-	-	-	-
Rufous-sided towhee	-	-	-	2/1	-	-	-	-
Mourning dove	-	-	-	1/1	-	-	-	-
White-throated sparrow	-	-	-	2/1	-	-	-	-
Robin	-	-	-	1/1	-	-	-	-
Large bird	-	-	-	1/–	-	-	-	-
Unidentifiable bird	-	-	-	106/–	-	11/–	-	-
Amphibians								
Hellbender	-	-	-	2/1	-	-	-	-
Toad	-	-	3/1	6,560/616	-	14/2	-	1/1
Frog	-	-	-	19/3	-	-	-	-
Reptiles	-	-	-					
Box turtle	-	-	-	101/8	16/1	4/1	-	-
Mud turtle	-	-	-	5/2	-	-	-	-
Snapping turtle	-	-	-	6/1	-	-	-	-
Unidentifiable turtle	-	-	-	70/–	-	3/–	-	-
Unidentifiable snake	-	-	-	114/–	-	-	-	-
Unidentifiable reptile	-	-	-	4/–	-	-	-	-
Fish								
Unidentified fish	-	-	-	22/–	-	14/–	-	-
Unidentifiable	-	-	-	22/–	50/–	191/–	1/–	-
NISP Totals	**1**	**3**	**66**	**9,660**	**194**	**1,021**	**4**	**99**

Table 2 continued.

Category	F-76	F-87	F-96	F-98	F-102	F-107	Totals
Mammals							
Bear	-	-	-	-	-	-	98/7
White-tailed deer	-	4/1	13/1	-	-	-	960/22
Dog/Coyote	-	-	-	-	-	-	15/2
Beaver	-	-	-	-	-	-	1/1
Rabbit	-	-	-	-	-	-	14/1
Squirrel	-	-	-	-	-	-	33/3
Woodchuck	-	-	-	-	-	-	1/1
Rodentia	-	-	-	-	-	-	16/–
Large mammal	16/–	53/–	-	-	75/–	29/–	662/–
Medium-large mammal	-	-	75/–	-	-	-	508/–
Medium mammal	-	-	-	1/–	-	-	11/–
Small mammal	-	-	4/–	-	-	-	45/–
Unidentifiable mammal	-	-	-	-	-	-	1,899/–
Birds							
Wild turkey	-	-	2/1	-	-	-	56/5
Canada goose	-	-	-	-	-	-	4/1
Bobwhite quail	-	-	-	-	-	-	2/1
Ruffed Grouse	-	-	-	-	-	-	3/1
Rufous-sided towhee	-	-	-	-	-	-	2/1
Mourning dove	-	-	-	-	-	-	1/1
White-throated sparrow	-	-	-	-	-	-	2/1
Robin	-	-	-	-	-	-	1/1
Large bird	-	-	3/–	-	-	-	4/–
Unidentifiable bird	-	-	-	-	-	-	117/–
Amphibians							
Hellbender	-	-	-	-	-	-	2/1
Toad	-	-	14/3	-	-	-	6,596/624
Frog	-	-	-	-	-	-	19/3
Reptiles							
Box turtle	-	-	19/–	-	-	-	151/12
Mud turtle	-	-	-	-	-	-	5/2
Snapping turtle	-	-	-	-	-	-	6/1
Unidentifiable turtle	-	-	3/–	-	-	-	76/–
Unidentifiable snake	-	-	5/–	-	-	-	119/–
Unidentifiable reptile	-	-	-	-	-	-	4/–
Fish							
Unidentified fish	-	-	4/–	-	-	-	40/–
Unidentifiable	-	25/–	794/–	-	-	-	1,084/–
NISP Totals	**16**	**82**	**936**	**1**	**75**	**29**	**12,557**

Table 3. Number of Identified Specimens (NISP) / Minimum Numbers of Indiviuals (MNI) for Townhouse Floors and Mound Fill at Coweeta Creek.

Category	Floor 6	Floor 5	Floor 4	Floor 3	Floor 2	Mound Fill	Totals
Mammals							
Bear	4/1	26/2	2/1	7/1	1/1	23/2	63/8
White-tailed deer	170/5	145/6	65/2	15/1	1/1	161/6	557/21
Cougar	-	-	-	-	-	1/1	1/1
Bobcat	-	-	-	1/1	-	-	1/1
Beaver	1/1	-	-	-	-	-	1/1
Raccoon	1/1	-	-	-	-	-	1/1
Opossum	-	1/1	-	-	-	-	1/1
Rabbit	15/3	3/1	-	-	-	-	18/4
Squirrel	6/2	5/1	-	-	-	-	11/3
Rodentia	-	-	2/–	1/–	-	2/–	5/–
Large mammal	789/–	980/–	170/–	147/–	8/–	649/–	2,743/–
Medium-large mammal	-	29/–	2/–	4/–	5/–	169/–	209/–
Medium mammal	-	1/–	-	-	-	1/–	2/–
Small mammal	3/–	1/–	-	-	-	1/–	5/–
Unidentifiable mammal	-	35/–	3/–	85/–	-	50/–	173/–
Birds							
Wild turkey	42/4	28/6	1/1	-	2/1	17/2	90/14
Canada goose	-	1/1	-	-	-	-	1/1
Hawk	-	1/1	-	-	-	-	1/1
Passenger Pigeon	-	1/1	-	-	-	-	1/1
Unidentified duck	-	-	1/1	-	-	-	1/1
Large Bird	89/–	95/–	12/–	11/–	-	18/–	225/–
Medium-large bird	1/–	3/–	3/–	-	-	7/–	14/–
Medium bird	-	4/–	-	-	-	6/–	10/–
Small bird	-	1/–	-	-	-	-	1/–
Unidentifiable Bird	15/–	2/–	3/–	-	-	3/–	23/–
Amphibians							
Hellbender	-	1/1	-	-	-	-	1/1
Toad	1/1	16/1	15/3	3/1	-	28/3	63/9
Frog	-	1/1	-	-	-	-	1/1
Reptiles							
Box turtle	-	11/1	1/1	1/1	-	9/1	22/4
Unidentifiable turtle	-	4/–	-	10/–	-	23/–	37/–
Unidentifiable reptile	-	2/–	-	1/–	-	-	3/–
Fish							
Unidentified fish	-	2/–	-	1/–	-	3/–	6/–
Unidentifiable	30/–	214/–	213/–	71/–	-	626/–	1,154/–
NISP Totals	**1,167**	**1,613**	**493**	**358**	**17**	**1,797**	**5,445**

Table 4. Coweeta Creek Site NISP Totals and Percentages by Animal Class.

Class	NISP	% of Total	NISP excluding Amphibians[1]	% of Total
Mammals	8,054	44.7%	8,054	71.1%
Birds	559	3.1%	559	4.9%
Amphibians	6,682	37.1%	--	--
Reptiles	423	2.3%	423	3.7%
Fish	46	0.3%	46	0.4%
Unidentifiable	2,238	12.4%	2,238	19.8%
Total	**18,002**	**100%**	**11,320**	**100%**

[1]Since 98.4% of the amphibians derive from one feature (F-65) that constitutes a single fill episode, their inclusion skews the Animal Class Percentages shown in the first calculation.

bird, with the exception of turkey, appear to have contributed minimally to the diet of the Coweeta Creek residents.

Four townhouse floors, the townhouse fill, and six features yielded amphibian remains. Three taxa were identified. Toad (*Bufo* sp.) was by far most numerous but, as noted, most of the remains were recovered from Feature 65. Other amphibians in the sample include the hellbender (*Cryptobranchus alleghaniensis*) and the frog (*Rana catesbeiana*), both of which were uncommon inclusions.

Reptilian remains were recovered from four townhouse floors, the mound fill, and six pit features. Four taxa were identified: box turtle (*Terrepene carolina*), mud turtle (*Kinosternon subrubrum*), snapping turtle (*Chelydra serpentina*), and unidentified snake. Box turtle, by far the most common, was nearly ubiquitous across the site. The mud turtle and snapping turtle remains were found only in Feature 65.

A total of 43 unidentified fish remains were recovered from two townhouse floors, the mound fill, and three pit features. Given the fine mesh used for recovery and the presence of elements from other small animals, the lack of fish remains in the Coweeta Creek assemblage probably signifies the minimal role that fish played in the diet of the site's inhabitants.

Generally, the inhabitants of Coweeta Creek relied most heavily on mammals as meat resources. Although the toad remains are numerous, they are mostly restricted one feature that was filled during a single episode. MNI tabulations for the site indicate the presence of 770 individuals. Of these 770 individuals, amphibians (primarily toads) account for 641. Upon removing amphibians from the pool of individuals, we find that deer (MNI=43), turkey (MNI=19), box turtle (MNI=16), and bear (MNI=15) are the most numerous. These species were undoubtedly the most important meat resources exploited by the site's inhabitants. Other small mammals, birds, turtles, and a minimal amount of fish could have easily substituted as meat sources when primary meat staples were unavailable.

Botanical Analysis

Botanical samples were analyzed systematically according to the following process. After weighing, each sample was sieved through a 2.00 mm screen. The samples were examined under 10× to 40× magnification using a stereoscopic microscope. Materials greater than 2.00 mm were sorted completely by taxa; constituents of each taxon were counted and weighed. Materials less than 2.00 mm were scanned for seeds, which were counted. When samples were too large to permit timely analysis, we sub-sampled (as with Feature 65, Feature 72, and some townhouse floor samples). No attempts were made to estimate entire samples based on extrapolations from sub-samples.

Thirty-six taxa were identified and assigned to categories of crops, fruits, nuts, and weedy seeds (Tables 5 and 6). Corn (*Zea mays*) was by far the most abundant crop. Bean (*Phaseolus vulgaris*) was a minimal inclusion, but squash rinds (Cucurbitaceae) yielded slightly higher counts. The presence of the agricultural triad of corn, beans, and squash, common throughout the Eastern Woodlands during the late prehistoric and protohistoric periods, is not surprising. Of particular note is the recovery of domesticated chenopod (*Chenopodium berlandieri*) and little barley (*Hordeum pusillum*), a likely cultivar. Evidence for cultivation of these taxa, both members of the Southeastern Agricultural Complex, extends back into the Late Archaic period (Fritz 1990; Yarnell 1993; Yarnell and Black 1985). Chenopod in particular was a significant component of the native diet prior to the adoption of corn agriculture (Fritz 1990). Their presence at this seventeenth-century site indicates their continued use.

Fruit taxa recovered from the site are primarily wild species, including grape (*Vitis* sp.), blackberry/raspberry (*Rubus* sp.), blueberry (*Vaccinium* sp.), maypop (*Passiflora incarnata*), and persimmon (*Diospyros virginiana*). Peach (*Prunus persica*), an Old World species, is a relatively common inclusion at the site but probably does not indicate direct contact with Europeans. The species was likely dispersed among Native American groups through traditional exchange networks (Gremillion 1993). Being weedy and well-adapted to the climate of the Southeast, it may have extended its range naturally as well (Gremillion 1993). Persimmon seeds and peach pit fragments were most numerous. Like nutshell, peach pits were likely used as a source of fuel after the fleshy fruit was consumed. Peach pits are also more durable and less easily swallowed than smaller berry seeds. These characteristics may explain why peach pits are more numerous in the assemblage.

