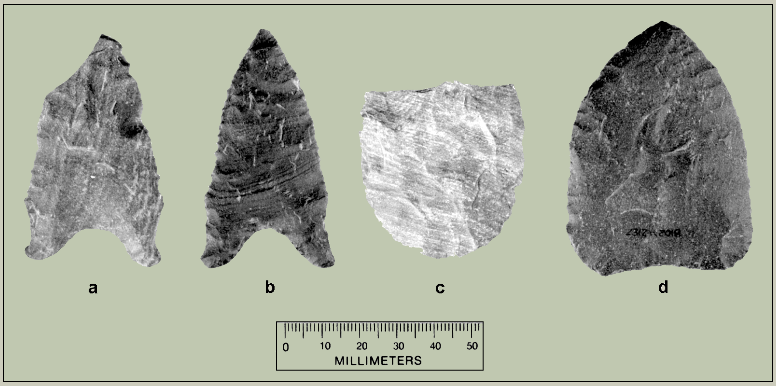
Southern Indian Studies



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AN ARCHAEOLOGICAL SURVEY AND PETROGRAPHIC DESCRIPTION OF RHYOLITE SOURCES IN THE UWHARRIE MOUNTAINS, NORTH CAROLINA

by
I. Randolph Daniel, Jr. and J. Robert Butler

Abstract

While archaeologists have known of the existence of prehistoric rhyolite quarries in the Uwharrie Mountains for decades, no systematic attempt has been made previously to inventory these sites or to characterize them petrologically. During 1990 and 1991, approximately 27 quarries were recorded in the Uwharrie Mountains of Montgomery, Stanly, and Randolph counties, North Carolina. Collectively, the rock from these quarries is referred to as Uwharrie Rhyolite. Petrologic data indicate that most of the quarried rock can be subdivided into distinct types based upon color, grain size, and the presence of features such as phenocrysts, flow-banding, and spherulites. Pinpointed among these quarry sites is the location of the dark gray, aphyric and often flow-banded rhyolite that is so abundant in the stone-tool assemblage at the Hardaway site. The data from these quarries form an important baseline for researchers interested in studying rhyolite variability and sourcing in stone-tool assemblages from North Carolina and surrounding regions.

For the past several decades, North Carolina archaeologists have noted that a fine-grained metamorphosed volcanic rock—usually called rhyolite—comprises a significant portion of the stone recovered in prehistoric stone-tool assemblages in the state. Moreover, they have also been aware that quarried outcrops of this stone are concentrated in the Uwharrie Mountains, located in the south-central portion of the Carolina Slate Belt (North Carolina Geological Survey 1985). Nevertheless, until recently, no attempt has been made to systematically survey the region for prehistoric quarries or characterize them petrologically.

The purpose of this report is to present the findings of a quarry survey, conducted in 1990 and 1991, of a portion of the Uwharrie Mountains and surrounding region. Described here are the survey methods used and the quarry locations identified by our fieldwork. Archaeological and petrological data gathered from each quarry also are presented. Originally, the results of this study were used to identify the rhyolite types represented among the Early Archaic artifacts found at the

Hardaway site (Coe 1964; Daniel 1994). Several thousand other Early Archaic projectile points from sites across North Carolina and South Carolina then were examined to determine the spatial extent to which these rhyolite types were used during this period (Daniel 1994). The present study provides a key inventory of quarries for the Piedmont and petrologic data for what we call Uwharrie Rhyolite. As such, it forms an important baseline for researchers interested in studying rhyolite variability and sourcing in stone-tool assemblages from North Carolina and surrounding regions.

The paper is organized as follows. First, we provide some background on the geology of the survey area, including a brief discussion of the topography and geologic formations of the Uwharrie Mountains. Next, we present our quarry survey methods, followed by site descriptions and petrologic data. We conclude with a summary of the significance of our results.

Geologic Background

The Carolina Slate Belt is made up of metavolcanic and metasedimentary rocks and extends approximately 600 km from Virginia to Georgia; it has a maximum width of about 140 km in central North Carolina (Butler and Secor 1991:66). These rocks were formed during the Precambrian period as a result of the eruptions of a chain of volcanic islands surrounded by shallow seas. The lava, ash, and sediment deposited by these eruptions were later metamorphosed, folded, and faulted, exposing them to eventual erosion that forms the present land surface of the Uwharrie Mountains.

Although the Uwharries are called mountains, they are actually inselbergs, being the erosional remnants of an ancient and higher Miocene peneplain (Kesel 1974). By the start of the Pliocene epoch, streams flowing east across the Piedmont from the newly formed Continental Divide had altered the nearly level surface of the peneplain, exposing the more resistant rock as elevations. Thus, while the rocks comprising the Uwharries are several hundred million years old, the erosion that created them is actually relatively young geologically speaking.

Topography

Today, the Uwharries consist of a loosely defined, narrow chain of mountains approximately 46 km long between Badin and Asheboro in Stanly, Montgomery, and Randolph counties. As identified on USGS topographic maps, the northern end of this chain borders the eastern edge of the Uwharrie River and a major tributary, Caraway Creek, near Asheboro in Randolph County. The mountain range then crosses the Uwharrie River and, bordering the river's western edge in Montgomery County, eventually terminates near Badin in Stanly County at the river's confluence with the Yadkin. The Uwharries tend to range from 150–300 m in elevation and have hilly peaks, narrow ridge crests, and steep slopes; and they make up significant portions of both the Uwharrie National Forest and Morrow Mountain State Park (Figure 1).

Geology

The Albemarle-Asheboro area forms one of the best-known geologic regions of the Carolina Slate Belt (e.g., Butler 1986; Butler and Secor 1991, Conley 1962; Harris and Glover 1988; Milton 1974; Seiders 1981). Three geologic formations comprise the Uwharries: the Uwharrie, Tillery, and Cid formations (Butler and Secor 1991:Figures 4–5) (Figure 2).

The exact age and geologic relationship of some these formations have been the subject of recent debate, but they can be generally described as follows. The Uwharrie Formation, which is the oldest of the three, makes up the northern half of the Uwharrie Mountains. It is a complex arrangement of felsic metavolcanic rocks with lesser amounts of mafic tuffs and layered beds of reworked volcanic debris (Butler and Secor 1991:67–69).

The Tillery and Cid formations roughly divide the southern half of the mountain chain. The Tillery consists of laminated to thinly bedded metamudstone and argillite. The Cid Formation (at the southern most end of the chain), is also predominantly a metasedimentary sequence, although it does contain locally abundant metavolcanic rocks (Butler and Secor 1991:67–69).

While volcanic units constitute only a minor portion of both the Tillery and Cid formations, one such unit is of particular archaeological significance. This unit is Morrow Mountain Rhyolite which is present at a contact between the Tillery and Cid formations to the south and west of

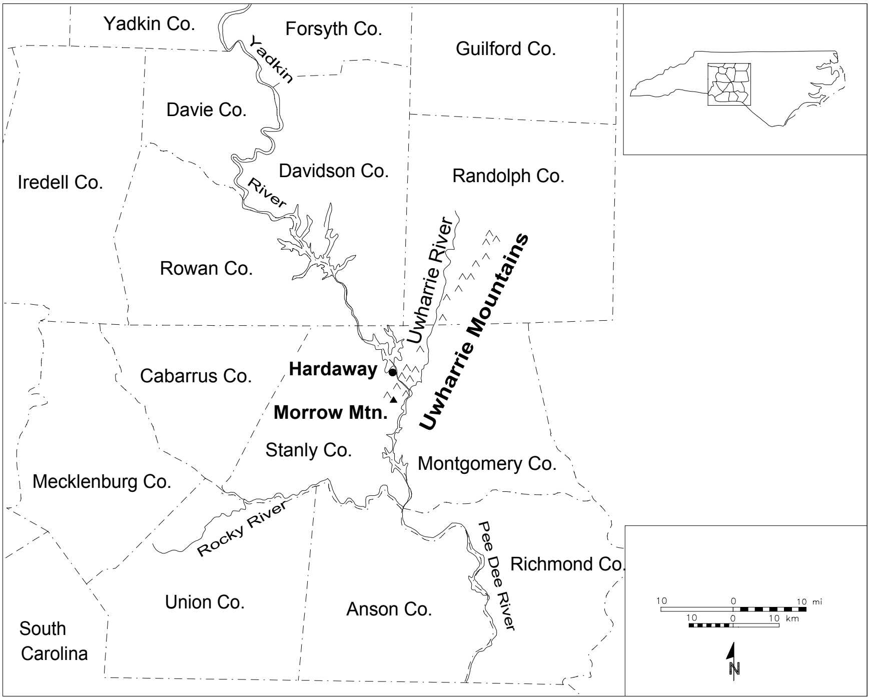

Figure 1. Location of the Uwharrie Mountains, Morrow Mountain, and the Hardaway site.

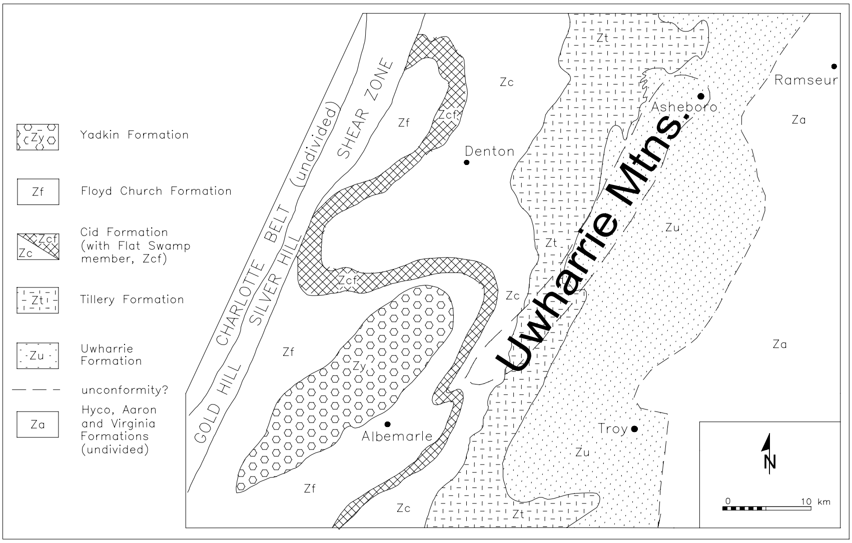

Figure 2. Uwharrie Mountains geology (adapted from Butler and Secor 1971:Figure 4.5).

the Hardaway site (Conley 1962:Plate 1). Although the rhyolite unit has been assigned tentatively to the upper Tillery Formation, its exact status with respect to the Tillery and Cid formations is still unresolved (Harris and Glover 1988; Milton 1984). Be that as it may, it forms the erosionally resistant mountain tops around Hardaway which were extensively mined prehistorically for raw material.

It should be noted that the term Morrow Mountain Rhyolite is used to describe a lithologic unit covering several mountains around Hardaway and is not restricted to Morrow Mountain itself (Conley 1962:Plate 1). Specifically, it refers to a series of mixed lava flows originating from several vents which produced an almost sheet-like deposit in the area. The relatively rapid cooling of this lava and the low-grade metamorphism of the region produced the rhyolite's good-to-excellent conchoidal fracture (Butler 1986; Conley 1962:15). More accurately, it should be called metarhyolite, but the term rhyolite is used here for the sake of simplicity.

The Hardaway site itself lies on Badin Greenstone, a significant lithologic unit within the lower Cid Formation, which is adjacent to and occasionally in contact with the Morrow Mountain Rhyolite unit (Conley 1962:Plate 1). As is the case with the rhyolite, this greenstone unit forms the erosionally resistant tops of other mountains in the vicinity. The final lithologic unit of importance in the area is argillite which is part of the Tillery Formation. Argillite underlies both the greenstone and rhyolite and forms the stream valleys for the Uwharrie and Pee Dee rivers (Conley 1962).

Survey Objectives and Methods

An initial examination of the Hardaway assemblage indicated that metavolcanic stone, primarily a rhyolitic flow, dominated raw material types. Moreover, given the density of stone debris in the assemblage, and our review of the previous geological and archaeological work (see below) done in the area, it seemed likely that the source or sources of this rhyolite would be relatively close to the Hardaway site. Thus, the objectives of this survey were to investigate the rhyolite outcrops and quarries known to exist in the area, locate any potentially unrecorded quarries, and gather data sufficient to determine whether any of these locations were the sources of stone seen in the Hardaway assemblage.

The survey strategy was fairly straightforward: rhyolite outcrops in the vicinity of Hardaway were identified using current geologic maps and then field checked for quarrying activity. The Hardaway site is located on the Albemarle 15-minute quadrangle, which was geologically mapped by Conley (1962). Our fieldwork was concentrated here where many large areas of rhyolite were mapped around Hardaway in the Uwharrie Mountains. Most of the rest of the Uwharries were mapped by Stromquist et al. (1971) and Seiders (1981). Burt (1967), Upchurch (1968), and Dover (1985) mapped smaller areas in the Uwharries.

All known rhyolite quarries in the area were also visited. Archaeological surveys in the vicinity of Hardaway included work in Morrow Mountain State Park (Hargrove 1989) and just across the river in the Uwharrie National Forest (Cooper and Hanchette 1977; Cooper and Norville 1978; Harmon and Snedeker 1988). This work recorded several quarries which we revisited in order to gather the data needed for this project.

Similarly, both professional and amateur archaeologists who were familiar with archaeological sites in the Uwharrie region were also interviewed. These informants included several members of the Uwharrie Archaeological Society who were particularly helpful in identifying a second area for survey near Asheboro.

The survey was conducted by the two authors in a truck and on foot, over a total of 20 days and primarily during the winter and spring months of 1990 and 1991. Specific areas surveyed are described below. All information from the survey, including fieldnotes, site location maps, and photographs, are on file in the Research Laboratories of Anthropology and the Department of Geology at The University of North Carolina at Chapel Hill. These data also include an extensive raw materials type collection housed in both locations.

Given the geological maps and dormant undergrowth, outcrops were fairly easy to locate. When an outcrop was encountered, rhyolite samples were collected for further analysis and a brief field description of its lithic characteristics were made. The objective here was to assess the variability exhibited by the stone archaeologists call "rhyolite" to see if the creation of different types was warranted.

If an outcrop was also utilized as a quarry, information on site size and degree of utilization, as well as stone type, was obtained. Usually vegetation was sparse enough that site size could be roughly estimated based on the stone remains present on the surface, although these estimates remain to be verified by more systematic survey. In some instances, however, surface remains of quarry debris was virtually continuous on mountain tops (e.g., Morrow Mountain) and no attempt was made to bound the site except by its geologic unit.

Although no subsurface testing was performed, an idea of site depth could be obtained at some locations from tree falls which uprooted lithic material. These were fairly common in the surveyed areas around Hardaway due to the recent (1988) winds of Hurricane Hugo. Specific instances of these occurrences are discussed below. A few flakes, and in some instances crude bifaces, were collected from each quarry but no attempt was made to collect systematically. No temporally diagnostic artifacts were observed at any of the sites.