Hickory (*Carya* sp.) was by far the most abundant nutshell identified in the assemblage, with acorn (*Quercus* sp.) running a distant second. Other nut species present at the site include beech (*Fagus grandifolia*) and

Table 5. Counts of Plant Taxa for Pit Features at Coweeta Creek.

Category	F-18	F-32	F-33	F-36	F-41	F-55	F-56	F-65	F-72
Wood Weight	73.59	2.71	5.98	38.11	11.7	0.03	1.59	75.22	90.94
Crops									
Bean	-	-	-	3	-	-	-	-	1
Corn kernel	-	2	-	16	-	-	-	65	9
Corn cupule	13	2	-	53	6	-	-	37	155
Little barley	-	-	-	-	2	-	-	-	-
Fruits									
Blackberry/raspberry	-	-	-	-	-	-	-	-	1
Blueberry	-	-	-	9	-	-	-	-	-
Grape	-	-	-	-	-	-	-	-	2
Grape Family	-	-	-	-	-	-	-	2	-
Maypop	-	-	-	-	-	-	-	-	2
Peach	-	-	-	1	-	-	-	-	4
Persimmon	-	-	-	-	-	-	-	2	-
Nuts									
Acorn	-	-	-	1	8	-	4	11	6
Beech	-	-	-	-	-	-	-	-	1
Hickory	-	-	-	8	16	-	-	14	191
Walnut	-	-	-	-	-	-	-	-	1
Weedy Seeds									
Amaranth	-	-	-	-	-	-	-	-	2
Cheno/am	-	-	-	-	9	-	-	-	-
Chenopod (wild)	-	-	-	1	-	-	-	-	5
Knotweed	-	-	-	-	1	-	-	-	-
Pokeweed	-	-	-	2	-	-	-	-	2
Purslane	-	-	-	1	-	-	-	-	2
Sedge family	-	-	-	-	-	-	-	-	1
Smartweed	-	-	-	-	-	-	-	-	16
Spurge family	-	-	-	-	2	-	-	-	5
Other									
Bearsfoot	-	-	-	-	-	-	-	-	41
Unidentified seed	-	-	-	3	-	-	-	-	10
Unidentified	-	-	-	-	1	-	-	-	3
Unidentifiable	-	-	-	19	6	-	-	41	126

Table 5 continued.

Category	F-73	F-79	F-87	F-96	F-98	F-102	F-107	Total
Wood Weight	0.0	1.63	3.38	129.04	0.25	21.96	8.31	464.44
Crops								
Bean	-	-	-	2	-	-	-	5
Corn kernel	-	-	-	48	-	-	-	140
Corn cupule	-	-	-	70	-	-	-	336
Little barley	-	-	-	-	-	-	-	2
Fruits								
Blackberry/raspberry	-	-	-	-	-	-	-	1
Blueberry	-	-	-	-	-	-	-	9
Grape	-	-	-	-	-	-	-	2
Grape Family	-	-	-	-	-	-	-	2
Maypop	2	-	-	-	-	-	-	4
Peach	4	-	-	-	-	-	-	9
Persimmon	-	-	-	-	-	-	-	2
Nuts								
Acorn	-	-	-	3	-	-	-	33
Beech	-	-	-	-	-	-	-	1
Hickory	2	-	-	15	-	-	-	246
Walnut	-	-	-	2	-	-	-	3
Weedy Seeds								
Amaranth	-	-	-	-	-	-	-	2
Cheno/am	-	-	-	-	-	-	-	9
Chenopod (wild)	-	-	-	1	-	-	-	7
Knotweed	-	-	-	-	-	-	-	1
Pokeweed	-	-	-	-	-	-	-	4
Purslane	-	-	-	1	-	-	-	4
Sedge family	-	-	-	-	-	-	-	1
Smartweed	-	-	-	-	-	-	-	16
Spurge family	-	-	-	1	-	-	-	8
Other								
Bearsfoot	1	-	-	1	-	-	-	43
Unidentified seed	-	-	-	2	-	-	-	15
Unidentified	-	-	-	-	-	-	-	4
Unidentifiable	1	-	-	1	-	-	-	194

Table 6. Counts of Plant Taxa for Townhouse Floors at Coweeta Creek.

Category	Floor 6	Floor 5	Floor 4	Floor 3	Floor 2/3	Floor 2	Total
Wood Weight	0.01	80.11	388.8	217.7	63.6	111.57	861.79
Crops							
Bean	-	1	-	-	-	-	1
Chenopod (domesticated)	-	-	-	10	-	-	10
Corn kernel	-	16	10	4	-	-	30
Corn cupule	-	6	3	19	-	-	28
Cucurbit rind	-	-	3	24	-	-	27
Fruits							
Grape	-	-	-	-	1	-	1
Maypop	-	1	5	-	-	-	6
Peach	15	-	-	-	-	-	15
Persimmon	-	5	12	3	-	-	20
Nuts							
Acorn	-	2	-	5	2	-	9
Hickory	-	19	5	18	-	-	42
Weedy Seeds							
Bean family	-	-	-	1	-	-	1
Cheno/am	-	1	1	-	-	-	2
Chenopod (wild)	-	1	-	6	-	-	7
Cleaver	-	-	1	-	-	-	1
Grass family	-	-	-	7	-	-	1
Knotweed	-	2	18	4	1	-	25
Morningglory	-	-	1	1	-	-	2
Pokeweed	-	1	8	14	-	1	24
Smartweed	-	-	-	1	-	-	1
Spurge family	-	-	1	1	-	-	2
Spurge family cf.	-	-	1	-	-	-	1
Sunflower cf.	-	-	1	1	-	-	2
Other							
Bearsfoot	-	-	3	2	-	-	5
Gum	-	-	1	-	-	-	1
Holly	-	-	-	5	-	-	5
Sumac	-	-	2	3	-	-	5
Unidentified seed	-	-	8	-	-	1	9
Unidentified	-	6	-	11	-	-	17
Unidentifiable	-	23	11	373	-	-	407

walnut (*Juglans* sp.), both represented by few shell fragments. Hickory nuts were an important food item throughout prehistoric and historic eastern North America, especially during lean winter months (Scarry 1996). They were generally pounded into a meal and shaped into balls, which were later boiled to extract the oils, making a soup or drink (Ulmer and Beck 1951). The nearly ubiquitous presence of hickory nutshells at Coweeta Creek reflects their continued importance in historic times.

A variety of seeds were identified. These include amaranth (*Amaranthus* sp.), bearsfoot (*Polymnia uvedalia*), wild chenopod (*Chenopodium* sp.), cleaver (*Galium* sp.), knotweed (*Polygonum* sp.), morning glory (*Ipomoea/Convolvulus*), pokeweed (*Phytolacca americana*), purslane (*Portulaca* sp.), smartweed (*Polygonum cf. pennsylvan*), and sumac (*Rhus* sp.). Also identified were possible sunflower (*Helianthus* sp.) and several seeds belonging to the spurge family. Most numerous among these taxa are bearsfoot, knotweed, and pokeweed. While the seeds of most of these taxa were probably eaten, including amaranth, bearsfoot, chenopod, knotweed, and smartweed, the leaves of amaranth, chenopod, knotweed, pokeweed, purslane, and smartweed could have been eaten as potherbs as well (Hedrick 1972; Medsger 1966; Ulmer and Beck 1951). Cleaver seeds could have been used to make a drink similar to coffee and its leaves used for a tea (Hedrick 1972). While some species of morning glory produce an edible tuber (Medsger 1966), the seeds recovered here may represent field weeds. Sumac berries were likely used to make a beverage comparable to lemonade (Hedrick 1972; Medsger 1966; Ulmer and Beck 1951).

Finally, five seeds from the genus *Ilex* were recovered from the townhouse floors. Although these seeds could not be identified to species, it is notable that these remains, potentially from a ritually important plant (i.e., yaupon holly, used to make Black Drink), were recovered from the townhouse.

Summary and Conclusion

Generally, the larger subsistence picture presented here is comparable to sites across the southeastern United States. In terms of animal species, the inhabitants of the Coweeta Creek site relied most heavily on white-tailed deer, bear, and wild turkey. The smaller mammals, birds, and turtles recovered from the site would have supplemented these major sources of meat. Bobcat, cougar, and hawk, however, were probably not food items, and instead were likely used as ritual paraphernalia in townhouse ceremonies (Bogan 1983; Jackson and Scott 1995; VanDerwarker and Detwiler 2000). The botanical assemblage indicates that plants of the agricultural triad of maize, beans, and squash were being cultivated at Coweeta Creek. In addition, domesticated chenopod, little barley, and perhaps sunflower were grown at the site. These indigenous cultivars are joined by peach, the only Old World taxa present. Among wild plant resources, hickory nuts stand out as an important staple. Wild fruits and seeds, and undoubtedly greens as well, supplemented the diet.

The combination of faunal and floral analyses reported here provides a more holistic account of seventeenth-century Cherokee subsistence than is possible through any single line of evidence. We hope it stimulates continued research of Cherokee foodways at the Coweeta Creek site, as well as at protohistoric and historic Cherokee sites throughout the southern Appalachian region.

Notes

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[1] Botanical remains from the townhouse floors derive from squares 160R90 and 180R100.

[2] Reference was also made to the lead author's personal comparative collection.

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LATE WOODLAND CERAMICS ON THE COASTAL PLAIN: A POSSIBLE NEW TYPE FROM CARTERET COUNTY, NORTH CAROLINA

by
Thomas W. Davis and Kathleen M. Child

Abstract

The results of recent site investigations at Marine Corps Auxiliary Landing Field Bogue in Carteret County suggest a possible change in the prehistoric ceramic chronology for coastal North Carolina. The Late Woodland period at the site includes at least two and possibly three occupational horizons. Three radiocarbon dates and the stratigraphic sequence at the site strongly indicate that sand may be a chronologically significant inclusion in shell-tempered White Oak pottery. Sand-and-shell-tempered White Oak ceramics appear dominant at the site before A.D. 1200, with pure shell-tempered ceramics dominant after 1200.

Recent archeological work at Marine Corps Auxiliary Landing Field (MCALF) Bogue provides new insight into the Late Woodland period in coastal North Carolina. MCALF Bogue is located at Taylor Bay on the mainland side of Bogue Sound in southwestern Carteret County, North Carolina (Figure 1). Investigations at prehistoric site 31CR53, the Shelly Point site, were designed to gain a better understanding of the ceramic cultural sequence in the region. The authors would like to thank Mr. William Rogers of the Environmental Affairs Department of Marine Corps Air Station Cherry Point and Mr. Bruce Larson of The Naval Engineering Command, Atlantic Division, for their assistance with this project.

The Late Woodland period at the site may include at least two, and possibly three, occupational horizons. It is likely that portions of the site were used at different times during what was probably a continuous occupation of the landform. Although analysis of White Oak ceramics in North Carolina has traditionally dismissed sand as a natural inclusion in the clay, the stratigraphic sequence and three radiocarbon dates from the site indicate that the sand inclusions may have temporal significance.

The coastal section of central and southern North Carolina served as a crossroads during the Late Woodland period. The area was, nearly simultaneously, the southern extent of the Algonkian and Iroquoian spheres of influence and the northeastern extent of the established Siouan cultures of the deeper south. Regional settlement was intensive and extensive with little elapsed time between occupations. Indeed, arbitrary borders such as natural drainages and modern roads define many of the sites. This is done out of necessity because, otherwise, long stretches of the North Carolina coast would constitute enormous archaeological sites.

Site 31CR53 occupies a large area along the coastal plain in southern Carteret County. The ready availability of shellfish and the close

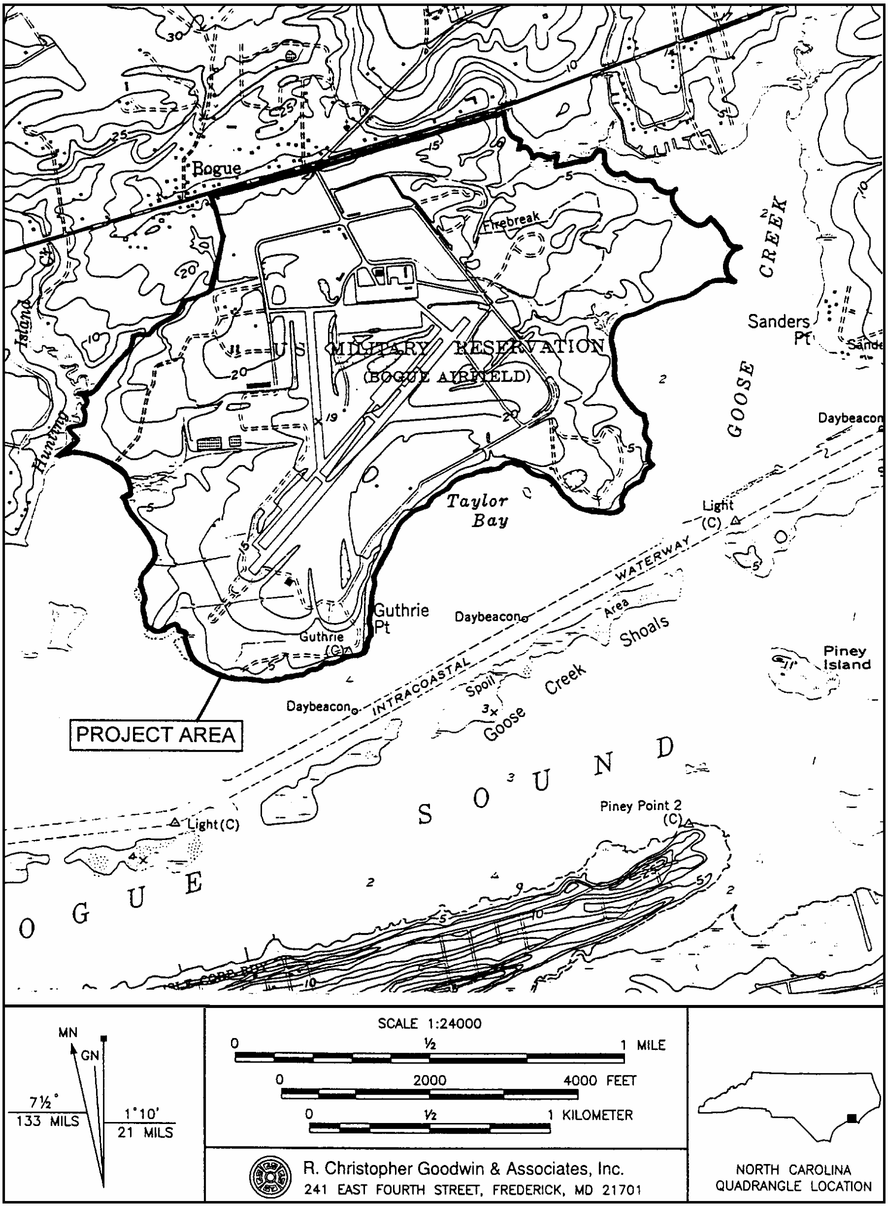

Figure 1. Portion of the 1983 Swansboro, North Carolina, 7.5-minute USGS Quadrangle showing the location of MCALF Bogue in Carteret County.

proximity to fresh water sources made the area popular for prehistoric settlement. The central area of the site (southern portions of Area D) contains a slight rise. This hillock, the highest point above the sound to the south and wetland areas to the north, has yielded the highest concentration of cultural activity yet observed across the site. This is not unexpected as this rise affords the greatest protection from high or standing ground water while remaining convenient to food and water sources.

Investigations at the Site

Site 31CR53 was first recorded as the Shelly Point Site in 1969 when more than 1,300 artifacts were collected (Hargrove et al. 1985). In 1994, the Cultural Resources Group of Louis Berger and Associates (Reid and Simpson 1994) examined a 42.3 acre area of the site with 30 mechanical trenches and nine shovel tests. This work focused directly on Shelly Point and did not examine interior areas. Forty possible cultural features and 274 possible postmolds were identified, and the site was nominated for inclusion in the National Register of Historic Places under Significance Criterion D (i.e., the site has yielded, or may be likely to yield, information important in prehistory or history).

In 1996, R. Christopher Goodwin & Associates conducted a Phase I survey of 225 acres on MCALF Bogue (Davis et al. 1997), including inland portions of Shelly Point (Figure 2). The discovery of extensive prehistoric deposits expanded the site boundaries considerably, incorporating a previously identified site, 31CR100. The expanded site measures approximately 600 m by 800 m (48 ha or 118.6 ac).

In 1998 and 1999, archaeologists from Goodwin & Associates continued to examine 31CR53. This recent project included an extensive, staged effort to increase the understanding of the site. The first stage was classified as a rescue operation and involved the excavation of a Middle Woodland shell-filled pit (a feature within 31CR53) exposed through erosion of the shoreline at Bogue Sound. The second stage of investigation consisted of the sampling of possible features in previously surveyed areas (Area E) and additional Phase I survey in an area just north of the original site boundary. The main focus of the recent work at 31CR53 consisted of mechanized removal of the plowzone over 1753.37 m^2 and the examination of selected features within that exposed area (Areas D and D1). The mechanized excavation consisted of the exposure of 18 trenches and three blocks within an approximately 200 m (656.17 ft) by 250 m (820.21 ft) area (Figure 3). The area had been recently cleared of vegetation to mitigate damage caused by a series of recent tropical storms. The trenches and blocks varied in size, depending on their location in the survey area and specific research goals.

The prehistoric cultural features identified during mechanized excavations included 63 definite postholes, 73 probable postholes, 13 pits, four shell middens, and one discrete deposit of shell. It is possible that two angled alignments of postholes represent a longhouse wall and an

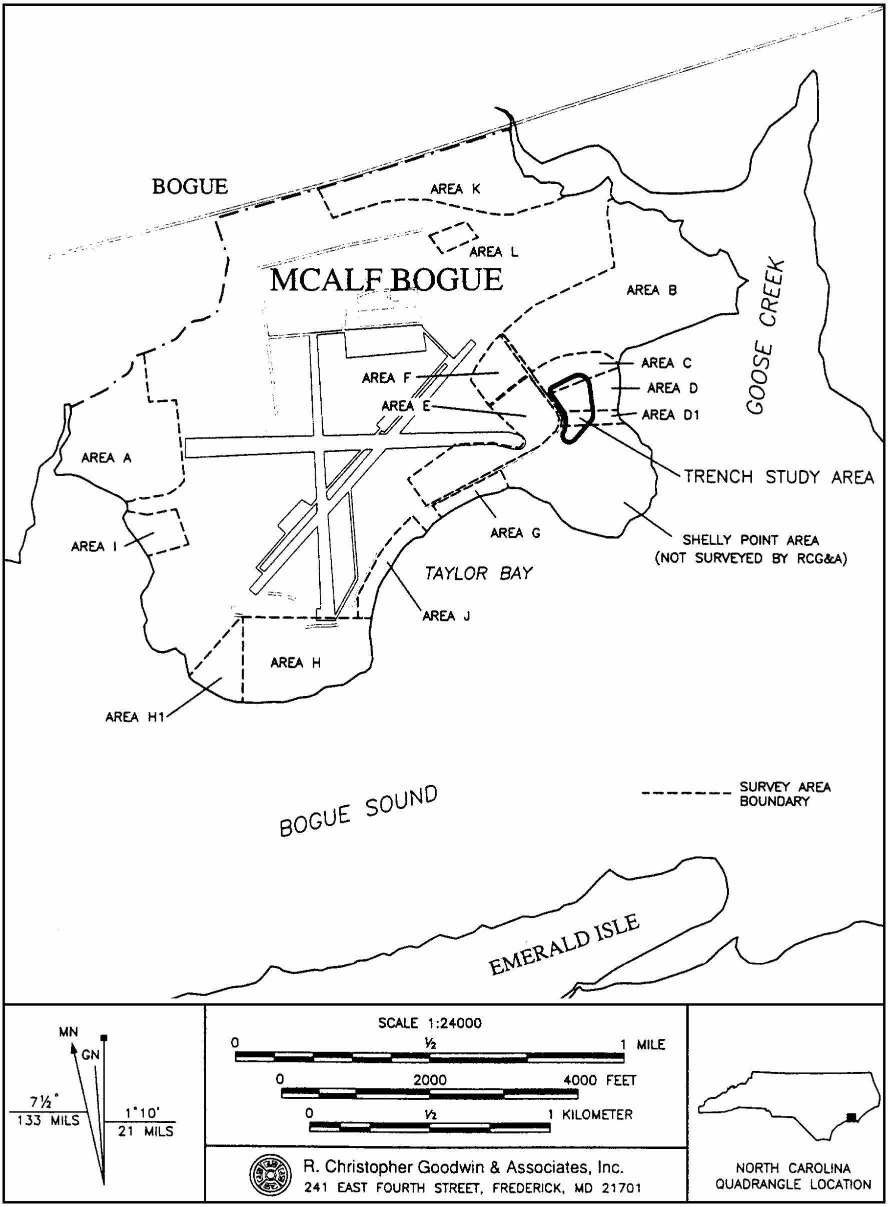

Figure 2. Map of 31CR53, showing the location of the mechanized excavation area on MCALF Bogue.