In addition, we also surveyed (and collected rock samples from) outcrops that were not used prehistorically but are important to understanding the area's geology. Moreover, these samples helped differentiate the rhyolite that was used prehistorically from other similar stone in the area, as well as indicating where quarries were not located.

We began our survey by examining outcrops in the immediate vicinity of the Hardaway site. This was done to familiarize ourselves with the local geology and to determine if Conley's (1962) geologic map of the Albemarle region (including the southern Uwharries) adequately showed the locations of rhyolite exposures in the area. We checked contacts of geologic units where they were best exposed along the Yadkin River south of the Hardaway site and at spot locations throughout the area. We found only minor discrepancies in locations of the contacts, and no significant problems with the designations of lithologic units on the maps. Massive rhyolite suitable for flaking was found almost exclusively in the map unit with the symbol *ur* and described as "rhyolite and porphyritic rhyolite containing prominent flow-banding" (Conley 1962). This unit also correlated with the location of previously recorded quarries. None of the rhyolite mapped by Burt (1967) and Dover (1985) in parts of the Albemarle quadrangle is similar to the raw materials in the Hardaway assemblage and we found no likely quarries in those areas.

Specifically, we examined all major outcrops in the above mapped lithologic unit for evidence of quarrying. The vast majority of this rhyolite occurred in Morrow Mountain State Park in Stanly County, and in portions of the Uwharrie National Forest bordering the Yadkin River in Montgomery County; a minor amount of this unit also occurred on property of The Aluminum Company of America, Badin Works, just south of the Hardaway site. This resulted in a total of approximately 90 sq km around the Hardaway site being thoroughly driven or walked over. This proved to be a fruitful strategy as approximately 20 quarry sites were located and/or revisited and sampled for petrologic analysis (Figure 3).

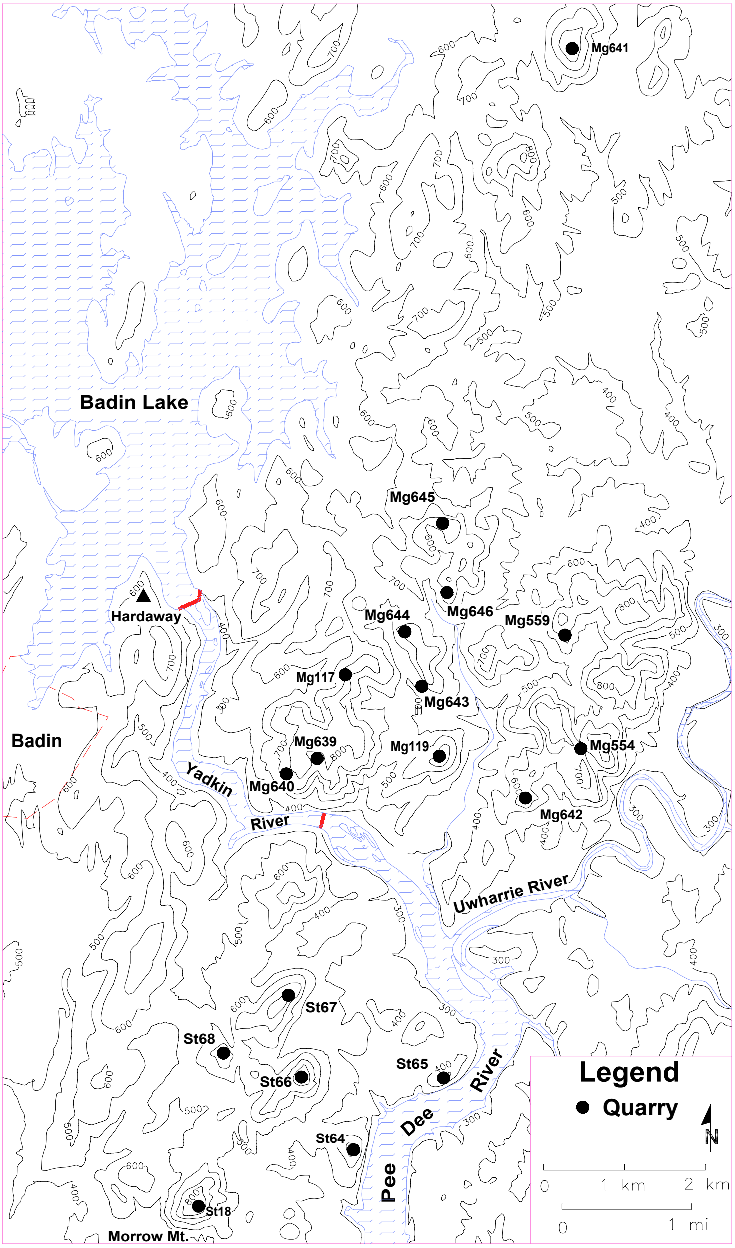

Figure 3. Quarry locations in the southern Uwharrie Mountains.

The results of our survey are discussed below. The southern Uwharrie area, containing most of the sources used by the inhabitants of Hardaway, is described first. This discussion is followed by a description of the sources located in the northern Uwharries.

The Southern Uwharries: Rhyolite Types and Site Descriptions

Rhyolite is a very fine-grained igneous rock that is composed mainly of quartz and feldspar, with minor amounts of accessory minerals such as biotite, hornblende, and iron oxides. Rhyolites are formed in a volcanic environment, either at or near the surface of the earth. Rhyolite is commonly porphyritic; that is, it has larger crystals (phenocrysts) in an aphanitic groundmass. Aphanitic refers to a grain size in which the crystals are too small to be seen with an unaided eye. We use the term sugary to refer to a rhyolite groundmass that is a fine-grained granular aggregate, slightly coarser than the usual aphanitic groundmass. In the Uwharrie Mountains, the phenocrysts in rhyolite are typically quartz or feldspar, 1–3 mm long, in a dark groundmass that is microcrystalline or cryptocrystalline. Aphyric rhyolite, which lacks phenocrysts and is entirely aphanitic, is rare in the Uwharrie Mountains.

The main Morrow Mountain Rhyolite unit mapped by Conley (1962) can be subdivided into distinct types based on color, grain size, and the presence or abundance of special features such as phenocrysts, flow-banding, and spherulites. In general, this rhyolite exhibits a fine-grained texture that exhibits a gray to grayish black color in fresh specimens. Upon weathering it develops a white chalky outer coating that in some cases reveals a distinct flow-banding.

Uwharrie Rhyolite can be subdivided into distinct types based on color, grain size, and the presence or abundance of special features such as phenocrysts, flow-banding, and spherulites. In general, this rhyolite exhibits a fine-grained texture and a gray to grayish black color in fresh specimens. Upon weathering, it develops a white, chalky, outer coating that in some cases reveals a distinct flow-banding. The nature and relative abundance of phenocrysts (or absence of phenocrysts in the aphyric variety) are particularly useful for subdividing the rhyolite as the presence or absence of phenocrysts corresponds to restricted areas of occurrence within the rhyolite unit around Hardaway, usually including one or two mountain tops.

The most consistent features for characterizing rhyolite types are those that relate to the original magma, such as the nature and abundance of phenocrysts, rather than to features formed during or after magma emplacement. For example, brecciation of lava or development of flow-banding takes place during emplacement of a volume of magma, but rhyolite breccia and flow-banded rhyolite still contain the same phenocrysts present in the bulk of the magma. There may be sporadic development of spherulites by devitrification of volcanic glass, or local hydrothermal alteration of rhyolite and formation of disseminated fine-grained pyrite. These are post-magmatic effects that may vary within one rhyolite body. Therefore, we have found that the most useful bases for subdividing this rhyolite are the nature and relative abundance of phenocrysts (or absence of phenocrysts in the aphyric variety). Color is fairly consistent in fresh samples from one rhyolite body, but can vary with incipient weathering.

The presence or absence of phenocrysts corresponds to restricted areas of occurrence within the rhyolite unit around Hardaway, usually including one or two mountain tops on both sides of the Yadkin River. Four basic rhyolitic types were identified: (1) aphyric, (2) plagioclase porphyritic, (3) quartz porphyritic, and (4) plagioclase-quartz porphyritic. These phenocrysts are disseminated in a fine-grained, sugary textured groundmass that is light to dark gray in color. Flow-banding is less pronounced, if present at all, among this group. An additional "miscellaneous" category of stone included sources of rhyolitic breccia, lapilli stone, and tuff. Virtually all of the prehistoric quarries were located in areas of each of the four rhyolite types; only two quarries—both of rhyolitic tuffs—were identified within the area of miscellaneous stone.

Each of the four rhyolite types has been named after the most prominent mountain with which it is associated. A general description of each type and its associated quarries follows.

Morrow Mountain Rhyolite (aphyric rhyolite)

The results of our survey and petrologic analysis indicates that the dark-gray homogeneous rhyolite that is so abundant in the Hardaway assemblage (Daniel 1994) was obtained almost exclusively from Morrow Mountain. As discussed below, rhyolite artifacts in the Hardaway assemblage are indistinguishable in both macroscopic and microscopic characteristics from geological samples obtained from Morrow Mountain (Figures 4, 5, and 6).

Hand Sample Description. This type is a dark gray, aphanitic, aphyric rhyolite, that commonly exhibits flow-banding, especially on slightly

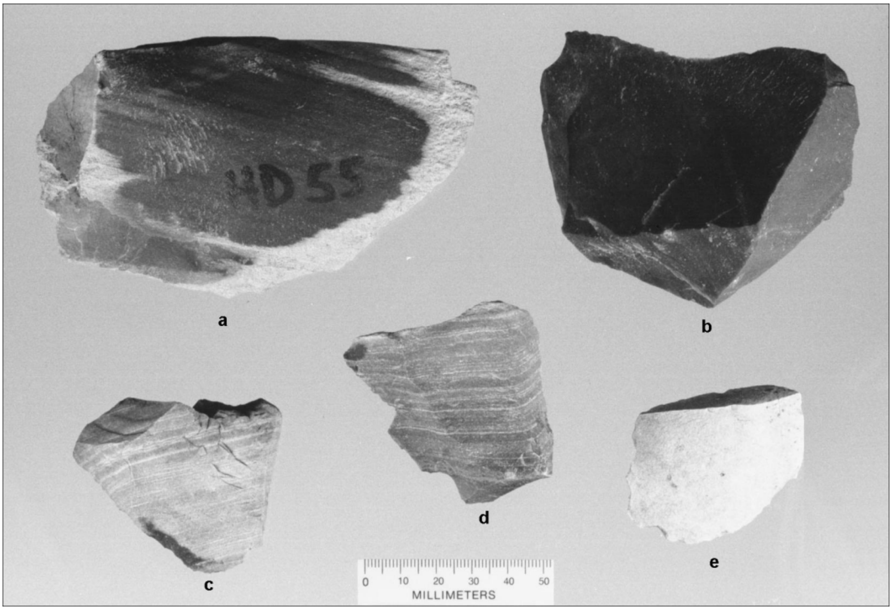

Figure 4. Aphyric rhyolite from Morrow Mountain: (*a–b*) geological specimens from Morrow Mountain; (*c–e*) artifacts from Morrow Mountain.

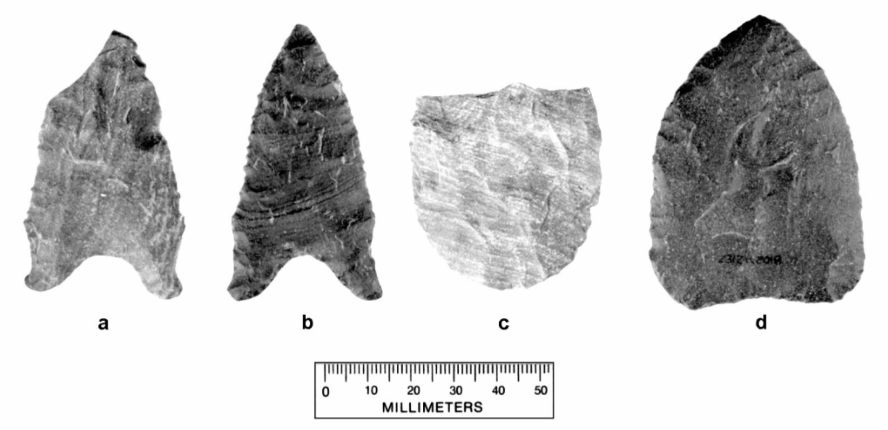

Figure 5. Aphyric rhyolite artifacts from the Hardaway assemblage: (*a–b*) Hardaway-Dalton points; (*c–d*) bifaces.

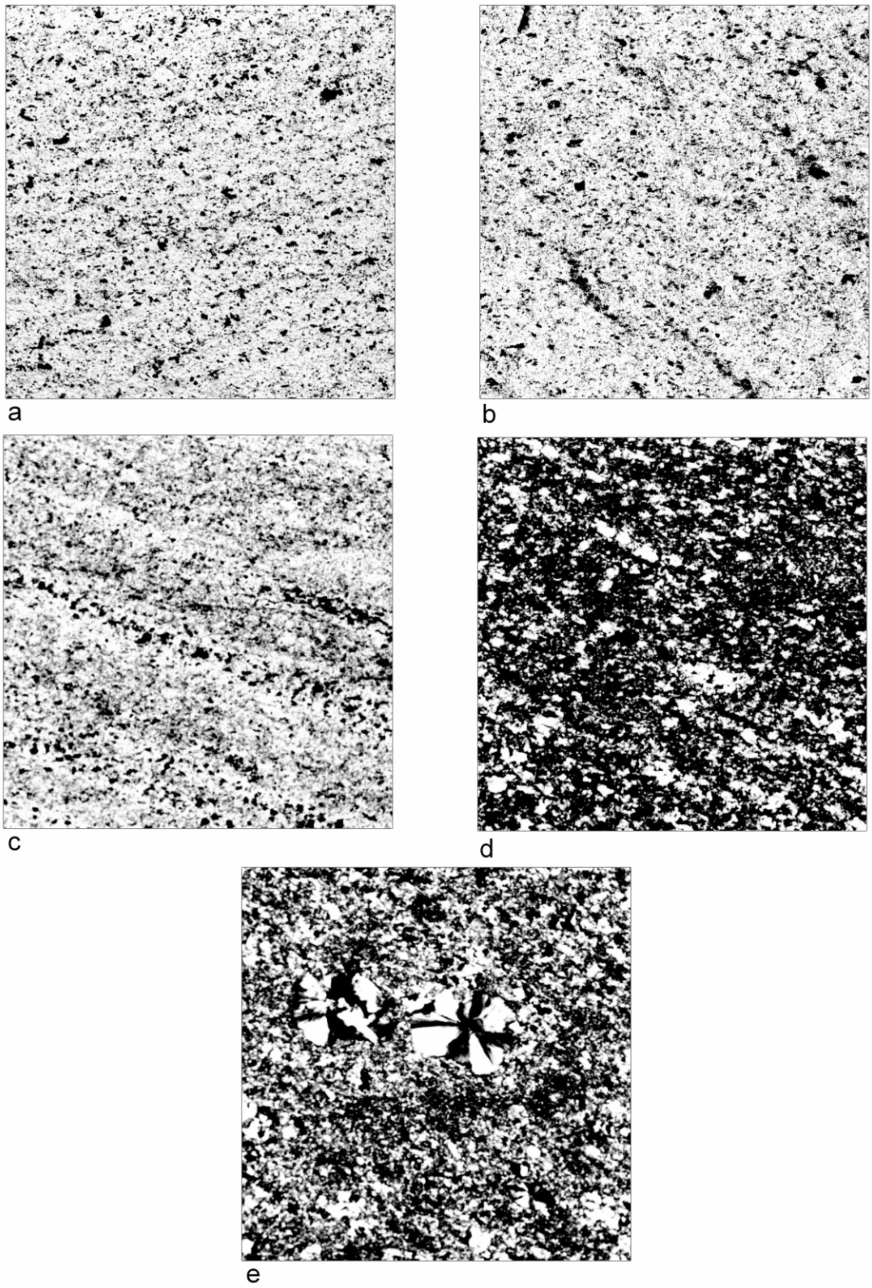

Figure 6. Photomicrographs of aphyric rhyolite thin sections: (*a*) flake, Hardaway site; (*b*) geological specimen, Morrow Mountain; (*c–d*) flow-banded artifacts, Hardaway assemblage; (*e*) spherulite in geological specimen from Morrow Mountain (note: *a–c* are plain polarized light, 40×; *d–e* are cross-polarized light, 40×).

weathered surfaces (Figure 4*c–d*). In some fresh rhyolite, however, flow lines are relatively inconspicuous (Figure 4*a–b*). When present, flow lines are generally very thin (i.e., only a few millimeters) and alternate in a pattern of light and dark gray. Some extremely weathered quarry debris from Morrow Mountain lack discernible flow-banding; these specimens exhibit an extremely chalky grayish-white exterior (Figure 4*e*). Although this rhyolite has a very homogeneous appearance, some specimens exhibit small spherulites (circa 1 mm in diameter) which appear as tiny patches of radiating fibers. These spherulites may occur in the absence of flow-banding (Figures 5*d and 6e*).

Thin Section Description. The texture is a microcrystalline intergrowth of feldspar and quartz, with minor biotite and chlorite (Figure 6). The individual minerals are difficult to distinguish. Flow banded samples have distinct layers less than 0.2 mm thick (Figure 6*c*). There are strings of dark minerals along some fractures.

Morrow Mountain, St18.[1] Morrow Mountain is clearly the most spectacular quarry identified in the Piedmont (Figure 7). It was first recorded in the Research Laboratories of Anthropology site files in 1958, although it was apparently known as an archaeological site for many years prior to that. Today, Morrow Mountain is the main feature of the State Park bearing its name. Quarry debris is present virtually everywhere on the mountain. In fact, rhyolite flakes and chunks are so dense that they literally form a pavement covering most of the summit and slopes.

Although Morrow Mountain has been known for decades, it has received very little systematic archaeological investigation. Recent investigations included a reconnaissance survey of about 162 ha of Park ground along with some surface collecting and limited excavations on Morrow Mountain (Hargrove 1989). This work indicated that the quarry encompassed the summit and slopes of the mountain as well as about 600 m of the narrow ridge extending north of the mountain (Hargrove 1989:18).

Despite the limited testing, over 30,000 artifacts were recovered. The assemblage contained mostly quarry debris quarry debris, as well as a few points spanning the Early Archaic through Woodland periods. Like Hargrove (1989:17), we were puzzled by the absence of visible rhyolite outcrops on the mountain's slope. This absence stands in contrast to every other mountain top we visited that exhibited at least small rhyolite boulders exposed on the ground surface. However, *in situ* beds are exposed in the bottom of a recent erosional gully present on the southeast side of the mountain. This gully is over three meters deep in some places

Figure 7. View of Morrow Mountain, looking southwest.

Figure 8. Erosional ditch on Morrow Mountain containing quarry debris: (left) ditch wall showing quarry debris; (right) close-up of ditch wall.

and exhibits virtually a continuous profile of flaking debris (Figure 8). Given slope steepness, colluvium is probably a contributing factor to the deep deposits; however, these deposits also probably are the remains of filled prehistoric pits dug (and redug) to expose rhyolite beds. Therefore, given the density of quarry debris on Morrow Mountain and the unlikely event that no surface exposure of rhyolite existed, it suggests that those surface exposures that were present on the mountain were completely exploited, leaving it necessary to quarry underground bedrock.

Tater Top Mountain, St64. Tater Top is one of the smaller mountains in the state park, with a very steep eastern slope immediately adjacent to the Yadkin River. The rhyolite unit occurs along the eastern slope and mountain crest. The evidence of quarry activity is less apparent here than with most other rhyolite-capped mountains visited during this survey. Evidence of rhyolite working is thinly distributed over the hilltop; the most obvious signs of quarry activity are present in the form of flaking debris on the north end of the mountain crest around several tree trunks.

The rhyolite from Tater Top and Morrow Mountain have been grouped because of their similar color, fine-grained texture, and lack of phenocrysts. Tater Top rhyolite, however, tends to lack flow-banding. In any event, it has a blocky rather than a conchoidal fracture, as revealed in our attempt to procure sample rock. This might at least partially explain the minor use of this rhyolite outcrop.

Discussion. Given the minor evidence for quarrying on Tater Top Mountain, it appears that Morrow Mountain was the primary source of the aphyric rhyolite in the Hardaway assemblage. Moreover, we reject the possibility that aphyric rhyolite was obtained from quarries along the Yadkin-Pee Dee River that are now covered by man-made reservoirs. Our field work confirmed Conley's (1962) map that shows the rhyolite occurring mainly at higher elevations in the area, on the middle to upper slopes and crests of the more rugged hills. We located numerous places where rhyolite on the upper parts of hills was in contact with argillite or basaltic tuff at lower elevations, consistent with Conley's map. The only type of rhyolite that extended below waterline in the survey area was the plagioclase-porphyritic rhyolite on both sides of the river in the vicinity of Falls Dam (see below). Therefore, it is possible that plagioclase-porphyritic rhyolite quarries were covered when water was impounded by the dam. All known outcrops of aphyric rhyolite, however, are well above the river and lake levels. Therefore, we conclude that it is unlikely that any aphyric rhyolite quarries were submerged when the dams were built.

Wolf Den Rhyolite (plagioclase-porphyritic rhyolite)

Two large mountains in the Uwharrie National Forest, near the eastern banks of the Yadkin River, contain the primary sources of this rhyolite: Wolf Den Mountain and Falls Mountain. Wolf Den Mountain encompasses most of the plagioclase-porphyritic rhyolite adjacent to the Yadkin River. It is a large mountain with a relatively flat and, in places, narrow ridge top that runs for almost 2 km. Three quarries were located on the mountain; given the size of the rhyolite unit, additional utilized areas may also be present. Falls Mountain, which lies to the east of Wolf Den Mountain, is much smaller and contained only one quarry. One other unnamed mountain, approximately 9 km to the north (near El Dorado), was also quarried for plagioclase-porphyritic rhyolite. Finally, some large outcrops of this rhyolite are also present on the west side of the river near Falls Dam.

Hand Sample Description. This is a dark gray to medium dark gray porphyritic rhyolite, with scattered white phenocrysts of plagioclase feldspar mostly less than 3 mm long in an aphanitic matrix. The phenocrysts rarely constitute more than 5% of the rock. At several localities, the rhyolite has scattered small crystals of fresh pyrite as much as 5 mm across; the crystals are surrounded by rims of whitish bleached-looking rhyolite.

With respect to previously existing raw material categories, the term "felsic tuff" used by many archaeologists corresponds to the plagioclase porphyritic rhyolite described here. Similarly, the category "porphyritic rhyolite" also used by many archaeologists corresponds to the plagioclase-quartz porphyritic rhyolite described below (see Novick 1978:427–428 for descriptions of "felsic tuff" and "porphyritic rhyolite").

Thin Section Description. Individual plagioclase crystals and clots of crystals occur in a microcrystalline matrix, mainly composed of feldspar and quartz, with some biotite (Figure 9).

Wolf Den Mountain, Mg117. This site was shown to us by U.S. Forest Service archaeologists Rodney Snedeker and Michael Harmon. The main portion of the site lies on the small cleared ridge crest on the north end of the mountain. Abundant porphyritic rhyolite flakes and some crude bifaces are scattered on the surface amid a few small rhyolite boulders, covering an area perhaps 200 m in diameter. Additional quarry debris extends just south of this area intermittently for about another 400 m along a gravel road. Again, cores and flakes are present among a few small porphyritic rhyolite boulders. A few tree falls also exhibit flakes in

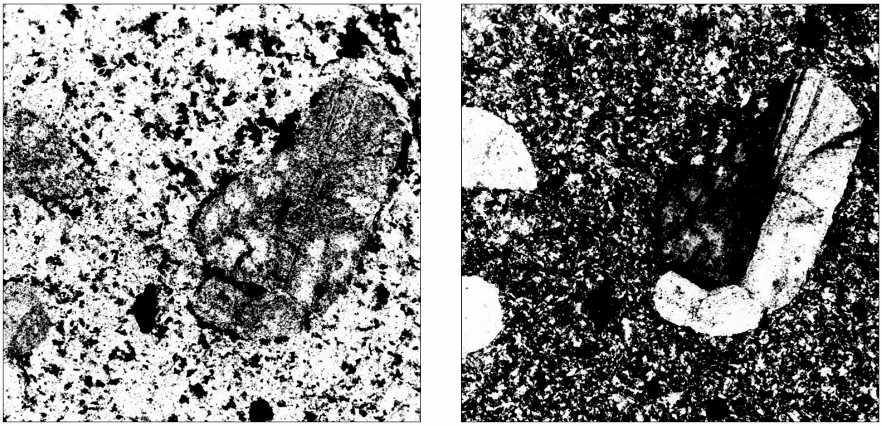

Figure 9. Photomicrographs of plagioclase porphyritic rhyolite thin section: (*a*) geological specimen from Falls Dam (plain polarized light, 40×); (*b*) geological specimen from Falls Dam (cross polarized light, 40×).

the soil clumped around their exposed roots. How far this material extends east of the road was not determined, but the edge of the crest lies less than 200 m away. Additional outcrops likely exist on the slope, although it was not surveyed.

Mg639. This site occurs on the south slope of Wolf Den Mountain above Falls Dam, between about 230 and 240 m in elevation. Small outcrops and sparse chunks of plagioclase-porphyritic rhyolite were scattered on the slope over an area of at least 100 × 50 m. Cores, chunks, and flakes were present among the outcrops and under leaf litter, although no attempt was made to determine if there was any depth to the cultural material. Many of the small boulders appear to have been split naturally, presumably as a result of freeze-cracking. Assuming that this process occurred prehistorically, it likely facilitated quarrying by providing smaller blocks of raw material suitable for cores.

Mg640. This probable quarry is topographically similar to Mg639. It is located on the south-facing slope of the mountain adjacent to its crest at about 240 m in elevation. Quarry debris is thinly scattered among small outcrops of porphyritic rhyolite present on the slope; however, numerous trees and dense leaf litter prevented an accurate estimation of both site size and intensity of use.

Falls Mountain, Mg119. Falls Mountain lies immediately east of Wolf Den Mountain and is capped by an extension of the same porphyritic rhyolite unit. The most obvious signs of quarrying we noted are present on the mountain peak which is small and flat. Here the mountain top has been cleared and is part of a hiking trail. Here also, flakes and rejected bifaces were fairly abundant in an area about 150 m in diameter. Again, several tree falls reveal flakes clustered in clumps of soil around exposed roots.

The possibility exists that only secondary reduction of material took place on the mountain top. This inference is based on the fact that very little large debris and only small rhyolite boulders were observed there. Presumably, the initial quarrying took place on the slopes, although we saw no clear evidence of this on our traverse across the mountain. Such evidence could have been missed, however, since we did not circle the entire mountain.

Mg641. This was another site was shown to us by U.S. Forest Service archaeologists who recorded it as part of a cultural resource assessment (Harmon and Snedeker 1988). Harmon and Snedeker (1988) described this as a larger but less intensively used quarry than Wolf Den. The quarry lies on an unnamed mountain about 1.5 km north of El Dorado at the northern end of the rhyolite range mapped by Conley (1962). A portion of the site has been disturbed by a recent logging road. Although rhyolite outcrops are spread at least 700 m along the western mountain slope, it is not altogether clear how much prehistoric quarrying actually took place here. That is, large angular chunks of fractured rhyolite are abundant among the outcrops but actual flakes and cores, which are typically present in the other rhyolite quarries, are rare (though one biface was recovered). If this fracturing of outcrops was the result of natural causes, we are at a loss to explain why it occurred so extensively here as compared to other mountain tops.

Mill Mountain Rhyolite (quartz-porphyritic rhyolite)

Only a single, relatively small occurrence of this porphyritic rhyolite was located during the survey.

Hand Sample Description. This rhyolite is characterized by a medium gray color, with sparse, glassy phenocrysts of quartz generally less than 1 mm across in an aphanitic sugary matrix. Very fine-grained, disseminated grains of pyrite are also present.

Thin Section Description. Scattered phenocrysts of quartz, generally less than 1 mm across, occur in a microcrystalline matrix, mainly composed of feldspar and quartz, with some biotite, chlorite, and disseminated pyrite (Figure 10).

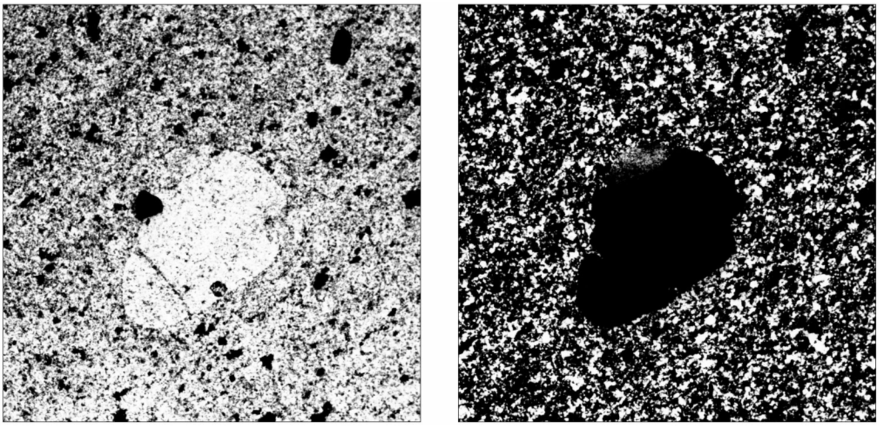

Figure 10. Photomicrographs of quartz porphyritic rhyolite thin section: (*a*) geological specimen from Mill Mountain (plain polarized light, 40×); (*b*) geological specimen from Mill Mountain (cross polarized light, 40×).