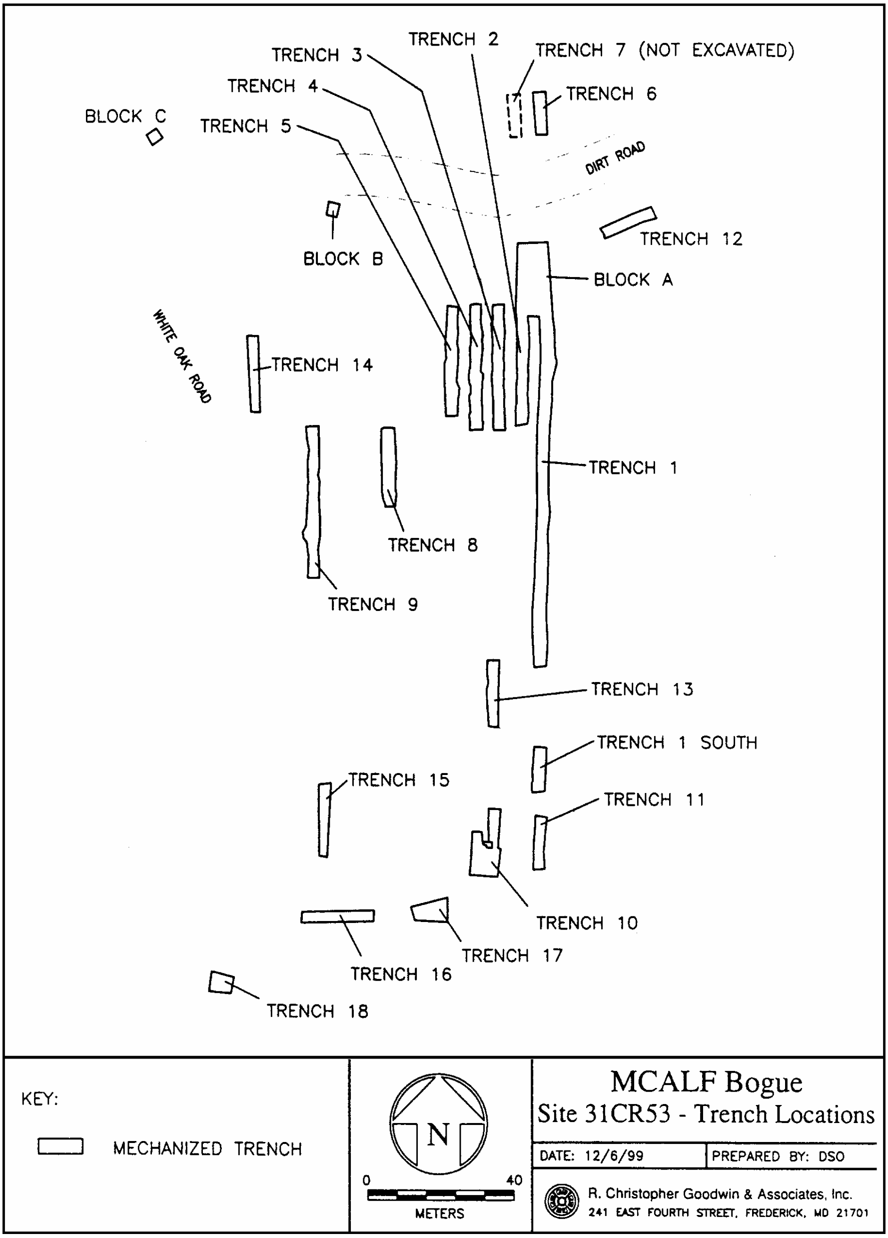

Figure 3. Map of 31CR53, showing the location of the mechanized excavation trenches in Areas C, D, and D1.

interior platform. The size and spacing of the postholes (in Trench 11) is within the parameters of coastal longhouses (Loftfield and Jones 1995). One historic feature, a vehicle tire track, was also recorded. Five features were judged to be of cultural origin but of indeterminate function.

Shell Middens

Shell middens were defined as concentrations of shell on the subsoil surface which did not appear to have been placed within a pit. Although the site had been plowed, shell on the existing ground surface indicated the presence of some of the buried middens. None of the middens was fully exposed, and all lay in the southwest quadrant of the investigated area.

Trench 10 exposed a very large midden that extended to the western edge of Trench 11 (Figure 4). The shell midden did not exceed 10 cm (3.94 in) in depth, but extended for at least 10 m by 17 m. When portions of the western and northern edges of the midden were mechanically removed, three pit features and 26 postholes were visible. Additional postholes were visible beyond the edge of the midden. Since all of the postholes beneath the midden contained shell, it is likely that they postdated at least the beginning of the midden. The pit features clearly predated the midden.

Trench 16 exposed a very broad shell deposit covering the western two-thirds of the trench; the exposed midden measured approximately 3 m by 18 m. Two 1-m-×-1-m test units (Test Units 1 and 2) were placed within the shell midden feature (Feature 16-B-1). The removal of the midden revealed a pit feature (Feature 16-B-2) dug into the subsoil, predating the midden.

The artifact subassemblage from Feature 16-B-1 consisted of 79 prehistoric ceramics and three lithic artifacts, only one of which was culturally modified (a piece of shatter). The ceramics included 64 shell-tempered White Oak sherds, 13 shell-and-quartz (sand)-tempered White Oak sherds, and one quartz-tempered, cord-marked sherd from the first level of the midden. This is probably a Cape Fear type that predates the main deposit. The inclusion of earlier materials in later features is a common occurrence on multi-component sites. The White Oak sherds were nearly all fabric impressed (54 of 55 surviving surfaces). Nearly 85% of the sherds were recovered from the shell midden layer, which clearly dates to the Late Woodland period.

Trench 18 exposed an extensive shell deposit that covered the entire trench. Two 1-m-×-1-m test units (Test Units 3 and 4) were placed within the shell midden feature (Feature 18-B-1). The preserved portion of the midden varied from 17 cm to 31 cm in thickness. Composed primarily (i.e., >60%) of oyster shell, the midden deposit also contained lesser amounts of clam and scallop. The feature yielded 63 prehistoric ceramics, including 53 White Oak sherds and 10 indeterminate quartz-tempered and combination-tempered sherds. These non-White Oak sherds all probably came from one vessel which was tempered with quartz and possibly

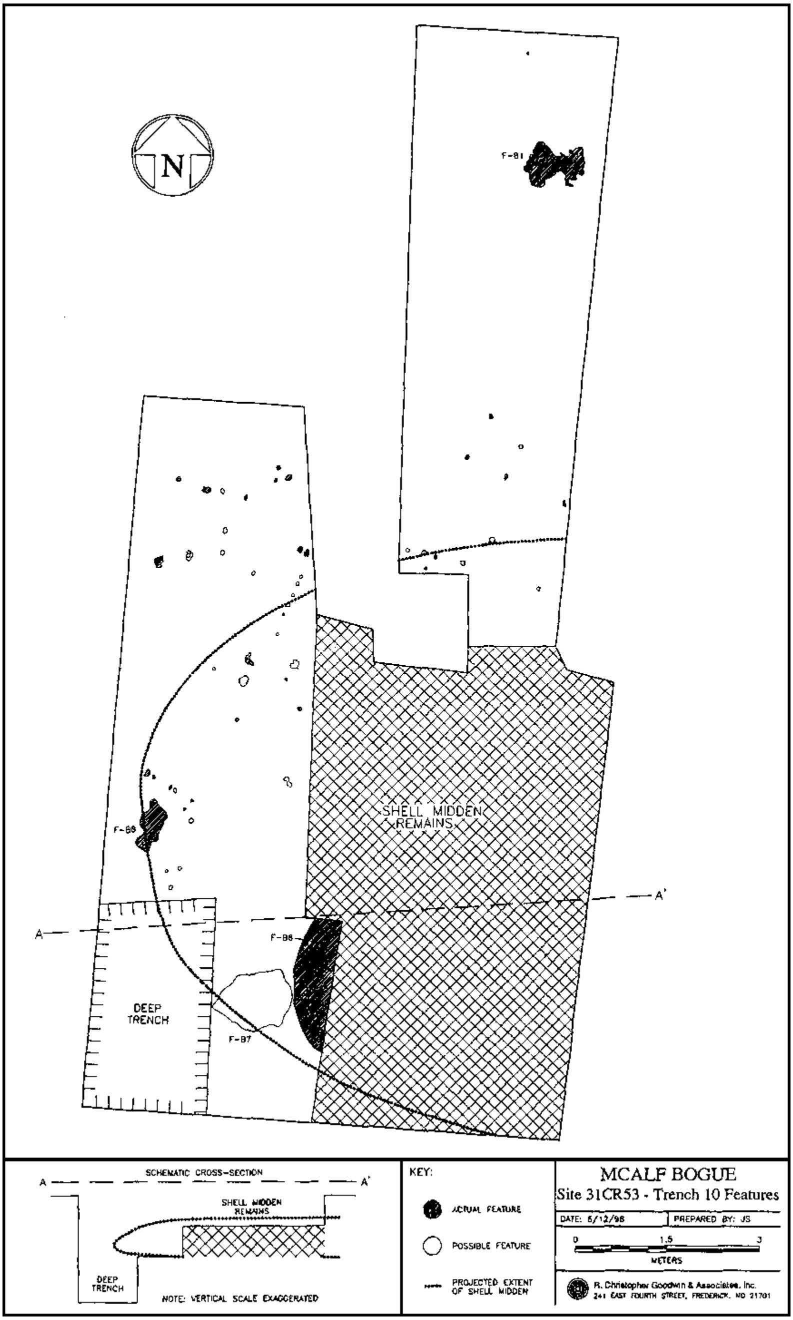

Figure 4. Map of mechanized Trench 10 at 31CR53, showing the location of cultural features.

limestone. This vessel may belong to the Colington or Cashie series. The White Oak sherds nearly all had limonite inclusions in the clay fabric. More than 98% (n=52) of the White Oak sherds were tempered with shell alone; only one appears to have had sand included as a tempering agent. More than 79% (n=42) of the White Oak sherds were fabric impressed; the remainder were undecorated or eroded. The indeterminate sherds were also fabric impressed (n=9) or not recordable (n=1). A shell sample from the midden was tested by Beta Analytic (Beta-131573) and yielded a calibrated two-sigma range of A.D. 1240 to 1420.

Earlier Pits

Within the midden cluster, at least four pit features were identified beneath the shell midden features. The three pits located in Trench 10 (Features 10-B-6, 10-B-7, and 10-B-8) occurred in the southeastern corner of the trench. The midden in Trench 16 covered at least one pit (Feature 16-B-2). Trench 17 also exposed pit features (Features 17-B-1 and 17-B-2), although these were not covered by midden deposit. Feature 10-B-7 was not excavated.

The exposed portion of Feature 10-B-6 was 250 cm by 80 cm (98.42 in by 31.50 in) in dimension, with the long axis arbitrarily determined by the trench wall as north-south. The projected size of the entire feature, at surface, is 3 m (9.84 ft) in diameter. The feature appeared as a dark, semi-circular soil stain extending from the southeastern wall of the shell midden bisection.

The feature was composed of a dark grayish brown (2.5Y 4/2) fine sand liberally mottled with very dark grayish brown (2.5Y 3/2) sand, olive yellow (2.5Y 6/6), and olive brown (2.5Y 4/3) sands. Minor inclusions of strong brown (7.5YR 5/8), oxidized, compacted sands were also noted. The feature extended to a depth of 30 cm (11.81 in) below the mechanized surface and presented a relatively even interface with the surrounding subsoil. The overall shape was broadly basin-shaped with minor rodent intrusions in the feature base.

One White Oak sherd, one probable White Oak (Broad Reach var.) sherd, and one indeterminate sherd were recovered from the feature matrix. The indeterminate sherd was tempered with a few shell fragments, voids, and rounded pebbles. The ceramics probably all represent varieties of White Oak, indicating deposition during the Late Woodland period. The size and definition of the feature suggest primary function as a storage pit. The lack of internal cultural stratigraphy suggests the feature was filled quickly following abandonment. The presence of the overlying shell midden indicates subsequent occupation of the area.