Mill Mountain, St65. Mill Mountain is one of the smaller rhyolite-capped mountains in the state park. It lies on the west bank of the Yadkin River just north of Tater Top Mountain. The entire rhyolite unit that covers the middle to upper slopes and crest of Mill Mountain exhibits extensive evidence of quarrying activity. Flaking debris litters the mountain slopes amid massive rhyolite boulders several meters in diameter. Uprooted trees also indicate deposits 20–30 cm deep in some places. The extensive flaking debris notwithstanding, only one small biface was recovered.

Although this rhyolite unit is much smaller in extent than most other rhyolite units in the park, it appears to have been as intensively utilized (if not more so) than any source excluding Morrow Mountain. This interpretation, however, may be biased by the greater surface exposure due to erosion. The mountain slope is very steep, particularly on the eastern side adjacent to the river, and this steepness is clearly promoting site erosion.

Sugarloaf Mountain Rhyolite (plagioclase-quartz porphyritic rhyolite)

Several quarries of this plagioclase-quartz porphyritic rhyolite are found on mountains on both sides of the Yadkin River. The primary outcrops of this rhyolite lie on Sugarloaf and Hattaway Mountains in

Morrow Mountain State Park and Shingletrap Mountain in the Uwharrie National Forest.

Hand Sample Description. This is a dark gray to light gray porphyritic rhyolite, with scattered phenocrysts of white plagioclase feldspar and glassy quartz, mainly less than 3 mm long, in an aphanitic matrix. Plagioclase phenocrysts are generally more abundant than quartz. Some specimens are flow-banded, and rarely disseminated pyrite is present.

Thin Section Description. Plagioclase and less common quartz crystals occur in a microcrystalline matrix, composed mainly of feldspar and quartz, with lesser amounts of biotite and chlorite. Some rocks have faint to distinct flow-banding. Disseminated, fine-grained pyrite is locally present (Figure 11).

Sugarloaf Mountain, St66. Sugarloaf Mountain (31St107) is another extensive mountain-top quarry. Hargrove's (1989:22) survey indicates that quarry debris is spread intermittently over the rhyolite unit that covers the mountain crest and upper slopes. We noted that quarry debris was most concentrated among rhyolite boulders on the mountain summit. We also observed the soil depressions mentioned by Hargrove (1989:22), which he interpreted to represent filled quarry pits. If these depressions are indeed pit remnants, Sugarloaf Mountain appears to be the only other quarry besides Morrow Mountain where subsurface bedrock was procured.

Hattaway Mountain, St67. The Hattaway Mountain rhyolite unit is part of an S-shaped rhyolite ridge that meanders through the Park for over 4 km. It begins on the summit of a small mountain just northeast of Hattaway and includes Sugarloaf and Morrow Mountain. The former two mountains are the primary sources of plagioclase-quartz porphyritic rhyolite we encountered on the west side of the Yadkin River.

Although the rhyolite ridge runs through the spine of Hattaway Mountain, quarry activity is not prevalent until the northeastern edge of the mountain crest is reached. Here, abundant rhyolite flakes are scattered amid clusters of numerous small rhyolite boulders. One tree fall on the summit revealed a deposit of flaking debris 10–20 cm thick.

St68. This site is located on an unnamed peak just south of Hattaway Mountain. Rhyolite flakes are thinly spread amid scattered small boulders along the porphyritic rhyolite unit that caps the mountain. The exact size of this site is unknown but it appears to be one of the lesser utilized quarry areas in the park.

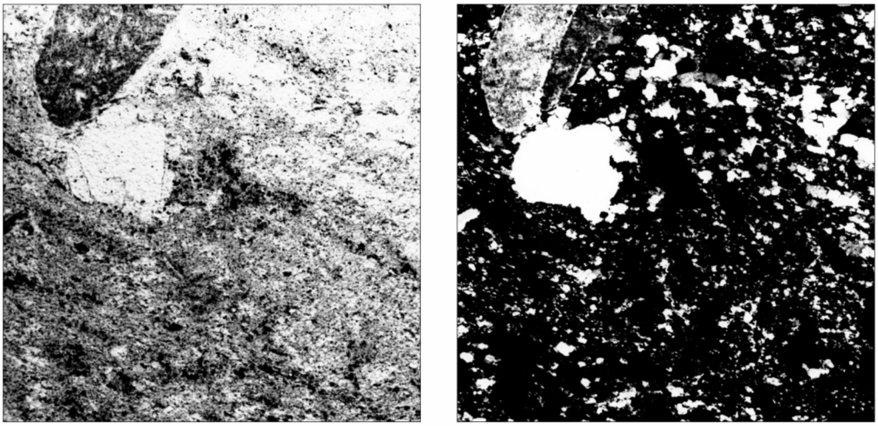

Figure 11. Photomicrographs of plagioclase-quartz porphyritic rhyolite thin section: (*a*) geological specimen from Mg559 (plain polarized light, 40×); (*b*) geological specimen from Mg559 (cross polarized light, 40×).

Shingletrap Mountain, Mg554. Shingletrap Mountain borders the western bank of the Uwharrie River and is a major source of plagioclase-quartz porphyritic rhyolite in the Uwharrie National Forest. The mountain slopes are steep with small to medium-sized rhyolite boulders and three relatively flat, narrow ridge tops. Although the entire mountain appears to have some evidence of quarry activity, we have delineated the two most intensively utilized areas. These include the southeastern and northwestern ridge tops and slopes. Again, although site distinctions have been made on physiographic differences, artifact distribution is almost continuous on the mountain top. For instance, a third ridge top to the south also displayed some evidence of quarry use.

The extensive nature of the quarry debris on Shingletrap Mountain presents a good example of the problem presented in trying to define site boundaries on many of these rhyolite-capped mountains. The Research Laboratories of Anthropology site files has at least five sites recorded on Shingletrap mountain (Mg554, Mg555, Mg557, Mg558, Mg568, and Mg570), which range in size from 4,500 sq m to 9 ha. However, one could easily define the whole mountain as a quarry. In such cases, it may be more practical to define a "site" initially based on its geologic unit with "subareas" within the unit being defined as more concentrated areas of use.

Each of these ridge tops is relatively large and level, particularly the northwestern one where large tree falls revealed the presence of a "flake midden" at least 10–20 cm thick. Quarried material extends intermittently across the ridge tops for several hundred meters. Several rejected bifaces also were present among the quarry debris. Moreover, it was our impression that these ridge tops contained smaller flakes and fewer outcrops that contrasted with the relatively larger and more numerous boulders, chunks, and flaking debris present on the slopes. Thus, as with several other quarried mountains, the more level ridge tops may have been stone-processing areas while initial quarrying took place on the mountain slopes.

Mg642. This site is also related to the extensive outcrops on Shingletrap Mountain. It lies on a southwest trending ridge top that is about 150 m lower in elevation than the rest of the mountain. A motorbike trail follows the ridge top along small to medium-sized outcrops of porphyritic rhyolite. Sporadic and small-scale quarrying can be observed along portions of the ridge, and it appears somewhat more concentrated at the southern peak and portions of its slope for perhaps 100 m.

This same rhyolite unit continues for almost 1.5 km onto the next hill to the southwest near the confluence of the Yadkin and Uwharrie Rivers. In a saddle about 250 m southwest of the above peak, however, there is an abrupt contact. Here the rhyolite changes markedly from a dark gray porphyritic stone to a sugary, non-porphyritic variety that is light gray to pinkish gray in color. There is no evidence of quarrying among this rhyolite, which outcrops much less frequently than the porphyritic variety.

Mg559. This site was discovered by observing quarry debris on a mountain slope while driving one of the roads in the National Forest. It is located on an unnamed mountain just north of Shingletrap Mountain. The rhyolite unit containing the site begins at about 180 m in elevation and continues to the crest at 240 m. The western slope and crest of the mountain exhibit numerous rhyolite boulders with scattered concentrations of flakes and chunks. Particularly extensive concentrations of quarry debris are present along the southwestern slope and crest. This debris extends along the slope for about 500 m at the base of the rhyolite unit. This site encompasses Mg559, as listed in the Research Laboratories of Anthropology site file, which appears to be smaller than our survey indicates. Of interest, however, is that a Savannah River point base was listed among the recovered artifacts from this site.

Virtually no quarrying activity was seen beyond the western crest of the mountain. This is despite the fact that numerous rhyolite outcrops extend beyond the mountain top virtually all the way to the Uwharrie River approximately 1.5 km to the east. The absence of quarrying there is likely due to its inferior flaking quality. This judgment is based on the irregular, hackly fracture the stone exhibited as we sampled outcrops along the mountain top to the river. Moreover, the hackly fracture is likely attributable to a marked increase in quartz phenocrysts in this portion of the rhyolite unit. This frequency change is most noticeable in a saddle to the northeast of Mg559. Presumably a geologic contact exists there.

This same quartz-rich porphyritic rhyolite unit extends to the next mountain across Gold Mine Branch immediately to the south. Likewise, abundant unused porphyritic rhyolite outcrops were seen there as well.

Mg643. This quarry was shown to us by U.S. Forest Service archaeologists. It is located on the mountain just east of a tributary that flows into Dutch John Creek. Numerous large porphyritic rhyolite boulders and quarry debris occupy the steep southwest flank of the mountain slope. This is one of the few places where rhyolite can be found at the base of the mountain and where boulders are present in the adjacent tributary. Worked material extends along this drainage for approximately 200 m and up to the top of the hill. Based on our determination, this would encompass two previously recorded sites: Mg260 and Mg261.

Although this rhyolite was generally similar in color and texture to the other porphyritic rhyolites, one unusual color difference distinguishes it from our other samples. Some rocks displayed irregular zones or streaks of a pale olive color that graded into the more usual dark gray groundmass. It is possible that these green streaks may serve as a color attribute unique to this location.

Mg644. This site is located on the northernmost peak of the same mountain that contains Mg643. While rhyolite outcrops are fairly continuous across the mountain top, quarry activity is basically confined to an area about 100 m in diameter on the south-facing slope of its north peak. This site was unusual in that it contained numerous large rough bifaces, although the significance of this observation is uncertain.

Rhyolitic Tuffs

The term tuff refers to an alternative form of volcanic deposition. Volcanic eruptions can expel material as magma, as in the case of rhyolitic flows mentioned above, or as ash and dust as in the case of rhyolitic tuffs. The tuffs seen in this study, both in the Hardaway assemblage and at quarries, were variable in color and texture. This variability includes several shades of green to light gray and both fine and somewhat coarse-grained stone. The heterogeneous nature of these tuffs suggest they came from several source locations. Some examples resemble rhyolitic tuff sources identified in the northern Uwharries near Asheboro, while others do not. Nevertheless, these other sources probably lie within in the Carolina Slate Belt.

The following two sites are the only rhyolitic tuff quarries we located among the rhyolite units in the southern Uwharries. In fact, they are the only quarries present on a large (about 3 km long) rhyolite unit located on an unnamed mountain just north of Wolf Den Mountain. The relative absence of quarries on this as well as another similar-sized rhyolite unit to the north is probably due to the more heterogeneous composition of their rhyolite bodies. Our survey indicates that rhyolitic breccia and porphyritic rhyolite comprise most of these units, with a lesser amount of tuff present only on the southernmost mountain. Only the tuff outcrops showed any evidence of quarrying.

Similarly, rhyolitic breccia, tuffs, and porphyritic rhyolite make up the majority of about one dozen small island-like rhyolite bodies scattered across several nearby mountain tops bordering the east side of Badin Lake. These are generally small outcrops of poor-quality stone and we saw no evidence of quarrying among them.

Mg645. This quarry lies on the north slope of a U-shaped ridge that forms the mountain crest. It is a small but intensively worked area of small to medium-sized tuff outcrops that are cut by a trail bike path. Small chunks and flakes extend along this path and further up the slope almost to the mountain summit, covering an area perhaps 100 m in diameter. Some sporadic evidence of quarrying also extends along the path on the east side of the ridge.

Hand Sample Description (Mg645). This stone is a dark gray, sugary tuff that weathers to a chalky grayish white. It is generally homogeneous but exhibits scattered, patchy, olive-green "splotches" (somewhat similar to Mg643) of varying sizes and shapes. Although subtle, they are even apparent on weathered surfaces.

Mg646. This site is a series of small, quarried tuff outcrops located about 1 km south of Mg643. A moderate amount of flaking debris is scattered for about 100 m along a path between two knolls near the southern tip of the mountain ridge. This material has a somewhat hackly fracture which likely accounts for its only moderate exploitation.

Of particular interest is another concentration of flaking debris, apparently of the same material, less than 50 m to the east of this site. Topographically, this area is a small spur located just below the ridge top where Mg646 is situated. Much of this spur is fairly level ground that offers a good panorama of Moccasin Branch and the landscape to the east. Rather than a quarry, the presence of small flaking debris, particularly numerous bifacial retouch flakes coupled with the absence of any stone outcrops, suggests a workshop associated with Mg646.

Hand Sample Description (Mg646). This stone is a black to dark gray homogeneous tuff that is otherwise nondescript. Given its color and the absence of phenocrysts, this stone is somewhat similar in appearance to Morrow Mountain rhyolite, some 8 km to the south. It also displays some flow banding which is particularly noticeable on weathered specimens. The band widths appear thicker and somewhat more irregular than those on Morrow Mountain rhyolite, although this distinction may be very subtle. Despite the macroscopic similarities, this tuff is clearly discernible from Morrow Mountain rhyolite in thin section.

The Northern Uwharries: Lithic Types and Type Descriptions

Our attention was drawn to this area by members of the Uwharrie Archaeological Society who were aware of several stone sources in the vicinity of Asheboro, about 38 km north of Badin (Figure 12). Here, our goal was to compare the sources around Asheboro with those around the Hardaway site. Initially, an opportunistic survey strategy was adopted, relying mostly on local informants to point out quarries. We had hoped to find a pattern in the location of quarries and mapped geologic units that could provide a basis for more systematic survey such as was done around Hardaway. As it turned out, such a pattern could not be found.