Identified during mechanical excavation of Trench 10, Feature 10-B-8 was an oblong soil stain composed of dark grayish brown (2.5Y 4/2) sand with minor oyster shell flecking. The soil stain measured 84 m by 40 cm (33.07 in by 15.75 in), with the long axis oriented at 206/296°. The feature was bisected following the long axis, and the southern half was removed.

The feature consisted of a single stratigraphic zone containing oyster flecking and occasional larger oyster shell fragments. Maximum depth was 14 cm (5.51 in) below the mechanized surface. The profile was relatively uniform and bowl-shaped with a sharp transition to the surrounding olive-yellow (2.5Y 6/6) sand subsoil. One Cape Fear sherd and three bone fragments were recovered from the feature matrix. A fourth bone fragment was found in the underlying subsoil. One bone fragment found in the feature showed evidence of exposure to fire. Feature 10-B-8 is cultural in nature and likely represents a single-episode refuse or discard pit. The small size of the feature suggests this was the primary function of the pit. The Cape Fear sherd indicates a Middle Woodland *terminus post quem* for the pit.

Feature 16-B-2 is a pit feature of unknown size sampled within Test Unit 2 in Trench 16. Exposed in the northwest corner of Test Unit 2, the pit was covered by the shell midden (Feature 16-B-1) and extended into both the north and west walls of the unit. The pit measured at least 62 cm by 76 cm with an excavated depth of 40 cm. The top of the feature was separable from the bottom horizon of the midden, indicating an earlier date of use. Unfortunately, no cultural material was recovered from the pit. A good amount of charcoal was observed and a sample taken. This is probably an example of an "empty" feature, a phenomenon noted at other prehistoric sites (e.g., Broad Reach) on the Outer Coastal Plain in North Carolina.

Trench 17 revealed two adjacent pit features. Feature 17-B-1 measured approximately 190 cm by 225 cm in a roughly oval shape. Feature 17-B-1 was cut on the west side by an intrusive shell pit (Feature 17-B-2). The Feature 17-B-1 matrix consisted of dark grayish brown (2.5Y4/2) loamy sand mottled (<5%) with light yellowish brown (2.5Y6/4) sand and light olive brown (2.5Y5/3) sand. The southeast quadrant was removed to determine the internal stratigraphy and pit depth. The depth of the pit varied, extending approximately 20 cm below the stripped surface. No internal structure was identified. The artifact sub-assemblage consisted of 14 White Oak sherds, nine of which were fabric impressed. All of the sherds were shell-and-sand tempered, and many had limonite inclusions. A wood charcoal sample from the feature was tested by Beta Analytic (Beta-131572) and yielded a calibrated two-sigma range of A.D. 900 to 1170.

The intrusive shell pit (Feature 17-B-2) was delineated and the southwest quadrant removed. The feature measured 38 cm by 68 cm and contained four identifiable strata. The top 8 cm of fill consisted of an oval-shaped concentration of oyster shell (30%) in olive brown (2.5Y4/3) loamy sand. The second stratum was 12 cm thick and consisted of the same soil matrix but without shell. Below this was another concentration of shell in the same soil matrix (8 cm thick) overlying a 10 cm thick, slightly less organic matrix (light olive brown [2.5Y5/4]) sand that formed the base of the feature. Both bottom strata consisted of 30% shell.

Prehistoric sherds were recovered from the first and the third strata; no cultural material was recovered from the second and fourth strata. The artifact sub-assemblage consisted of five White Oak sherds and three indeterminate sherds. These sherds all had abundant limonite inclusions, more than normally occurred in the Broad Reach variant of White Oak at the site. However, Feature 17-B-2 post-dated Feature 17-B-1, so the radiocarbon date from Feature 17-B-1 provides a *terminus post quem* for Feature 17-B-2. This date appears to fall within the accepted range for Broad Reach. Feature 17-B-2 appears to have been a refuse pit with two depositions in a relatively short period of time.

Artifact Assemblage

The artifact inventory for 31CR53 is consistent with that of other sites excavated in the North Carolina Coastal Plain. Nine hundred and fifty-five ceramic artifacts and 26 lithic artifacts were recovered from the entire site area during the most recent research. Lithic artifacts are rare. This trait is common to the region. Unlike more inland sites, lowland, tidewater sites are nearly devoid of stone tools and the spoil of their production. The reasons for this are apparent. First, there are few lowland deposits of usable raw lithic material. Therefore, stone would have to be imported or acquired through trade; either option is time or labor intensive. Second, the primary food source, shellfish, produces a byproduct, shell, which is fairly easily modified for use as tools. The stone tools recovered from the site are, generally, very small, modified pebbles. It is likely that these are associated with food consumption; they may represent a means of opening shells or a blade for cutting the muscle attachments.

One bone tool was recovered from a Late Woodland shell midden feature. It was made from a large mammalian long bone mid-shaft, likely a white-tailed deer humerus. Given the absence of longitudinal striations on the external surface of the midshaft, it is unlikely this tool represents a bone pressure flaker or awl. Since these tools are used in a pushing fashion, they typically have long, deep, longitudinal scars over all surfaces. The general shape of this tool is more similar to other modified bone objects called beamers. No single use for beamers has been inferred in the literature. It has been suggested that beamers represent everything from corn shuckers (Wing and Brown 1979) to hide-scraping tools (Olsen 1996).

As shellfish constitute the primary food source, the associated refuse is the most abundant cultural material encountered across the site. Shell midden deposits are identified with regularity. Plowing during historic times has brought some of this midden deposit to the surface, making it more noticeable. The southern, more elevated portion of the site, in particular, has extensive deposits. The stratigraphic profile of this area starts with an organic, A_O horizon underlain by an historic A_P horizon with considerable shell content. Immediately below this is a thin layer of articulated or semi-articulated shell. This layer represents the remnant of what must have been a substantial shell midden. A number of species can be identified within the various shell deposits. Scallop, oyster, and clam have all been noted on site. Their respective proportions vary across site and oftentimes within the depositional episodes of a feature. This represents either an isolated dietary choice (on a micro level) or a forced shift in diet (on a macro level).

Prehistoric ceramic fragments are the most diagnostic artifacts recovered from 31CR53. An interesting facet of North Carolina coastal archaeology is that the various cultures inhabiting the area during the Woodland period shared similar ceramic technologies. For the most part, ceramics recovered are shell-tempered or sand-tempered with a fabric-impressed surface treatment or no treatment at all. Surface treatments that are encountered in much smaller quantities include cord-wrapped stick impressions and burnishing. The vast majority of the prehistoric ceramics recovered from the site have been typed as White Oak, a shell-tempered ceramic series belonging to the Late Woodland period. Cape Fear, a Middle Woodland ceramic series, was also recovered in much smaller quantities. The predominance of White Oak pottery within the assemblage may suggest one of the following: (1) there was a greater population during the Late Woodland period than during other eras; (2) the population during the Late Woodland period was similar to that of other times, but the duration of their occupation was longer; (3) ceramic production, utilization, and discard was more prevalent during the Late Woodland period; or (4) the areas investigated were more greatly impacted during the Late Woodland period than during the preceding Middle Woodland period.

Sand-and-Shell-Tempered White Oak Ceramics

The stratigraphic sequence for Trenches 10, 16, 17, and 18 in Area D suggests three successive Late Woodland occupations. The test units excavated in Area E also seem to support this suggested occupational sequence. In Trenches 10 and 16, shell midden deposits clearly overlay pit features representing separate activities. The midden deposit in Trench 16 yielded 65 White Oak sherds, of which 64 were tempered only with shell. The very similar shell midden feature in Trench 18 yielded 53 White Oak sherds, and, again, all but one were tempered only with shell (Figure 5). A shell sample from the Trench 18 shell midden, tested by Beta-Analytic (Beta-131573), yielded a calibrated two-sigma range of A.D. 1240 to 1420 for the midden deposit. The ceramic sub-assemblage would indicate a similar date for all of the shell middens clustered in Area D. The midden features are clustered on the higher portion of the site and along the western edge of Area D. These may be household middens, created by the occupants of the non-midden zone to the northeast.

It is possible that the pit features in Trenches 10, 11, 16, and 17 are contemporary with each other. The features in Trenches 10 and 16 clearly predate the middens. Unfortunately, these pit features yielded very few potsherds. However, a wood charcoal sample from Feature 17-B-1, a

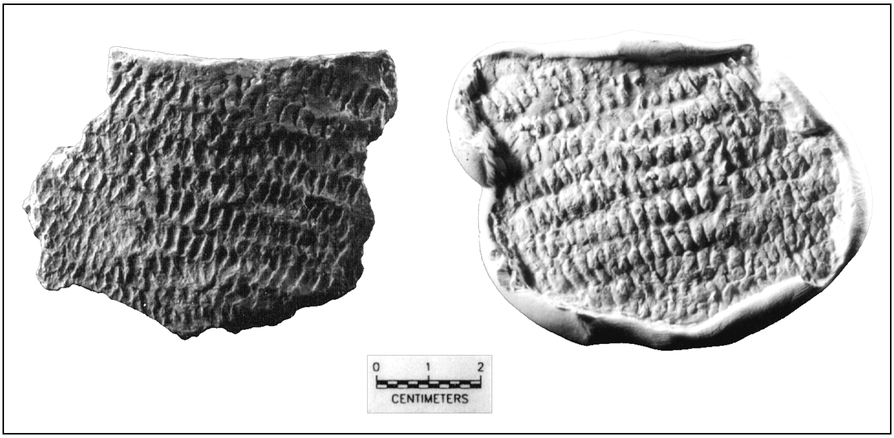

Figure 5. Shell-tempered White Oak rim sherd (left) and corresponding fabric-impressed surface treatment cast (right) from shell midden Feature 18-B-1 at 31CR53 (FS 2099).

large pit feature located within 25 m of the extensive midden deposits in Trenches 10 and 16, yielded a calibrated two-sigma range of A.D. 900 to 1170. The artifact sub-assemblage from that feature consisted of 14 White Oak sherds, but all of them were tempered with a combination of shell and sand (Figure 6).

Analysis of White Oak ceramics in North Carolina has traditionally dismissed sand as a natural inclusion in the clay (cf. Daniel 1999). Although this may be the case, the evidence from Bogue suggests that the sand inclusions may have temporal significance. This conclusion is based on analysis of the apparent occupational history of the site.

The testing in Area E concentrated on three apparent features. The White Oak ceramic sub-assemblage from Area E is dominated by sand-and-shell-tempered sherds (n=166, 67%) (Figure 7). All three test blocks yielded approximately the same 2:1 ratio of sand-and-shell-tempered to shell-tempered ceramics. Feature 3-01, a shell-filled pit, yielded 13 White Oak sherds. Twelve of these were tempered with sand and shell while one was tempered with shell alone. Sherds of the sand-and-shell-tempered variety of White Oak were predominant in the deposits above and surrounding the feature. A clam shell sample gave a calibrated two-sigma range of A.D. 1020–1270 for the feature and the sand-and-shell-tempered ceramics. This is generally contemporary with the dated pit feature from Area D.

When compared with the later-dated midden assemblage from Feature 18-B-1, the earlier dates from the pit features suggest that the sand-and-shell-tempered ceramics are associated with an earlier phase in the Late Woodland period. If this is the case, then the pit features that have yielded White Oak ceramic sub-assemblages dominated by sand-and-shell-tempered ceramics in Areas D and E are generally

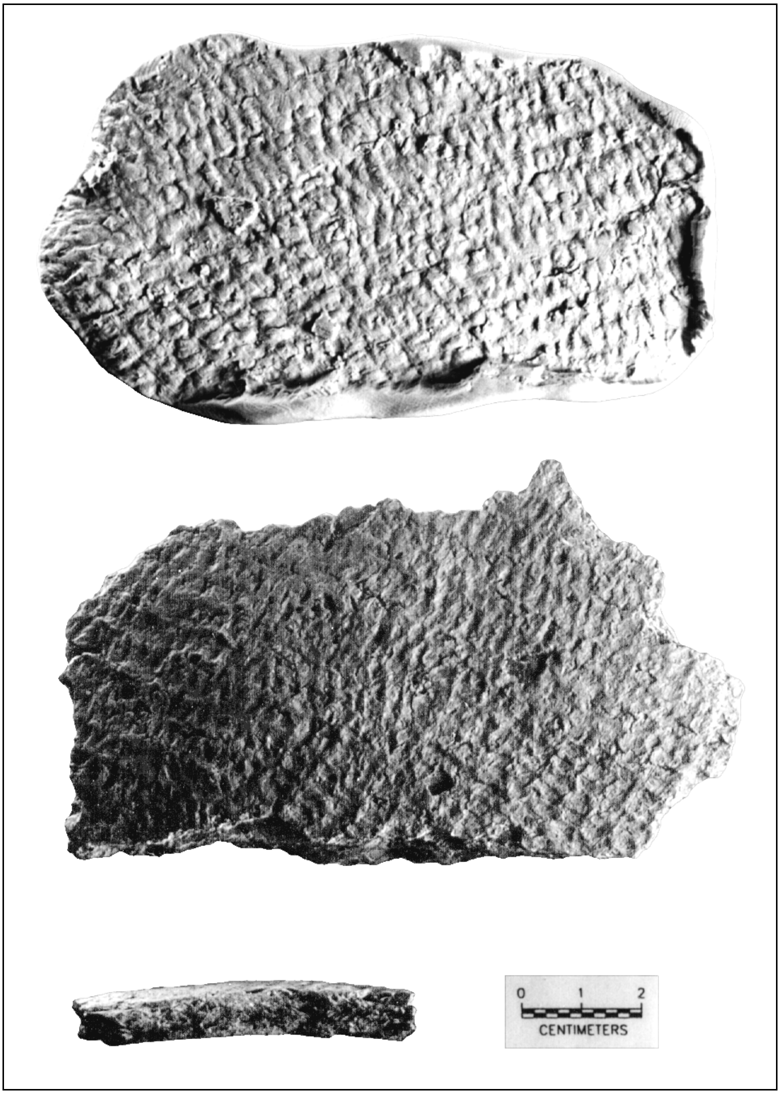

Figure 6. Shell-and-sand-tempered White Oak sherd (bottom) and corresponding fabric-impressed surface treatment cast (top) from pit Feature 17-B-1 at 31CR53 (FS 2106).

contemporary. Some of the pit features are "empty" and no conclusions can be drawn about their temporal use-life.

Feature 14-B-1, a midden found in Trench 14 and situated more than 125 m northwest of the main midden cluster, is anomalous. This midden has no other associated features, and may predate the southern cluster of middens. The artifact sub-assemblage is dominated by sand-and-shell-

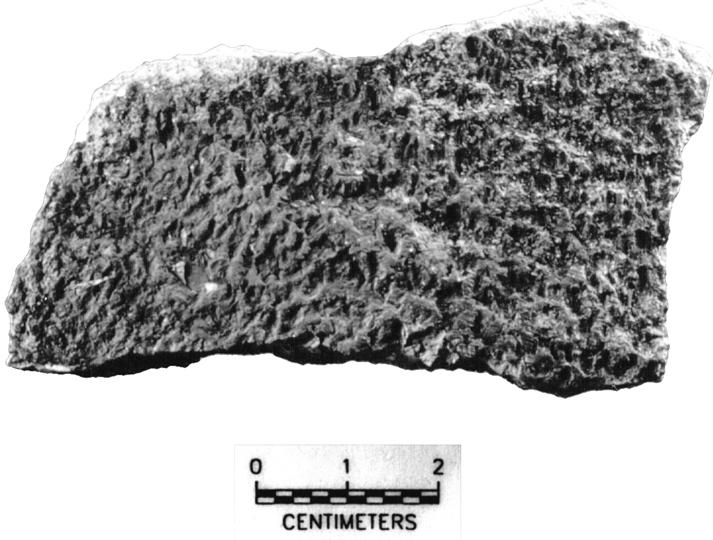

Figure 7. Shell-and-sand-tempered White Oak sherd from pit Feature 3-01 at 31CR53 (FS 2020).

tempered White Oak ceramics. This may indicate a more interior western location for shellfish processing in the earlier phase of the Late Woodland period.

The final Late Woodland phase at 31CR53 is marked by postholes that probably postdate the midden features. While it is likely that some postholes without shell were not recognized in the field; more than 90% of the recorded postholes contained fragments of shell, indicating they probably were driven through midden deposits. This is certainly the case in Trench 10. Unfortunately, these postholes cannot be directly associated with any of the dated features.

Intuitively, the sand-and-shell-tempered ceramics should be earlier than purely shell-tempered ceramics. Sand tempering is a hallmark of Middle Woodland ceramics throughout the Middle Atlantic region, including North Carolina. Likewise, shell is the predominant temper type of the Late Woodland period. In an ideal typology, the combined sand-and-shell-tempered ceramics should mark the transition. This appears to be the case at Bogue. Sand-and-shell-tempered ceramics are more common in the archaeological record before A.D. 1200, and purely shell-tempered ceramics are predominant after that time. Unfortunately, for comparative purposes, the recordation of many Coastal Plain ceramic assemblages has not included sand in the description of White Oak sherds since it has been regarded as a natural inclusion of no temporal significance. Researchers should be encouraged to record the presence of sand in White Oak sherds, since further data are needed before a conclusion can be drawn regarding this apparent patterning.

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BOOK REVIEWS

Laboring in the Fields of the Lord, by Jerald T. Milanich. Smithsonian Institution Press, Washington D.C., 1999. 210 pp. $26.95 (cloth).

Reviewed by Charles Ewen

Jerald Milanich knows Florida archaeology. He knows the subject because virtually his entire career as a practicing archaeologist has been spent in Florida. He did his graduate work at the University of Florida and now serves as curator of archaeology at the Florida Museum of Natural History. The length of time he has spent in the state has allowed him to know, personally, the major figures in Florida archaeology, visit all the major sites in the state, conduct extensive long-term projects of his own, and place his students at key sites around the state. I should know, since Jerry was instrumental in my excavating the site of Hernando de Soto's first winter encampment in Tallahassee in 1987. But it is not enough to simply be knowledgeable about the archaeology of an area, even if you do pass much of this knowledge on to your students.

Jerald Milanich also knows how to write. He is probably the most prolific and respected writer of Florida archaeology living today. His writing spans the time period from the earliest inhabitants of Florida until their demise at the hands of the Europeans during the early eighteenth century. He has written site reports, monographs, journal articles, and a number of scholarly books. He has also edited volumes that bring the work of other scholars in Florida archaeology together. A good example of the latter is *First Encounters* (University of Florida Press, 1989) which not only pulls together many interesting perspectives on the contact experience in the New World, but does so in a format that is accessible to both scholars and the general public.

Milanich's latest opus, *Laboring in the Fields of the Lord*, is another successful attempt to make the work of scholars available to the interested layperson without "dumbing it down" to the point where it is not useful to an academic audience. This volume follows on the heels of his *Archaeology of Precolumbian Florida* (University Press of Florida, 1994) and *Florida Indians and the Invasion from Europe* (University Press of Florida, 1995). Since this current book takes us to the demise of the Florida Indians, one wonders what he will do for an encore!

The Spanish exploration and exploitation of Florida has been the subject of historical and archaeological research since long before Milanich arrived on the scene. The route of the de Soto entrada through the peninsula has intrigued scholars for scores of years, and archaeological work in St. Augustine and at the Spanish missions of northern Florida has been ongoing for over half a century. However, this story has only recently been told to a general audience, thanks in no small part to the work of Milanich and his colleagues.

Spanish colonial archaeology has evolved in Florida and the rest of the southeastern United States from a search for the "oldest" and the "first" to the study of colonial patterns and the impact of Spanish contact on the indigenous peoples. The evolution of these interests is reflected in the on-going archaeological investigations at such sites as St. Augustine and the missions of north Florida. The recent Columbian Quincentennial, expected to take this research to a higher level, actually proved more of a distraction than a boon to Spanish colonial archaeology. Celebrations of the Columbian discovery of America were often embroiled in controversy concerning the impact of this event on the native inhabitants of the New World. However, out of this controversy, scholarly attention has come to focus on such subjects as creolization and a reassessment of the impact of European disease and technology on the peoples of the New World. Milanich takes on all these topics in his latest work.

The purpose of this volume, according to the author, is "to introduce readers to the Spanish missions of La Florida and the native peoples they served . . . also to acquaint you with some of the research projects and methods archaeologists and historians used to develop the new perspectives. . . ." (p. xiii). The opening page of the book contains a copy of the *Requerimiento* (a tract read, in Spanish, to the native inhabitants requiring that they accept the rule of Spain and the Catholic church or suffer the consequences) juxtaposed with Alexander Pope's proverb "to err is human; to forgive divine." These quotes set the tone for what follows.

The book begins with overviews of the native inhabitants of Florida and the discovery and exploration of the peninsula by the Spanish conquistadors. This useful introduction is necessary to put the subsequent Spanish actions in proper context. The reader may not (and probably should not) agree with the Spanish methods of settlement and missionization, but this allows one to understand why such decisions might have been made. It also goes a long way in explaining why Pedro Menéndez de Avilés was revered in Spain and vilified by his non-Spanish contemporaries.

The Mission period in Florida, which essentially corresponds with the seventeenth century, is the heart of this book. Milanich describes the failed Jesuit attempts during the late sixteenth century and the mixed successes of the Franciscans during the following century. After providing the Spanish perspective, Milanich discusses what life was like for a native Floridian in a Mission period village. These discussions are highlighted with appropriate quotes from the primary documents (which Milanich, himself, has translated in some cases), and reference is made to the corresponding archaeological evidence when available.

The saga of the original Florida Indians ends with a discussion of the decline and fall of the Franciscan mission effort and the corresponding demise of the individual native polities. This chapter in the history of the aboriginal population of Florida ends with both a bang and a whimper. Milanich chronicles how the pitiful remnants of the once numerous tribes were consolidated into a few villages only to be wiped out by raids by English colonists and their native mercenaries from the north. This tragic tale is little known outside of academic circles with most of the general public equating the subsequent influx of the Seminole populations with Florida's original inhabitants.

This is a truly powerful book on an important subject. I can find little to criticize except for a couple of points. First, one should recognize that this is the author's perspective on the events and archaeology of the Spanish Mission period in Florida. It represents a lifetime of meticulous research but not all his opinions are shared by researchers in the area (are they ever?). Those looking for in-text citations for some of the archaeological work upon which his opinions are based will be frustrated. On the other hand, the bibliography is adequate and those annoyed by the constant attribution of every phrase will find that their absence here makes the book more readable.