Unfortunately, the Asheboro area has only been mapped in general (mostly felsic or mafic) units (Seiders 1981). Most of these units are tuffs that for our purposes appear to be variable. Moreover, none of these units could be correlated with the rhyolite units that exhibited quarries to the south; nor was it readily apparent which felsic or mafic locations might contain potentially knappable stone. For example, an area including Shepherd and Caraway mountains northwest of Asheboro is mapped in the same unit: a light to dark gray felsite, parts of which contain phenocrysts. As will be discussed below, we found a plagioclase-

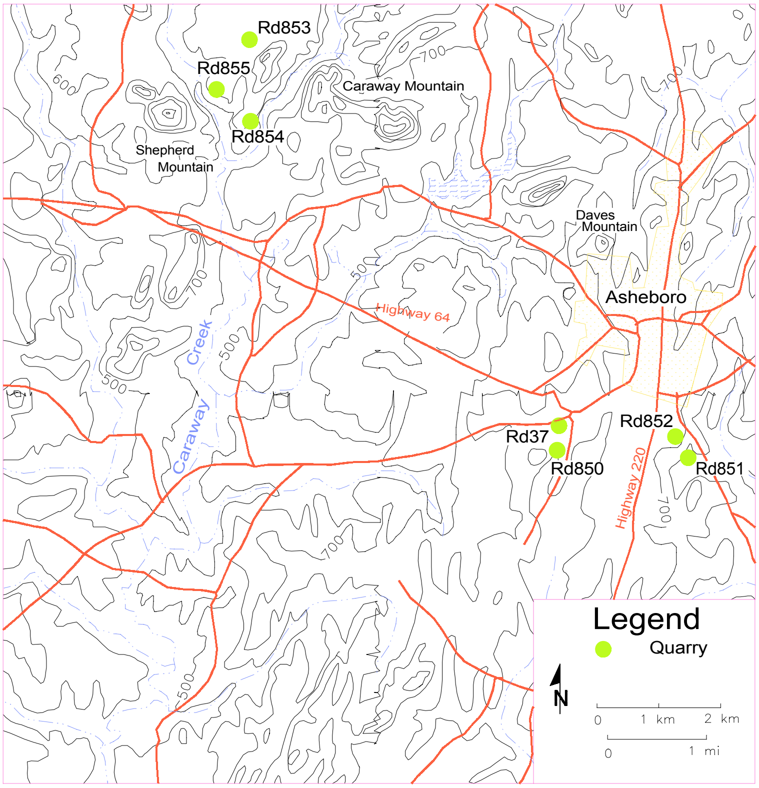

Figure 12. Uwharrie Formation quarries and other outcrops near Asheboro.

porphyritic rhyolite on Shepherd Mountain and a fine-grained granite on Caraway Mountain. Neither stone appeared to have been quarried. The hill immediately adjacent to Shepherd Mountain, however, featured a porphyritic rhyolite that was intensively exploited (see Figure 12). In short, unlike the Albemarle region to the south, the Asheboro geologic map provided little structure on which to base a quarry survey.

Therefore, our survey strategy simply consisted of visiting a specific quarry identified by an informant and then surveying the adjacent area for additional exposures or quarries. In this manner we recorded seven quarries around Asheboro. All but one were rhyolitic metatuffs, more commonly referred to as tuffs. Some of these might have been the source of the tuffs in the Hardaway assemblage; our uncertainty is due to the more variable nature of the tuffs and their widespread distribution around the northern Uwharries. Only general descriptions of these lithic sources are presented here; no formal type names are offered yet. First, we describe four quarries located within the Uwharrie Formation, followed by three sources identified within the Tillery Formation.

Uwharrie Formation Quarries Near Asheboro

Rd37. At least one area of quarrying was noted here and others might have been present prior to extensive earth-moving activities which have taken place over the past several years. Specifically, this area is located in southwest Asheboro along the south side of N.C. 49, just about one kilometer west of the intersection of U.S. 64 and N.C. 49. As such, it is situated on the eastern edge of the Uwharries. Although recorded in 1969, no information was noted beyond the fact that much flaking debris was present and no projectile points were recovered.

Since this time the area has undergone extensive modification as a result of borrow activities and most recently building construction. It is unknown how much of this earth moving has resulted in site destruction; however, the only remaining evidence of any quarry activity that we noted was present on a cleared hilltop just east and northeast of the borrow pit. Here, much debitage was concentrated along the hill slope and part of the southern crest of the hill. Additional flaking debris was also scattered along the hilltop to the north. Although we noted some exposures of this material—a dark gray metarhyolite—along the slope, these outcrops appeared to be recently exposed. Presumably the exposures exploited prehistorically were removed as a result of borrow activities. What natural outcrops we did observe on the hilltop, however, were mostly highly variable exposures of rhyolitic lapillistone and breccia that would not have been suitable for flaking.

Rhyolitic lappillistone and breccia were also observed in large roadcut exposures along the southeast side of N.C. 49. The most homogeneous rock was an aphyric, bluish-gray metarhyolite flow or dike. Flow banding, as well as the presence of small, oval, white calcite patches, is variable in hand specimen. We saw no evidence that this stone was quarried prehistorically and our sampling of outcrops suggests it has more of a blocky than a conchoidal fracture. Nevertheless, this stone cannot be entirely eliminated as a potential raw material source.

The dark gray metarhyolite, and to a lesser extent the bluish-gray metarhyolite flow or dike, could potentially be confused with the rhyolite from Morrow Mountain. The former sample, like Morrow Mountain rhyolite, is a dark gray, fine grained, non-porphyritic stone that is classified as an aphyric garnite-biotite metarhyolite flow or dike. Most of the material we observed, however, did not exhibit flow banding in hand specimen, although it was present to some degree. Nevertheless, this stone is distinctive from Morrow Mountain rhyolite in thin section.

Similarly, the latter sample is also classified as an aphyric garnite-biotite metarhyolite flow or dike, and also can be distinguished from Morrow Mountain rhyolite in thin section. Moreover, it can also be distinguished in hand specimen somewhat in color (a lighter gray) and texture (some portions of the outcrop were even more fine-grained than Morrow Mountain rhyolite). Perhaps the most distinctive characteristic, though, is the presence of white calcite patches, although their presence can be quite variable.

Rd850. This site was found while surveying the hilltops near the borrow pit described above. It is located on the southern toe of a ridge top just southeast of the borrow area. At the time of the survey quarry debris was scattered along a slight slope and apparently confined to two or three recently cleared adjacent lots where new houses were being built. A particularly dense concentration of quarry debris—including numerous bifaces scattered among some small outcrops—was noted in one lot. It was apparent that grading and construction had done considerable damage to the site.

This stone is a lithic crystal tuff that is a bluish-gray in color with a very sugary texture that weathers to a chalky greenish-yellow.

Hillcrest Stables, Rd851. This site was located through the help of Mike Murrow of Asheboro; it occurs on private property in the southeast portion of the city off of N.C. 159. Although this site is in the Uwharrie Formation, it is about 3 km east of the edge of the Uwharries and does not appear to have been a major stone source.

The site consists of flaking debris exposed for about 30 m in a road cut along the southeastern face of the hill slope. In particular, flaking debris was several tens of centimeters thick, exposed in a ditch along the road. Although some apparent outcrops were present along the road, the exact nature of the site was difficult to determine since it has been disturbed by grading as well as the periodic visits by local knappers who mine this material. This stone is a rhyolitic metatuff that is mostly light green in color but can vary from dark gray to brown; it also has a variable texture from fine-grained to very fine-grained.

Northampton Road, Rd852. These worked outcrops were found as we surveyed the slope of the hill above Hillcrest Stables. The site occupies a portion of a hill crest which is actually a south-projecting, finger-like ridge, approximately 200 m up slope from the quarrying at Hillcrest Stables. The site lies in an undeveloped, slightly wooded area adjacent to some residences on Northampton Road. A minor amount of quarry debris is spread over a few tens of meters amid low-scattered tuff outcrops on the west side of the road, which runs along the eastern edge of the ridge top. A power-line right-of-way also runs through a portion of the outcrops. However, it does not appear that the houses or power line have had much impact on the site.

This stone is light gray in color with a very sugary texture and is classified as a crystal-lithic metatuff.

Tillery Formation Quarries Near Asheboro

These following three quarries were shown to us by John Arsenault of Asheboro. All are within 2 km of each other and are situated on the eastern edge of the Tillery Formation about 7 km west of the Uwharries.

Pierce Mountain, Rd853. This site is located in a pasture on the southwest slope of a low hill about 2 km west of Caraway Creek, just south of State Road 1539. A small amount of flaking debris is associated with very low outcrops of rhyolite, and there are some shallow depressions about 1–3 m in diameter. While these may be filled-in pits resulting from prehistoric quarrying, they more likely are related to former gold prospecting since an abandoned gold mine lies in a gully to the south.

Although this material resembles the plagioclase-porphyritic rhyolite from the southern Uwharries, it actually is classified as a crystal-lithic metatuff. This stone is gray in color and contains plagioclase crystals that can be seen in hand specimen, though their presence is sparse. These may be clasts rather than phenocrysts, which distinguishes this material in thin section from the porphyritic rhyolites to the south. The presence of a more sugary groundmass as well as numerous disseminated small pyrite—which leaves leached square to rectangular voids in weathered specimens—serve to distinguish this stone in hand specimen as well.

Rd854. This is another relatively minor quarry located on a low north-trending ridge about 2.5 km south of Rd41, on the west side of Caraway Creek. Here, low outcrops and flakes are spread intermittently across the ridge top for about 200 m. As with the outcrops from Rd41, this material has been identified as a crystal-lithic metatuff and is also similar in hand specimen to the sample from Rd41.

Tater Head Mountain, Rd855. Tater Head is a local name for a small mountain located on the east side of Little Caraway Creek across from Shephard Mountain, about 23 km northwest of Asheboro. This is the most intensively quarried source we encountered in the Asheboro area. Massive porphyritic rhyolite outcrops are present on the southwest slope of the mountain just above the creek. A dense layer of quarry debris can be seen in the cut of an old logging road, just above the outcrops. The exact size of the quarrying was hard to estimate due to dense leaf-litter cover at the time of our visit; however, it is likely that it is present on most of the southwest flank of the hill, if not a larger area.

The stone at this quarry is classified as a slightly altered and pyritized plagioclase-porphyritic rhyolite. It is similar in hand specimen to the plagioclase-porphyritic rhyolite found to the south: it is medium dark gray in color and has a very fine sugary textured groundmass with plagioclase phenocrysts and small pyrite inclusions. Weathered specimens tend to be a mottled grayish white with small voids marking the presence of leached pyrite. The greater abundance of pyrite relative to the plagioclase, however, might tend to distinguish this stone in hand specimen from the porphyritic rhyolite to the south. Regardless, the pyritized nature of this stone also distinguishes it in thin section.

Other Outcrops Near Asheboro

Finally, three other mountains near Asheboro were surveyed whose outcrops did not exhibit any evidence of prehistoric quarrying: Shepherd Mountain, Caraway Mountain, and Daves Mountain. The first two mountains lie northwest of the city on the eastern edge of the Tillery Formation while the last is located in northwest Asheboro on the western edge of the Uwharrie Formation.

Shepherd Mountain is the most prominent mountain along Little Caraway Creek. Numerous porphyritic rhyolite outcrops can be seen along a dirt road up the southern flank, although no definite evidence of quarrying is present here or on the mountain summit. It is a plagioclase-porphyritic rhyolite with disseminated pyrite similar to that found at Rd42. Our attempts to obtain rock samples indicate that it does not have a conchoidal fracture which would explain its apparent lack of use.

Caraway Mountain is another large mountain located about 3 km east of Shepherd Mountain. A survey of its three peaks and portions of its slope revealed massive stone outcrops but no evidence of quarrying. This stone is classified as a plagioclase-porphyritic felsic granophyre (i.e., fine-grained granite). Again, the absence of a conchoidal fracture probably precluded this material's use.

Daves Mountain occurs at the northern tip of the Uwharries and is in a heavily developed section of the city. The numerous residences made locating exposures more difficult, but from the outcrops we did see it is unlikely that this stone was used prehistorically. The stone here is a densely plagioclase porphyritic rhyolite with a blocky fracture. Its abundant phenocrysts probably contribute to this characteristic.

Summary and Discussion

The Uwharrie Mountains are of particular significance to the archaeology of the North Carolina and the Southeast. Through fortuitous geologic events, a series of outcrops which contain stone suitable for knapping are clustered at the southern end of the Uwharries in a rhyolite unit tentatively assigned to the Tillery Formation (Milton 1984). Consequently, it is no coincidence that the Hardaway site is located in the midst of these bedrock outcrops. In fact, we recorded approximately 20 quarries associated with this formation and, with a single exception, all lie within an 8 km radius of the Hardaway site. Eighteen of these quarries could be divided into four macroscopically distinct metarhyolite types (including the distinctive aphyric flow-banded rhyolite from Morrow Mountain), while the remaining two quarries are classified as rhyolitic tuffs.

Implications for Raw Material Use During the Early Archaic

The results of this survey tend to confirm archaeologist's impression that this region once served as an important source of the high-quality microcrystalline to cryptocrystalline metavolcanic stone so often observed in lithic assemblages across the Piedmont. In fact, about 70% of all Early Archaic artifacts studied by Daniel (1994:146–152) from the Hardaway site were made of Uwharrie Rhyolite. Similarly, an examination of some 3,000 Early Archaic projectile points from collections across the Piedmont and along the Yadkin-Pee Dee River indicates that the Uwharrie Mountains were *the* major stone source during the Early Archaic period (Daniel 1994:222–244).

Most of the stone in the Hardaway assemblage, however, appears to be from a single quarry—Morrow Mountain—located just 8 km to the south. Morrow Mountain also happens to be the largest and most extensively quarried source currently known in North Carolina. The focus on Morrow Mountain as a rhyolite source is all the more interesting in that more abundant and somewhat closer outcrops of porphyritic rhyolites, some of which show fairly extensive signs of use, were largely ignored by the inhabitants of the Hardaway site. Presumably, this preference for Morrow Mountain rhyolite was due its superior conchoidal fracture.

A significant implication of this preference is the likelihood that a temporal difference exists in the use of rhyolite quarries. That is, during the Early Archaic period (and presumably the Paleo-Indian period as well), Morrow Mountain was the primary Piedmont stone source, while the use of the more abundant porphyritic rhyolites did not become widespread until after the Early Archaic period. Preliminary support for this can be found in Coe's (1964:35–44) comments that porphyritic rhyolite was the primary raw material used for the manufacture of the Middle Archaic and Late Archaic stemmed points from the Doerschuk site. Although we have no quantified data to support such a view, our distinct impression from examining numerous collections is that this pattern of raw material use holds for Middle Archaic and Late Archaic projectile points across the Piedmont.

Presuming that porphyritic rhyolites are inferior in quality to Morrow Mountain rhyolite and that a temporal difference did exist in quarry use, it raises the question of why such a shift occurred. Perhaps the use of porphyritic rhyolite was precipitated by the over-exploitation of the outcrops on Morrow Mountain. In this context, the absence of significant outcrops on Morrow Mountain (and the suspected underground quarrying of stone there) may be significant. Over time, the preferred quality of Morrow Mountain rhyolite may have been offset by the difficulty in acquiring it compared to the readily available porphyritic rhyolite outcrops. In any event, the prospects are tantalizing and worth further consideration.