The one substantive topic with which I take issue is the discussion of the impact of epidemic diseases. Milanich is straightforward in saying that the documentary record is strangely mute when it comes to direct discussion of epidemic diseases (p. 157) and the archaeological record does not offer any direct evidence either (pp. 158-159). That said, he goes on to attribute many demographic and cultural changes to these diseases, which he feels must have occurred in order to account for the population loss. Clearly disease must have played a role in the demise of the native peoples of the Southeast. However, aboriginal population estimates and the factors affecting them are currently being debated by archaeologists.

These are very minor quibbles and the fact that the book has provoked these questions speaks in its favor. Milanich has managed to pack an incredible amount of information into a relatively thin volume. The logical organization, easy reading style, and numerous high-quality illustrations made this volume a pleasure to review.

Before I go to sleep each night I read fiction, detective novels, spy thrillers, or science fiction—anything but archaeology! I need the break, but I still feel oddly guilty about this indulgence. Milanich's book was guilt-free reading. It was an interesting story well told. To anyone interested or even merely curious about the Spanish colonial efforts in Florida, I urge you to buy this book! To my colleagues in North Carolina who would like to compare the Spanish colonial experience with England's efforts on the Outer Banks and the Albemarle, this book is a wonderful place to start.

Time Before History: The Archaeology of North Carolina, by H. Trawick Ward and R. P. Stephen Davis, Jr. The University of North Carolina Press, Chapel Hill and London, 1999. xiv + 312 pp., illus., index. $39.95 (cloth), $18.95 (paper).

Reviewed by I. Randolph Daniel, Jr.

It is difficult to be all things to all people. Yet, that is what Trawick Ward and Steve Davis set out to accomplish with *Time Before History*, in which they present the current archaeological understanding of North Carolina's ancient past. Aiming for a wide audience, the authors note in their preface the dual obligations they felt to write for both the interested public and the professional archaeological community. They succeed admirably. In this highly readable volume, both the layperson and professional will find plenty to ponder. The layperson will find a thoughtful, jargon-free synthesis of the state's archaeology; the professional will find new ideas that challenge conventional interpretations.

In the interest of full disclosure, however, I should first point out that I was at the University of North Carolina at Chapel Hill when the authors were writing this book. Indeed, I read portions of a draft manuscript while at UNC, and some of my own research is presented in the volume. Consequently, it is difficult for me to keep my admiration of the authors, both of whom I know well, from influencing my perspective on this book. That said, however, it is simply not possible to find any two individuals more qualified to write this volume. During their tenure at the Research Laboratories of Archaeology (RLA), Ward and Davis have been associated either directly or indirectly with much of the archaeology that has been done in the state over the last several decades. Moreover, what archaeology that occurred prior to their tenure at UNC, they were able to experience vicariously through the artifact collections, field notes, and correspondence curated at the RLA.

Time Before History has seven chapters. It begins with a brief culture-historical overview of the major periods archaeologists use to organize North Carolina prehistory. The remainder of Chapter 1 provides a discussion of the history of archaeology in the state. Readers familiar with the history of the discipline in North Carolina will recognize the names of Joffre Coe, Douglas Rights, and James Bullitt as driving forces in organizing the Archaeological Society of North Carolina. Essentially run by non-professionals, this society laid the foundation for professional archaeology in the state during the 1930s. Eventually, however, archaeological work in the state would fall under the purview of Coe at the Research Laboratories of Anthropology (now Research Laboratories of Archaeology) in the academic program at UNC. The program at Chapel Hill would influence much of the archaeology in North Carolina for the next three decades. Sprinkled throughout this discussion are names of archaeology students who went on to become well-known researchers in their own right, including Lewis Binford, Hester Davis, Stanley South, David Phelps, Roy Dickens, Jr., Leland Ferguson, and Jefferson Reid, to name just a few. These and other students received their archaeological training working for Coe at sites like Hardaway and Town Creek in the Piedmont, and at the mound and village sites of the Cherokee project in the Mountains. The chapter ends with a discussion of the tremendous growth that the state has witnessed in archaeology since the 1970s on all fronts, including academic and government positions as well as the birth of archaeology jobs in the private sector.

The other chapters detail what is known about the state's prehistory. With the exception of the Paleoindian and Archaic periods, which are treated in separate chapters that cover the entire state, the remainder of the book is divided into chapters that focus on cultural developments within each of the state's three physiographic regions (Mountains, Piedmont, and Coastal Plain). Each period is placed in context by highlighting relevant archaeology from surrounding areas outside the state. I found particularly interesting the historical notes sprinkled throughout the book. Anecdotes related to the excavations at Hardaway, Town Creek, Keyauwee, and the Cherokee project sites often provide a personal glimpse at the nature of archaeological fieldwork. These chapters also are well illustrated with excavation photographs, field maps, and numerous artifact pictures.

Chapter 2 outlines current views concerning the earliest known peopling of the state—the Paleoindian period (9,500–7,900 B.C.). Much of this chapter is comparative and typological in nature since no in-situ Paleoindian sites have been excavated in North Carolina—the famous Hardaway site notwithstanding. Here, as elsewhere in the Southeast, virtually all we know about Paleoindian occupations in North Carolina is based upon the spatial distributions of diagnostic fluted points recovered mostly as isolated surface finds. Nevertheless, based on palynological evidence from the state, a picture of Paleoindian settlement and subsistence strategies is painted, making it unlikely that kill sites of now extinct megafauna will be found in North Carolina like those Paleoindian sites excavated in the Southwest and Plains. Chapter 2 also includes an entertaining discussion of the history of work at the Hardaway site. In particular, readers learn how Coe came to work at the site, how Hardaway was virtually destroyed by pot hunters from all over North Carolina and surrounding states, and about the frustrating efforts of the RLA to salvage what little was left in the 1970s. Indeed, the authors write with some authority here, as Ward was the field supervisor at Hardaway for all those summers when "graduate students who were assigned to work at the site began to feel as though they were being banished to Badin" (p. 42). The chapter concludes with a typological discussion of the Hardaway complex (i.e., Hardaway Blade, Hardaway-Dalton, and Hardaway Side-Notched) and presents current views related to the problem of assigning the complex to a Late Paleoindian or Early Archaic temporal association.

The Archaic period (8,000 B.C.–1,000 B.C.) discussed in Chapter 3 necessarily focuses on the Piedmont, as it is there where sites with the best stratigraphic integrity have been excavated. Again, the Hardaway site is emphasized with respect to the Early Archaic, along with a review of two competing models on how Early Archaic bands might have been organized territorially. These two models include the drainage-based settlement strategy of the band-macroband model and the Uwharrie-Allendale model which features tool-stone rather than food resources as the central feature of settlement mobility. Doerschuk, Lowder's Ferry, and the Gaston site are featured in the Middle and Late Archaic sections. Of course, these sites, along with Hardaway, allowed Coe to construct the composite sequence that became the culture-historical touchstone for the entire Southeast. Projectile point sequences are highlighted in this section. Moreover, this discussion also provides an example of how the authors redress conventional views of typology. Traditionally, differences between Stanly and subsequent Morrow Mountain, Guilford, and Halifax points have been interpreted as reflecting "cultural intrusions." In contrast, the authors see more morphological similarities than differences among these artifact styles. This evidence, along with additional data presented by the authors, lead them to suggest that "cultural continuity rather than discontinuity" (p. 61) characterized the Middle and Late Archaic periods.

In Chapter 4, the Woodland period of the Piedmont is detailed. Ward and Davis refer to the cultural development that occurred during the Woodland period as the Piedmont Village Tradition. Early Woodland and Middle Woodland period (1,000 B.C. – A.D. 800) summaries are presented, focusing on the introduction of ceramics into the region which is seen as one of the material trait hallmarks of the Woodland period. The Piedmont is seen as an area influenced by ceramic traditions both to the north and south. Early piedmont ceramics such as Badin and Yadkin wares illustrate this point. For instance, the sand-tempering in Badin ceramics suggests ties with early ceramics from South Carolina, while its cord-marked and fabric-impressed surface treatments are indicative of early Virginia pottery. Further emphasis in this pottery discussion is given to the chronological relationship between Badin and Yadkin wares and similar early wares like Vincent and Clements in the northeast Piedmont. The presumed lineal development relationship between Badin and Yadkin is also reevaluated in light of additional radiocarbon dates and a review of the stratigraphic evidence on which the temporal separation of these two types was originally based. Although we still don't know exactly when these ceramics originated in the region, "the previous notion of a simple lineal progression from Badin to Yadkin or from Vincent to Clements wares is untenable. Badin pottery may be earlier in some areas, whereas Yadkin pottery may be earlier in others" (p. 98).

More detail about Woodland lifeways is provided in the subsequent discussion of the Late Woodland period (A.D. 800–1600). This section is largely based upon the RLA's Siouan project. Owing largely to the rich data sets accumulated from the excavation of numerous sites, details about artifact assemblages, community settlement, foodways, and burial practices are neatly presented. Summaries are presented via archaeologically defined phases lasting only a few centuries. Geographically, these phases focus on the major river drainages of the north-central Piedmont, including the Dan, Eno, and Haw rivers. Wake Forest University's work in the upper Yadkin River valley is also included in this section. Essentially, the Late Woodland is characterized by regional manifestations of the Piedmont Village Tradition. These archaeological groups were the likely ancestors to those native populations encountered by Europeans during the subsequent Contact period. Compact sedentary villages became common during the Piedmont Village Tradition; some settlements were even marked by stockades, reflecting the emergence of intertribal conflicts. The southern Piedmont, however, did not participate in the Piedmont Village Tradition during Late

Woodland times. Instead, this area was influenced by a cultural tradition referred to as South Appalachian Mississippian—a tradition characterized by politically complex cultures that engaged in mound building and elaborate ceremonialism. The best known example of this culture in North Carolina—referred to as the Pee Dee culture—is the Town Creek site, preserved today as a State Historic Site in Montgomery County. The mound and outlying Pee Dee villages have drawn the attention of archaeologists in the state for some six decades. Again, contrary to conventional wisdom, Ward and Davis propose that Town Creek was not simply the residence of a small number of high-ranking religious specialists. Instead, the authors note that evidence like large amounts of domestic refuse, the posthole outlines of numerous structures, and the presence of several hundred burials belies an occupation by just a handful of individuals.