By comparison, the metavolcanic sources we found in the Uwharrie and Tillery Formations around Asheboro were much smaller and generally less intensively exploited than the sources around Hardaway. These sources were primarily rhyolitic tuffs which are distinguishable in thin section, if not in hand specimen, from the rhyolites to the south. Although they can be distinguished as a group from the sources to the south, further work needs to be done before these tuffs can be divided into types such has been done for the rhyolites around Hardaway. And while these Asheboro sources may be the point of origin of some of the tuffs in the Hardaway assemblage, further work needs to be done to verify this possibility.

Part of the difficulty in distinguishing among tuffs may be related to their widespread distribution. Given the results of our survey around Asheboro and what we know about the geology of the Uwharrie Formation, it is likely that additional tuff beds were mined around Asheboro. However, how many of these were exploited during the Early Archaic period remains to be seen.

Nevertheless, the possibility of other metavolcanic stone quarries, both in the Uwharries and beyond, needs to be addressed. For example, a number of "lithic scatters" have been recorded in the central Uwharries on Cooler Knob and Cedar Rock Mountains. These mountains were surveyed some 15 years ago. Descriptions of this work are sketchy, but at least two sites (Rd346 and Rd349) are listed as porphyritic stone quarries on Cedar Rock Mountain. Unfortunately, no details concerning the type of porphyritic stone is given, but both mountains are geologically mapped as felsite lithologic units that contain varying sizes and amounts of plagioclase phenocrysts commonly accompanied by quartz (Seiders 1981).

Even though this area needs to be reevaluated in light of our current work, it is doubtful if it was exploited during the Early Archaic period. As documented by Daniel (1994), Early Archaic projectile points made of porphyritic rhyolite are very rare. Moreover, the area around these sites produced only later points: one Savannah River point was found at Rd349, and numerous Kirk Stemmed, Guilford, and Savannah River points were recovered elsewhere on the two mountains. No mention of any Early Archaic points was made on the site forms.

Admittedly, much of the central portion of the Uwharrie Mountains lies within the Uwharrie Formation and remains to be surveyed. Because this region is mapped in the same Felsite unit as Cedar Rock Mountain, quarry sites might exist. If they do exist, however, they were probably not were used during the Early Archaic period. Recall that Daves Mountain, near Asheboro, is similarly mapped and contains a densely porphyritic rhyolite that was unsuitable for tool manufacture.

Elsewhere in Montgomery and Randolph counties, east of the Uwharries, a cultural resource survey of eight tracts of National Forest land totaling over about 690 ha was recently undertaken (Walling et al. 1992). Among these tracts only one quarry (31Mg906) was found in the

Uwharrie Formation just south of Troy. This site, located on a ridge just west of the Little River about 24 km southeast of Hardaway, was revisited during the present survey and rock samples taken for analysis. Here, scattered float boulders and rare small tuff outcrops and artifacts are intermittently scattered for a few hundred meters along a ridge crest. Walling also recovered several bifaces in various stages of reduction, including one Savannah River point. This stone can be classified as a rhyolitic metatuff which appears to be similar in nature to the other tuff sources around Asheboro.

Finally, we have also done reconnaissance elsewhere in the Slate Belt, assessing the potential for metavolcanic quarries outside the Albemarle-Asheboro region. This fieldwork included inspection of some additional areas identified as rhyolite by Conley (1962) that are located on a range of mountains (e.g., Shelter Mountain, Lick Mountain, Buck Mountain, and Dark Mountain) associated with the Uwharrie Formation, just to the east of the Uwharrie and Pee Dee rivers. Our reconnaissance revealed little, if any, evidence of quarrying. Moreover, our examination of these outcrops indicated units of variable porphyritic and spherulitic rhyolite that exhibited little in the way of a conchoidal fracture. Although this area remains to be more closely surveyed, these results suggest little potential exists for significant quarries to be found here.

The details of this work and additional survey will be presented in a later report. Suffice it to say here that we have found only three quarries outside the Albemarle-Asheboro area, all located northeast of Hardaway within the Carolina Slate Belt. Two of these were located in northern Chatham County about 74 km from Hardaway. One contains a welded tuff while the other contains a rhyolitic breccia. Both are macroscopically distinctive, unlike any other raw material we have seen. No similar materials were seen in the Hardaway assemblage, but five Kirk Corner-Notched points recorded in the collections survey were made of material resembling the breccia (see Daniel 1994). The third quarry is located in southeastern Person County about 144 km from Hardaway. It is a very fine-grained, bluish-green rhyolitic metatuff that is otherwise fairly nondescript. It is uncertain if any Hardaway artifacts or points from the collections survey were made from this source.

In sum, our survey work has located and petrologically characterized approximately 27 quarries in or adjacent to the Uwharrie Mountains. Among these sites we have pinpointed the location of the dark gray, aphyric, and often flow-banded rhyolite so abundant in the Hardaway assemblage. In addition, we also have located the sources of three other porphyritic rhyolite types that are present in the assemblage. These rhyolite sources near Hardaway appear to be microscopically if not macroscopically distinct from a series of additional lithic sources at the northern end of the Uwharries, which for the most part can be classified as rhyolitic tuffs. A significant percentage of the tools from Hardaway appear to have been made from tuffs, but whether they came from these sources is unclear. In any event, it appears that Morrow Mountain was the most intensively exploited source during the Early Archaic period.

Finally, the implications of this work beyond the issue of Early Archaic settlement range should be clear. For example, now that rhyolite artifacts can be potentially traced to their points of origin, the distribution of stone raw materials can provide important clues concerning the geographic range of Archaic adaptations—as manifested by either group mobility or artifact exchange—and how these ranges changed through time. Abundant data in the form of projectile point collections exist in both institutional and private hands to examine questions such as these that are of wide anthropological interest.

Notes

Acknowledgments. This research was made possible by the assistance of several people and institutions. Foremost, financial support was provided by the National Science Foundation (BNS-8921648) and the Research Laboratories of Anthropology at The University of North Carolina at Chapel Hill. Rodney Snedeker and Michael Harmon were particularly helpful in our survey of the Uwharrie National Forest. Similarly, the cooperation of the staff at Morrow Mountain State Park is appreciated. The Office of State Archaeology in Raleigh—especially Steve Claggett—also supported our survey. The survey around Asheboro was facilitated by John Arsenault, John Davis, Mike Murrow, and Bill Terrell. The Aluminum Company of America (ALCOA), Badin Works, deserves thanks for its cooperation during our field work as well. Steve Davis, Vin Steponaitis, and Trawick Ward commented on previous drafts of this manuscript. Steve Davis also provided the editorial support necessary to see this manuscript to publication. Estella Stansbury provided the office assistance necessary to ensure the NSF grant was handled properly.

Finally, North Carolina archaeology lost a valued and distinguished scholar, when Bob Butler died of a heart attack on April 15, 1996. Bob applied his vast knowledge of the state's geology to address archaeological problems—particularly with respect to the identification of stone-tool raw materials and their geologic sources—for some 30 years. During this time he collaborated with professionals, students, and avocational archaeologists alike. This paper is dedicated to his memory.

[1]Archaeological site designations which have a "31" prefix (e.g., 31St107 or 31Mg906) refer to the official site-survey record maintained by the North Carolina Office

of State Archaeology. All other site designations refer to the Research Laboratories of Anthropology's site-survey records.

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IDENTIFICATION OF A PIEDMONT CHERT QUARRY

by
Loretta Lautzenheiser, Jane M. Eastman,
and Mary Ann Holm

Abstract

The identification of a rare chert quarry site (31LE83) and an associated lithic workshop (31LE86) in the Piedmont of North Carolina challenges some common beliefs about prehistoric trade, exchange networks, and group size. Researchers have long believed that most of the gray chert found in Piedmont sites derived from the mountainous regions to the west. Archaeologists therefore have considered the presence of chert in an assemblage an indication of extensive group range or trade between inhabitants of the two regions. Analysis of chert artifacts and debris from 31LE83, 31LE86, and a number of private collections, indicates that researchers can no longer make this assumption.

During the summer and winter of 1992, researchers at Coastal Carolina Research, Inc. identified and tested a chert quarry site and associated lithic workshop in the North Carolina Piedmont (Lautzenheiser and Eastman 1993). Sites 31LE83 and 31LE86 are located in the project area for the proposed Sanford-Lee County Airport in northern Lee County, North Carolina (Figure 1). This report provides a discussion of the quarry site within the context of the North Carolina Piedmont and a detailed description of the chert itself to aid in its identification by other researchers.

Lithic Quarries

Site Definition and Structure

Quarry sites are locations where a valued stone is collected, mined, or broken from an exposed rock face. The extraction method to a degree depends upon the rock type and its natural form, that is, whether it occurs in collectable nodules or pebbles, large exposed boulders, or in buried or exposed veins. In simple societies, such as the prehistoric societies of the North Carolina Piedmont, quarries usually appear to be neutral ground,

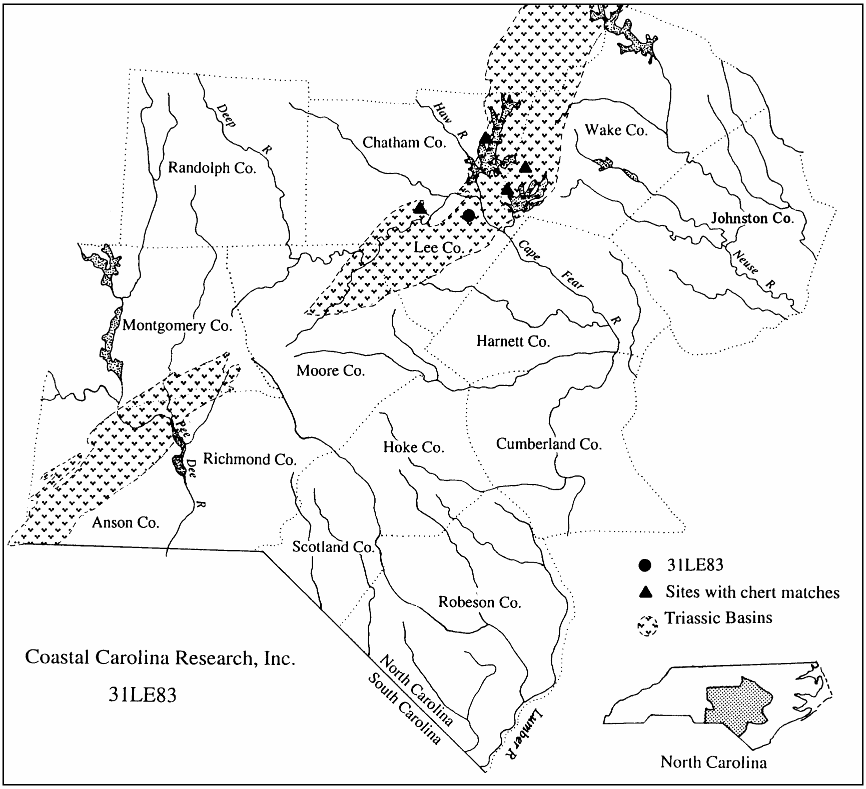

Figure 1. Location of 31LE83 and other sites with chert matches.

accessible to all local groups. For this reason, quarry sites in band and tribal areas are rarely occupied and are not claimed or controlled by any single group (Ericson 1984).

Quarry sites contain information about the processes of prehistoric lithic extraction and selection, knapping methods, and other on-site activities. A quarry with stratified deposits may also provide information about changes in the reduction sequence, stone-tool technology, or rates of tool manufacture over time. For this reason Ericson (1984) considers the quarry to be the most important site type within a lithic production system. He notes, however, that despite this potential, analysts often neglect quarry sites because of the nature of the site material, which is often "shattered, overlapping, sometimes shallow, nondiagnostic, undatable, unattractive, redundant, and at times voluminous" (Ericson 1984:2). Regardless of these limitations, it is nonetheless important to examine quarry sites, especially if the material is chemically or optically unique.

Identifying the source site for a unique type of stone can greatly enhance our understanding of prehistoric population movements, regional lithic production, and local or regional exchange systems.

Archaeological materials commonly associated with quarry sites include debitage, rejected raw material, and spent tools. Debitage is created and left at a quarry site during many different activities. For example, it is often necessary to reduce a boulder or vein before a usable flake can be removed. While conducting ethnoarchaeological fieldwork in Australia, Gould, Koster, and Sontz (1971) observed that as many as 200 flakes could be rejected for every one removed from aboriginal quarries. In addition to such "rejected" flakes, debitage created when preforms or finished tools are manufactured on-site may also be deposited at quarries. Bryan (1950) has argued that at North American quarry sites, Native Americans not only produced exportable raw material, but also manufactured a variety of implements on-site. Purdy (1981) reports a full range of stone tools at chert quarries in Florida. Experimentation has indicated that as much as 92 percent of the original nodule may be wasted during biface production (Newcomer 1971:90). Thus, the often "voluminous" record of debitage left at quarry sites has the potential to inform us about the entire reduction process from core preparation to tool production.

Unusable raw material constitutes a second category of material commonly left behind at quarry sites. For example, Fowke estimated that nine-tenths of the flint mined at the Brandon gunflint quarry was rejected (Holmes 1919:178). Given these observed and estimated ratios of rejected to usable material, it is not surprising that quarry sites are generally characterized by redundant and voluminous material records.

Spent tools may also be discarded at quarry sites where biface production occurs. Hayden (1979) explains that manufacturing debris and exhausted tools usually remain where manufacturing occurs because implements are commonly retooled at the same location. Because people do not live at quarry sites, debris and expended tools are usually left *in situ*; dangerously sharp stone debris is more likely to be gathered and disposed of at occupation sites. Therefore, quarry sites may provide better information for reconstructing lithic reduction processes than occupation sites. In a report on a New Hampshire quarry site, Gramly (1984) notes the presence of spent tools manufactured from lithic material from diverse sources. By identifying the sources of the foreign stone among the spent tools left at quarry sites, researchers might be able to reconstruct migration patterns of groups using the quarry.

A Framework for Analyzing Quarry Sites

Ericson's work on lithic production systems offers a useful beginning in the search for a better understanding of quarry sites. Ericson (1984:4) offers an analytical framework for categorizing these systems, describing three types of production systems: terminal, sequential, and irregular. Terminal production systems are characterized by production of finished tools at or near the quarry site. Sequential systems are those in which partially worked materials are taken from the quarry site and completed at or near the site of consumption. Irregular systems are those in which production is irregular and dispersed throughout the region.

Ericson (1984) expects that the internal structures of sites within these systems will vary markedly from one another, allowing for the identification of the system type. First, terminal production systems, where extraction, reduction, and tool manufacturing occur at the quarry site, are characterized by redundancy and regularity of site materials. Evidence of bifacial reduction and discarded, spent tools would be present at the quarry site. In this type of system one would not expect to find pieces of raw material outside the quarry area. Second, in a sequential production system one would expect to find evidence of unfinished or discarded tools in all site types. Raw material and debitage associated with bifacial reduction would be present at quarry sites and at sites of use or occupation. One would expect to find few spent tools at a quarry site in sequential production systems because finished tools and subsequent retooling of implements would occur outside the quarry site itself. Finally, in irregular production systems, production occurs at all sites within the system. Raw materials, debitage, and spent tools could appear at any site.

Quarry Sites in the North Carolina Piedmont

The majority of attention given to quarry sites in North Carolina has been focused on the rhyolite outcrops in the Uwharrie Mountains of the eastern Piedmont. Daniel and Butler (1991) recently identified or revisited 11 quarry sites in this region in order to locate rhyolite source areas and identify geological variability between outcrops. They successfully identified four distinct types of rhyolite based on: (1) color; (2) nature and abundance of phenocrysts; (3) grain size; (4) presence of flow banding; and (5) incidence of other special features.

Few quarry sites in the North Carolina Piedmont have received subsurface testing. In a 1980 survey, Baker recovered a number of artifacts from the surface and from shovel tests at two lithic quarry sites in Chatham County, 31CH427 and 31CH430. No features were revealed during the subsequent excavation of the sites, and no tools or diagnostic artifacts were recovered from the excavation units (Baker 1980). In 1989, Hargrove (1989) conducted a subsurface testing program at the well-known Morrow Mountain quarry in the Uwharries. Although excavation units yielded a tremendous amount of material, soil coring to a depth of three or four feet revealed no evidence of stratified cultural levels. The artifact layer, though dense, lacked temporal integrity. Hargrove suggested that a study of the quarry remains could best be made in conjunction with analysis of lithic artifacts from nearby sites with good temporal controls.

The Lee County Quarry

Local Topography and Geology

In 1992, archaeologists with Coastal Carolina Research, Inc. identified and conducted test excavations at a quarry site and an associated lithic workshop during a survey for the proposed Sanford-Lee County Airport. The project area is located in the Piedmont physiographic region near the contact zone between the Piedmont and Coastal Plain regions. In most parts of North Carolina, the fall line separating these regions is generally not an obvious topographic feature but appears instead as a transition zone 8–16 km wide. In the project area, however, the fall zone represents a more abrupt transition because it is influenced by the Durham-Wadesboro Triassic Basin. Other Triassic basins occur along the Atlantic Seaboard from Florida to Nova Scotia. Because the sediments within these basins are more easily eroded than the surrounding crystalline rocks of the Piedmont, they are topographically lower and therefore have fewer surface exposures.

The Durham-Wadesboro Basin stretches from near the North Carolina-Virginia border south into South Carolina (see Figure 1). It is bounded on the east by the Jonesboro Fault and on the west by the slate belts of the Piedmont. The Durham-Wadesboro Basin is surrounded and possibly underlain by metamorphic crystalline rocks, and it contains fluvial sediments that originated in the surrounding slate belts. The basin is traditionally divided into four substructures: the Durham Basin, the Colon Cross-Structure, the Sanford Basin, and the Wadesboro Basin (Bain and Harvey 1977). The project area lies within the Colon Cross-Structure, a cross-faulted feature separating the Durham and Sanford Triassic basins. The Colon Cross-Structure is 13 km long and 8 km wide and lies between the communities of Moncure, in southern Chatham County, and Colon, in northern Lee County (Bain and Harvey 1977). Bain and Harvey (1977) speculate that the occurrence of flaggy sandstones, fossiliferous argillite, and chert in the Colon Cross-Structure indicates that Triassic lakes were once present in the basin.

The sediments of the Durham-Wadesboro basin have traditionally been mapped into three horizontal formations. The Pekin Formation is the lowest of these three and is exposed within the Colon Cross-Structure. The Pekin Formation contains a basal unit of cemented and uncemented conglomerates overlain by sandstone, claystone, siltstone, and conglomerates. Surface exposures of red or brown sandstone, shale, and quartz-cemented conglomerate occur throughout the Pekin Formation. Within the Colon Cross-Structure the formation is 50–500 ft thick and rests unconformably on pre-Triassic metamorphic and igneous rocks (NCGS 1988; Reinemund 1955).

Chert occurs in several locations in the Durham-Wadesboro Triassic Basin. The Deep River Basin, located within the central portion of the Durham Sub-Basin, exhibits an unusual sequence of limestone and chert. The limestone appears as wavy-bedded layers in outcrops of red-brown mudstone and sandstone. Associated with the limestone are a few beds of chert that are as much as 60 cm thick. Two types of chert are present: a dark gray medium crystalline chalcedony with crystalline quartz and a light brown and porous type (Wheeler and Textoris 1978:765). During drilling conducted as part of a geological study of the Sanford Sub-Basin, Reinemund (1955) encountered limestone, found exclusively in the Cumnock Formation. Wheeler and Textoris (1978:766) note that the Triassic limestones and cherts in this formation usually occur in thin layers. Bain and Harvey (1977) identified chert or limestone in several places in the Durham Sub-Basin and the Colon Cross-Structure. This chert is found in strata that are dominantly fluvial but that contain extensive beds of gray shale with fossils. The outcrop belt, roughly in the center of the Durham Sub-Basin, strikes north-northeast–south-southwest (Wheeler and Textoris 1978:766).

Wheeler and Textoris (1978:768) note that the best locality for limestone and chert in the North Carolina Piedmont is in the Research Triangle Park, about 72 km northeast of the project area. In this area, chert occurs in beds up to 60 cm thick. It is "dense, dark gray, and consists of medium crystalline chalcedony with very finely crystalline quartz. . . . The chert does not contain ghost textures of the limestone tufa, and is nearly pure quartz" (Wheeler and Textoris 1978:769). The chert beds appear to be too pure to have a soil origin and are never associated with the caliche at the margin of the playa (Wheeler and Textoris 1978:769). In this chert there is evidence of neither volcanic ash nor diatoms or other organisms. Wheeler and Textoris (1978:769) suggest that the chert was formed in a playa lake as an inorganic precipitate. The precipitate formed as "an opaline gel which was converted during diagenesis to the present chert consisting of chalcedony and very finely crystalline quartz" (Wheeler and Textoris 1978:769).

J. Robert Butler, a professor of geology at the University of North Carolina at Chapel Hill and a licensed geologist, analyzed two chert specimens from the Lee County sites. He found that the first sample (Sample 92238-14), a dark gray chert, is a high-silica rock comprised almost entirely of chalcedony and microcrystalline quartz. The texture is somewhat more uniform and fine-grained than the mottled, cream-colored samples, and ghost textures are not as obvious. This chert is probably an inorganic precipitate, formed in a playa lake as an opaline gel and then converted into chalcedony and microcrystalline quartz.

The second sample (Sample 92241-1), a mottled white to gray chert, is comprised almost entirely of chalcedony and microcrystalline quartz. It is, therefore, a high-silica rock with probably more than 90 percent SiO_2. It is very fine grained. The longest fibers of chalcedony are no more than 0.3 mm long and most grains are much smaller. Sheaf-like bundles of chalcedony are scattered through the rock, and some irregular patches of brown chalcedony also appear to have filled open spaces within the original rock. Indistinct patterns in the groundmass of the cherts suggest a replacement origin for the chert. This sample is similar to the Triassic chert interpreted by Wheeler and Textoris (1978) to have been formed by silica replacing a porous limestone tufa.

Results of the Testing

Site 31LE83, an exhausted chert quarry, and site 31LE86, a probable habitation site and lithic workshop, were subjected to an intensive testing program involving surface survey, shovel testing, excavation units, and backhoe trenches (Figure 2).

Site 31LE83. Site 31LE83 is the location of an aboriginal quarry of a rare Piedmont chert located near the headwaters of a rank-one stream. The site, largely confined to the west side of a ridge slope, is not exposed in the streambed.

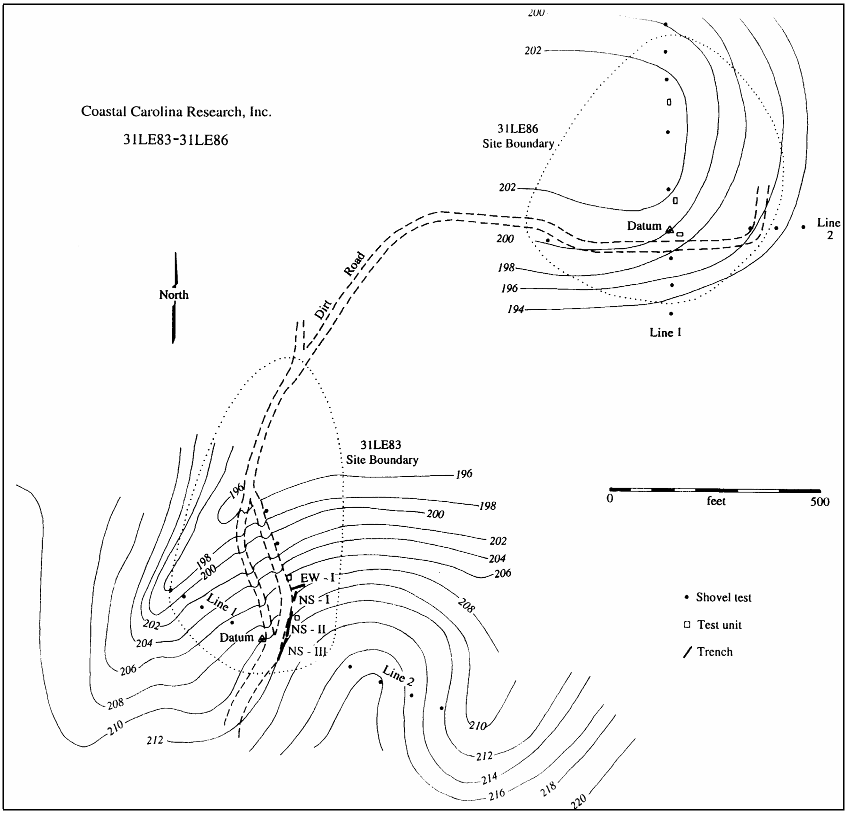

Figure 2. Map of sites 31LE83 and 31LE86 showing locations of site datums, shovel tests, and test units.

Cuts or gouges in the road bank on the east side of the site exposed quantities of the chert raw material. Two 2×2-meter test units and three backhoe trenches were excavated on the banks above these cuts. Only a few chert and quartz flakes were recovered from the first test unit, and no diagnostic artifacts were recovered. The upper zone of the second test unit contained flakes and shatter of chert and quartz as well as a Guilford Lanceolate projectile point of porphyritic rhyolite.

A backhoe was used to dig trenches to test for the chert vein. In one 3-m trench, chert blocks were encountered in Zone 2, a yellow silty clay. The vein appeared at the interface between Zone 2 and the red clay of Zone 3 (Figure 3). The chert vein undulated and was only about 15 cm thick at the maximum, appearing to pinch out at the ends. All of the chert was blocky, and no portions of the vein remained intact. This could have

Figure 3. North-south trench showing fractured chert vein.

resulted from the backhoe action but was more likely caused by fracturing during geologic events. Some flakes were recovered from this trench, but the majority of the chert consisted of unmodified blocks.

A second trench was located south of the first and extended for about 6 m. The profile of this trench revealed clusters of chert chunks, cores, and very small flakes. At about the midpoint of the trench there appeared to be a pit (referred to as Feature 3) refilled with chunks and debris (see Figure 4). The excavation of the feature suggested that the chert had been removed from above and the usable material was apparently exhausted. The feature fill contained a graver, a few retouched and used flakes, and a large number of cores, decortication flakes, and interior flakes. No temporally diagnostic materials were recovered.

Site 31LE86. Site 31LE86, which covered an area approximately 30×60 m, was recorded on a ridge toe at the confluence of rank-one and rank-two tributaries of Womble's Creek. The site was first noted in a roadbed of eroded Creedmoor fine sandy loam; however, a remnant *A* horizon was encountered in shovel tests in the woods. Lithic material was recovered from the surface of the road, from unvegetated spots in the woods, and from shovel tests.

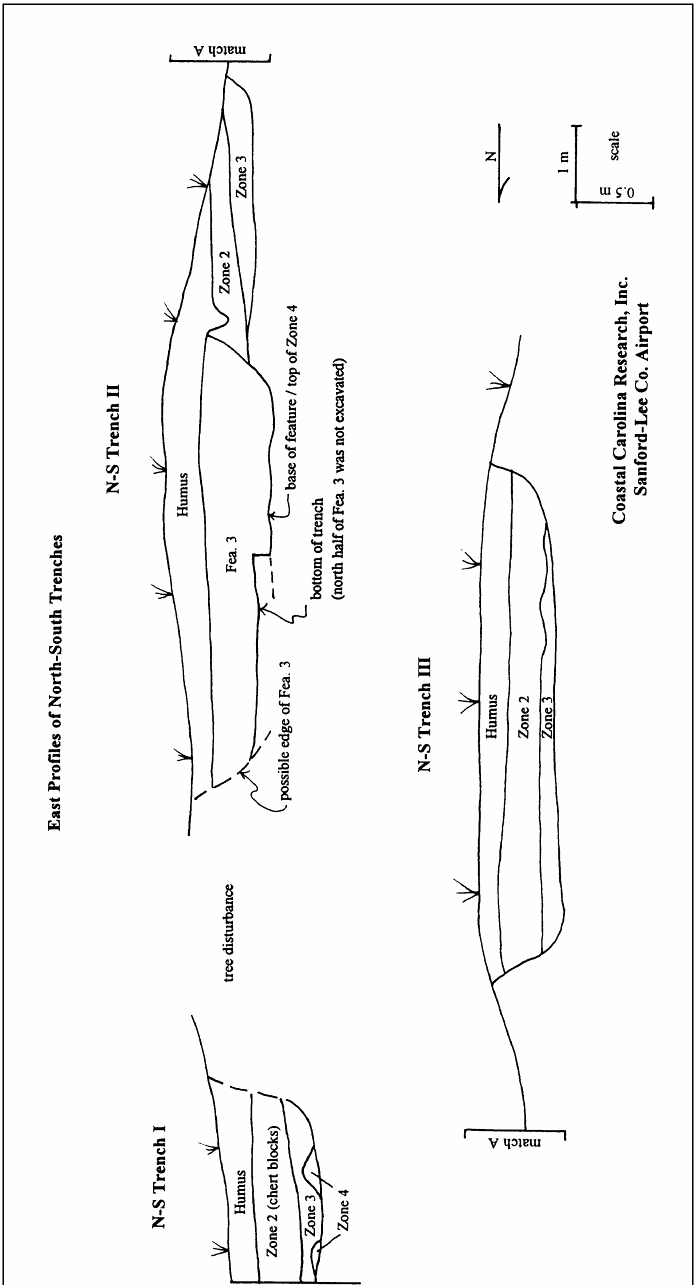

Figure 4. East profile of north-south trenches, Sanford-Lee County Airport, Lee County, North Carolina.