Woodland and Mississipian period archaeology of the Appalachian Summit are overviewed in Chapter 5. This chapter is subtitled "The Search for Cherokee Roots," and the origins and development of Cherokee culture is highlighted here by way of summarizing the RLA's Cherokee project of the 1960s and early 1970s. While the RLA work generated the chronological and typological basis of the Early Woodland and Middle Woodland periods, much that is known regarding settlement and subsistence practices has been filled in by related work in eastern Tennessee. A certain amount of unevenness exists with respect to our understanding of the Early Woodland and Middle Woodland cultures. The Early woodland period (1,000–300 B.C.) is primarily known from the large, stratified Warren Wilson site in Buncombe County which is prominently featured in this chapter. Although the main occupation at Warren Wilson dates somewhat later, the site provided basic information upon which Early Woodland artifact assemblages were defined in the region. As elsewhere in the Southeast at that time, the occupational intensity at Warren Wilson also suggests that larger and more sedentary communities were formed than existed earlier. The Middle Woodland period (300 B.C.–A.D. 800) in the mountains is divided into two phases: the Pigeon phase and the Connestee phase. Much more is known about the latter than the former, and much of what is known about the Connestee phase is derived from the work at the Garden Creek Mound No. 2 in Haywood County. While most of the mound was leveled for fill dirt, the information salvaged from the mound indicates that it was used at least in part as a platform for public buildings. Based upon "exotic" artifacts such as chert blades and copper beads that were recovered in the mound, readers learn that Middle Woodland cultures in the mountains had connections with temporally related groups in eastern Tennessee and Ohio. Some pottery found in the mound also appeared to be imported from these regions. Such interaction was probably based upon the export of mica, so plentiful in the North Carolina mountains. This soft, sheet-like mineral, cut into geometric and other forms, has been frequently recovered from Middle Woodland mounds in the Ohio River Valley and elsewhere in the Southeast. Owing to the limited database, the Late Woodland period (A.D. 800–1100) is perhaps the least understood archaeological period in the mountains. This is particularly unfortunate, as the authors' point out, since this period bears directly on the question of whether the historic Cherokee were the result of a long period of in-place cultural development or were the product of more abrupt cultural influences.

Whatever the process, the subsequent South Appalachian Mississippian tradition (ca. A.D. 1000–1450) exhibits significant cultural changes from the preceding Late Woodland period with respect to ceramics, village life, and foodways. South Appalachian Mississippian is divided into two sequential phases, Pisgah and Qualla. Excavations at the Warren Wilson and Garden Creek sites form the basis for the rich detail provided about artifact assemblages, architectural remains, subsistence, and ceremonial practices. Almost two decades of excavations at Warren Wilson have revealed a large palisaded village with a central plaza and rectangular wall-post houses sealed with clay. Burials were placed in deep pits inside or adjacent to houses. When present, burial goods included mostly ornamental items like shell beads, turtle-shell rattles, and mica plates and disks. Moreover, the distribution of burials with offerings exhibited a clustered pattern, leading to the interpretation of the association of grave offerings with higher-status households. A major shift toward a reliance on domesticated crops, supplemented by the hunting and gathering of wild foods, also distinguishes the Pisgah phase from the period just prior to A.D. 1000.

Pisgah ceremonial practices are best seen from data gathered by the excavations at Garden Creek Mound No. 1, located in the vicinity of the previously mentioned Middle Woodland Garden Creek Mound No. 2. Excavations revealed a pair of connected, semi-subterranean earth lodges that were eventually covered over by a single elevated earthen platform upon which a temple or chiefly residence was placed. Numerous burials were also placed in the mound. This earth-lodge-to-temple-mound construction sequence is very similar to that seen at Town Creek mentioned earlier. Moreover, this shift in architectural construction is also seen to reflect similar changes in South Appalachian sociopolitical organization. That is, earth lodges are interpreted to have functioned as "council houses" where egalitarian-based political decisions were made by several group representatives. Subsequent construction of a platform mound that supported chiefly residences, in contrast, likely reflects a change in sociopolitical organization whereby decisions were made by a kin-based ruling class.

The Qualla phase represents the last half of the South Appalachian Mississippian tradition. Moreover, Qualla is seen as part of a more widespread Lamar culture that existed across the Deep South at this time. In particular, Qualla is defined based upon a pottery style that exhibits a distinctive set of complicated-stamped motifs on vessel surfaces. Much of what is known about this mountain culture is based upon excavations at Coweeta Creek, a mound and associated village complex located in Macon County. A series of six town house structures, stacked upon each other in successive building episodes, formed the mound at Coweeta Creek. Most of the town houses appeared to have been burned, whereupon each building was covered with soil that formed the foundation for the next structure. The association of several burials with various town house floors suggests that these individuals were important community members, and their deaths may have triggered the burning and subsequent rebuilding cycle documented by the mound excavations.

Several dwellings, similar in size and shape to the Pisgah phase houses uncovered at Warren Wilson, were also excavated around the Coweeta Creek Mound. A portion of a plaza was also revealed by the excavations, suggesting a site plan consisting of a village centered on a town house and plaza. As at Warren Wilson, several dozen burials were placed in the village area, often associated with houses.

The Woodland period of the coastal region is the focus of Chapter 6. As is traditional, the authors divide the Coastal Plain into northern and southern regions which generally coincide with cultural groupings recognized from ethnohistoric records. Much of the discussion in this chapter is typological and culture-historical as it relates to taxonomic and chronological issues. Persons interested in detailed treatment of the typological and chronological issues discussed in this chapter should also read the most recent issue of this journal (*North Carolina Archaeology*, vol. 48, 1999), devoted to prehistoric pottery on the southern coastal plain. After a brief history of Coastal Plain archaeology, the Early Woodland, Middle Woodland, and Late Woodland periods are each discussed in turn. Most of what is known about the Early Woodland period comes from ceramic studies. The Deep Creek and New River phases, named for sand-tempered and predominantly cord-marked ceramic traditions in the northern and southern Coastal Plain, respectively, characterize the Early Woodland period. Separate phases marked by distinct ceramic types also characterize the Middle Woodland Period. In the north, the Mount Pleasant phase is marked by sand- and grit-tempered pottery with surface finishes that include fabric impressing, cord marking, and net impressing. Settlement and subsistence data, while sketchy, suggest more permanent settlements focusing on marine and estuarine resources than during earlier time periods. In the south, the Cape Fear phase distinguishes the Middle Woodland period. Two ceramic wares, including a sand-tempered series referred to as Cape Fear and a "grog tempered" series called Hanover, mark this period. The latter is the better known of the two types. Three surface finishes—cord marking, fabric impressing, and net impressing—are found on Cape Fear pottery. Surface treatments on Hanover pottery are generally fabric impressing or cord marking. Some consideration is also given to the widespread occurrence of low, sand burial mounds in the inner Coastal Plain, thought to be associated with the Cape Fear phase. Unfortunately, most of these mounds were heavily looted prior to their excavation. Nevertheless, what data we do have suggest these mounds were nondescript compared to other mounds in the state, essentially containing secondary burials and cremations. While traditionally considered as part of the Cape Fear phase, the authors prefer to place this mound complex into a "yet unnamed Late Woodland cultural phenomenon, extending southward into the Coastal Plains of South Carolina and Georgia" (p. 210).

Considerably more is known about the Late Woodland period on the coast. This is due both to the amount of archaeology that has been done and the excellent descriptions provided by early English explorers in the region. The authors draw heavily on these written descriptions, as well as the famous watercolor drawings of native life depicted by John White, in writing this section. In the northern region, the tidewater area is associated with the historic Algonkian-speaking natives, while to the west along the inner coastal plain is associated with Iroquois-speaking Tuscarora tribes. Shell-tempered pottery, longhouse construction, and ossuary or mass burials are the hallmark traits of Algonkian culture, identified with the Colington phase. Settlements were situated near major waterways and estuaries to take advantage of a variety of resources, not the least of which were fish and shellfish. Hunting and gathering of inland resources also occurred, as did farming, but the extent that crops contributed to the diet remains to be determined. Many of these same traits are also present in the upper portion of the southern coast where the White Oak phase is recognized. Minor differences in pottery distinguish these two phases archaeologically. Much of the White Oak phase discussion centers on the Broad Reach site which was recently excavated in Carteret County. Portions of at least two structures, as well as numerous pit features and various types of burial pits (including ossuaries), were uncovered there. The final Late Woodland phase discussed by the authors is Cashie, representing the Tuscarora Indians of the northern inner Coastal Plain. The most distinguishing characteristic of Cashie ceramics is that it is tempered with small pebbles. Early Cashie villages were probably occupied year round with a mixed subsistence base of agriculture, hunting, gathering, and fishing. Small ossuaries appear to represent the Cashie burial mode.

In summarizing this area of North Carolina, the authors make an important point about the paradox that is Coastal Plain archaeology. This region has received more archaeological attention than any other area of North Carolina, yet “it is arguably the least understood of all the major physiographic regions in the state” (p.226). As the authors also point out, this is at least in part due to the way archaeology has been conducted on the coast during the last decade. That is, while archaeologists have been justifiably preoccupied with keeping ahead of the huge commercial growth that the coast has experienced, development rather than design has largely driven the archaeology that has taken place. Consequently, we collect ever greater amounts of data under the dictates of modern land use at the expense of interpretive frameworks that have not kept pace with the volume of dirt moved by salvage excavations.

The final chapter details the time of contact between North Carolina Indians and Europeans arriving from Spain and England. In many respects this is the most engaging chapter in the book, as it tells a story of the meeting of two worlds that is richly detailed based upon evidence provided by both the archaeological and written records. Yet, it is also a tragic story of the devastation experienced by native cultures across the state. Much of this story is based on information about the Contact period in the central and north-central Piedmont during the seventeenth and early eighteenth centuries. Excavations at the Mitchum, Jenrette, and Fredricks sites along the Eno and Haw rivers and at Upper Saratown on the Dan River have allowed researchers to paint a picture of interaction and culture change that focuses on the topics of trade, subsistence, intertribal relations, and disease. Readers learn, for example, that while native groups sought firearms and iron tools, European tools and weapons did not replace native technologies. Likewise, foreign plants and animals did not supplant traditional native food sources. The presence of Europeans also escalated existing intertribal hostilities. New motivations for hostilities, such as stealing deerskins and capturing Indian slaves, increased raiding among native groups. The final disastrous result, of course, was the introduction of foreign diseases. At issue in this section, however, is not the result but the timing of epidemic diseases. For the authors, the evidence points to a late (i.e., post A.D. 1650) rather than early arrival in the Piedmont.

The last sections of the chapter focus on the Contact period in the Mountains and Coastal Plain regions. With regard to the former region, the authors focus on recent attempts to reconstruct that portion of Hernando de Soto's expedition route that traversed North Carolina during the early sixteenth century. Much of this reconstruction centers on documentary accounts used by other Southeastern scholars that have yet to be ground-truthed archaeologically. Despite attempts by North Carolina archaeologists to locate native sites that might have been associated with that route, unquestionable archaeological evidence of early Spanish contact remains elusive. In the Coastal Plain, the Contact period was marked by English rather than the Spanish attempts at settlement. But, as with the Mountain region, much of our current knowledge of European contact is based on historical accounts rather than archaeological ones. While archaeological excavations have been done on an Algonkian site thought to be the historic village of Croatan, and on one early eighteenth-century battle site between the Tuscaroras and colonists, the results of this work have not yet been reported.

In summary, *Time Before History* is the first comprehensive account of the archaeology of North Carolina. As professionals are becoming increasingly aware of their responsibility to communicate archaeological interpretations of the past to "many publics," the publication of this book could not have come at a better time. But the authors' feat in appealing to diverse interests is not their foremost accomplishment. Rather, the pages of this book embody a passion for doing and thinking about archaeology rarely communicated to any audience. Readers of *Time Before History* cannot finish this book without feeling they too have shared in that passion.

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