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Artifacts recovered from the site during the initial survey included 58 chert cores and 133 chert flakes. Other artifacts from the site included 26 chert chunks that had been tested and subsequently discarded, 60 chert shatter fragments, and vein chert chunks with cortex. Although the chert appeared identical to that recovered from site 31LE83, site 31LE86 did not appear to contain large unmodified blocks and chunks of the vein chert. Other artifacts included a crude metavolcanic biface, 37 flakes of weathered metavolcanic rock, 7 rhyolite flakes, and 1 quartz flake. Shovel tests yielded one small projectile point of rhyolite, and flakes and shatter of argillite, rhyolite, and chert from both Zones 1 and 2. These artifacts suggest that the site may have been a lithic reduction area where the raw material from the nearby quarry (31LE83) was knapped. The presence of biface fragments, flakes, shatter, and a scraper of other rock types suggests that the site may have been a short-term habitation.

Three test units were subsequently placed in the site to test for intact deposits. The surface of Test Unit 1 consisted of a shallow humus zone containing a rhyolite quarry blade, unmodified chert blocks, chert and quartz cores, and flakes of chert, rhyolite, and other metavolcanic rock. Zone 1, a silty clay with sandstone gravel, contained cores and flakes of chert, rhyolite, quartz, and metavolcanic rock. Interestingly, none of the decortication flakes were from the chert. Zone 2 contained a quartzite biface tip, as well as flakes and spalls of rhyolite, quartz, and metavolcanic rock. None of the flakes were of chert, although the zone did contain two spalls and a fractured block of heat-altered chert.

The second test unit was located in an eroded area from which numerous flakes were collected. There was no humus zone, and Zone 1 was a silty clay that contained artifacts in only two small areas of root disturbance. Small flakes, mostly of metavolcanic rocks, were recovered in flotation samples from these areas.

The third test unit contained two zones. The first, a silty clay loam and humus, contained flakes, fractured rocks, and unmodified chert blocks. Although none of the decortication flakes and only 2 of the 53 interior flakes were of chert, this zone contained 75 unmodified chert blocks. The second zone was a brown silty clay that graded into clay and contained one chert decortication flake and several other flakes and shatter fragments.

Feature 4 was a linear feature encountered in the third test unit at the interface between the first and second zones. Positioned in line with a row of trees that were part of the pine plantation covering the site, this feature had been disturbed by a planting trench. The feature contained a Savannah River Stemmed projectile point base fragment and a projectile point tip fragment, both of rhyolite. It also contained several unmodified chert blocks, fractured quartz, and numerous flakes. While a few of these flakes were of chert, most were of quartz, rhyolite, and other metavolcanic rocks. A fragment of window glass was recovered from the first zone of fill, and excavation of the feature revealed that Zone 1 material was present under the larger chert blocks. These were taken as indications that the feature had been thoroughly disturbed.

Analysis of Chert Artifacts and Debris

Artifacts recovered from the testing of sites 31LE83 and 31LE86 included blocks, flakes, and possible tools of the Piedmont chert (Figure 5), as well as artifacts of other lithic raw materials. In the following discussion, only the chert artifacts will be considered. During the course of analysis, microwear specialists examined the artifacts, and a lithic specialist identified them by technofunctional types. Also, samples of the chert were provided to the professional community in North Carolina and South Carolina for comparison with institutions' and consultants' collections. Local collectors were interviewed, and collections were examined for occurrences of this type of chert.

Initial macroscopic sorting of the chert artifacts from the two Lee County sites was undertaken with a 10× hand lens, and the artifacts were identified by technofunctional types and lithic material. Of the material found in nonfeature contexts, the most abundant artifact types are cores, shatter fragments, and interior flakes. Since no unfinished or abandoned bifacial blanks or spent tools were recovered, it seems most likely that the people who used this quarry were simply reducing the blocky pieces of vein to a portable size at the site or were producing cores for removal to workshop areas or camps.

Feature 3 at site 31LE83 is a small, irregularly shaped pit that appears to have been refilled with unusable raw material and debitage. It very closely resembles a pit illustrated in Staski and Sutro (1991) in which lithic material was being mined from an exposed creek bank. It is very likely that the chert vein occurred close to the surface but had to be dug out of the surrounding clay matrix. Interior flakes constitute 75 percent of the artifacts recovered from this feature. A comparison of the material recovered by waterscreening through 1/16-inch (.15 cm) mesh and that recovered by dry screening through 1/4-inch (0.64 cm) mesh reveals a not-unexpected result (Figure 6). Waterscreening recovered a higher percentage of small and medium-sized flakes. Small flakes, less than 8 mm in diameter, constituted 67 percent of the interior flakes recovered

Figure 5. Unmodified chert block, flakes, and tools recovered from site 31LE83.

from waterscreening, but only 52 percent of those recovered by dry screening. The waterscreened material consisted of nearly 30 percent medium-sized flakes, whereas that recovered by dry screening contained less than 20 percent medium-sized flakes. The more complete recovery accomplished by waterscreening reflects more accurately the size distribution of interior flakes deposited at the site. The abundance of interior flakes, especially very small flakes, suggests that the veins were being reduced significantly at the site.

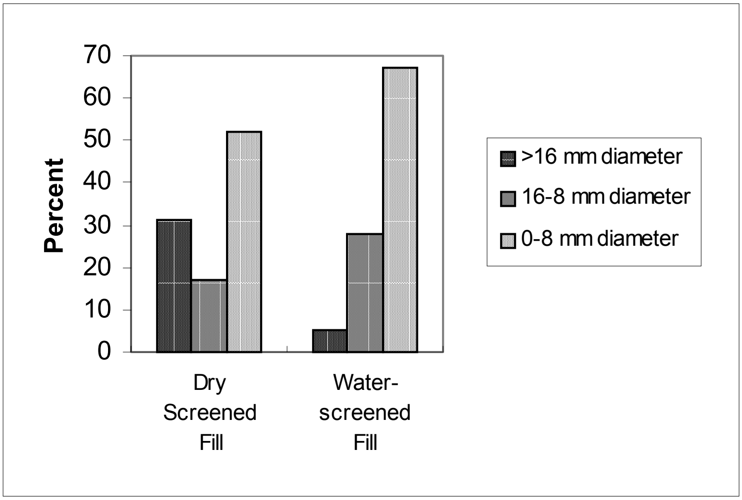

Figure 6. Percentage of interior flakes from Feature 3, sorted by size.

The material recovered from Feature 3 appears to have been produced by a block-on-block reduction method or by fire setting (see Purdy 1981). The amount of amorphous shatter, indications of heat alteration on vein sections and debitage, and the lack of symmetry or well-defined bulbs of percussion on debitage indicate this type of reduction.

A sample of artifacts and debris from excavated contexts underwent microscopic use-wear analysis by microwear specialists to identify polishes, abrasions, and other surface damage. Larry Kimball and Tom Whyte of Appalachian State University found that the numerous microtraces on specimens from 31LE83 are "best attributable to post-depositional movement of artifacts in the soil or against one another" (Kimball and Whyte 1993). Because these microtraces may obscure microtraces caused by use or hafting, it was not possible for Kimball and Whyte to determine if these artifacts had been used at the site.

In an attempt to trace the distribution pattern of the chert from site 31LE86, researchers examined lithic assemblages from Alamance, Lee, Wake, Chatham, Johnston, Wayne, and Greene counties. Assemblages included those obtained during surveys as well as those in the possession of seven avocational archaeologists with extensive collections from these areas. Chert samples from the quarry site were also distributed to the professional community in North Carolina and South Carolina for comparative analysis. Chert specimens were reported from 20 sites in Chatham County (Carlos Solis, personal communication 1993); another apparent match of heat-altered chert was reported an isolated find from the north shore of Jordan Lake (Tom Padgett, personal communication 1993). A chalcedony flake was recovered along with a quartz crystal flake and Archaic projectile points at 31AM259 in Alamance County (Ken Robinson, personal communication 1993). Finally, a possible matching chert specimen was recovered from a site located north of Goldsboro in Wayne County (Lautzenheiser et al. 1994). With the exception of a weathered core of heat-altered chert from Wake County, all of the chert specimens in the collections of avocational archaeologists were found in Chatham County. Evidence from the collectors survey indicates that the chert is confined to areas in close proximity to site 31LE83, especially areas within the Triassic Basin. This suggests a very localized distribution.

Summary and Implications

The lithic production system represented by sites 31LE83 and 31LE86 most closely resembles a sequential system, in which raw material is reduced to a certain stage at the quarry site, then completed at or near the site of consumption (Ericson 1984). This interpretation is supported by the absence of any unfinished or discarded chert projectile points or spent tools at the quarry site, 31LE83. Since no broken or discarded quarry blades or preforms were recovered from 31LE83, it can be inferred that the chert removed from the site was not worked into bifaces at the site. However, if biface production was not occurring at the site, it is difficult to account for the fact that the most common type of artifact found is a small (less than 8 mm in diameter) interior flake. One possible explanation is that the small flakes were produced during extraction or primary reduction of the chert veins. The chert occurs in linear veins with a relatively thick rind of country rock on the outside margins of the vein. It is possible that the vein material may have been reduced considerably just to remove this bulky and unusable rind.

The chert quarry at 31LE83 has provided significant information regarding the extraction of a rare lithic raw material. The material from nearby site 31LE86 fits the expected pattern of an associated lithic workshop where knapping was continued or completed. In addition to all stages of debitage, quarry blades and finished projectile points were recovered from the site. The collections research, which documented that the chert was carried to sites beyond the quarry, indicated that the use of the material was fairly localized.

Although no temporally diagnostic artifacts of the chert were recovered, the presence of Guilford (31LE83) and Savannah River (31LE86) projectile points in association with chert debitage is circumstantial evidence that the sites were most heavily utilized during the Archaic period. The chert vein was narrow, contained a thick rind, and was heavily fractured. It is possible that the physical limitations of the raw material precluded the manufacture of projectile points and dictated a flake tool industry. This would be especially true if the sites were occupied during the Guilford and Savannah River periods, as is surmised. The typical projectile points during both of these periods were too large to have been easily manufactured from the chert.

Settlement models have routinely considered the influence of the energy expended in the procurement of raw materials. Several long-accepted models (e.g., Binford 1979) have suggested that the presence of exotic, or nonlocal, materials in an artifact assemblage indicates the probable geographic range of a group. The patterns of lithic utilization have been seen as indicators of the degree of mobility of a group (Conaty 1987). Sassaman et al. (1988), noting that tool assemblages from the early Holocene often contained exotic raw materials, interpreted such materials as being indicative of expansive ranges. Conaty (1987), recording the presence of banded slate in many Archaic sites in the Midsouth and Midwest, suggests that these artifacts are indicative of long-distance trade networks, although the source and pattern of distribution of the material has never been fully documented.

Several studies (Conaty 1987; Futato 1983; Goodyear et al. 1989; Sassaman et al. 1988) have focused on the presence of chert in artifact assemblages. Sassaman et al. (1988) used data from numerous investigations in the Savannah River Valley, as well as extensive data from private collections, to document the changes in hunter-gatherer mobility during the Holocene. They noted that, during the course of the Holocene, patterns of lithic raw material procurement appear to become more localized. This change likely reflects a trend toward reduced range and the regional "settling-in" of groups. It is not until the Mississippian period that exotic materials again are found in numbers. This change more likely represents trade networks rather than group range.

A collector survey, building on work first conducted by Jim Michie, also provided information on the distribution of lanceolate projectile points in the Piedmont and Coastal Plain of South Carolina (Goodyear et al. 1989). The majority of these points were Clovis or Clovis-like, and most were formed from chert. A commonly used type was the Allendale chert, a high-quality material that appears in sites up to 241 km distant from the known source. The outcrops of Allendale chert appear to be the northernmost exposures of Tertiary age cherts that run from Florida to the western edge of Allendale County, South Carolina. Based on appearance and quality, all of the black, gray, and blue cherts recorded were assumed to have come from the Ridge and Valley physiographic province. Goodyear, however, suspected that some of the dark cherts may not have come from the mountains and proposed a possible Piedmont source. He based this supposition on the presence of a hard, pitted volcanic-like cortex, the preliminary petrographic analysis of which indicated an igneous-metamorphic origin. The small size of the points made from the dark cherts suggests that the original nodules were small. The discovery of the Lee County chert quarry lends support to Goodyear's suspicions.

Because there has heretofore been no documented source of aboriginally utilized chert in the Piedmont, the majority of researchers logically accept the previously proposed settlement and exchange models. In the absence of evidence to the contrary, these models assumed that the source of all high-quality gray cherts found on sites in the North Carolina Piedmont was to the west in the mountains or the Ridge and Valley region. The discovery of site 31LE83, however, has documented that high-quality chert sources do exist in the Piedmont. This particular chert vein was small and its exploitation does not come close to the extensive use at famous quarries such as the Dover chert quarries in Tennessee or the Uwharrie rhyolite quarry in the North Carolina Piedmont. However, this source of Piedmont chert was quarried to extinction and artifacts manufactured from this material have been recovered from several Piedmont sites.

The implications of this study emphasize the need to reexamine the previously held models of group range and trade networks. While much of the gray and dark gray chert in Piedmont collections undoubtedly comes from the mountains or the Ridge and Valley region, it can no longer be stated with certainty that the presence of dark cherts in collections is evidence of trade or of extensive range. As future research is conducted at other sites in the North and South Carolina and Virginia Piedmont regions, a clearer picture of trade and exchange networks may emerge.

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PREHISTORIC TERRITORIALITY IN VIRGINIA

by
Howard A. MacCord, Sr.

Abstract

Territories for bands, tribes, or cultures cannot with confidence be defined in prehistoric Virginia until the Late Woodland period. Earlier periods *may* have had defined and defended territories, separated by buffer zones or natural barriers, but these cannot be delineated with our present knowledge. Late Woodland territories can be seen for several discrete time levels (e.g., the early half of the period, AD 800–1200). Later boundaries can be fixed by centuries, beginning around AD 1400. These are shown on maps with this paper. Some territories for prehistoric cultural groups persisted into the Historic period, at which time we associate them with named historic tribes. Territories spanned and extended along major rivers, separated by natural obstacles or by buffer zones. Some territories at present-day state lines extended into adjacent states. Stability is noted for the earlier centuries, but population shifts and a breakdown of borders accelerated after European contact, roughly A.D. 1600. On-going researches are certain to clarify this picture in coming years.

When Europeans first explored the Virginia area they recognized several discrete linguistically-related groups (Figure 1). In the coastal area, including the Eastern Shore, were the well-known Powhatan groups under a paramount chief, and they spoke an Algonkian language. To the immediate west in the Piedmont region were the Monacan and Manahoac groups, who spoke Siouan dialects. In the Chowan River drainage were two tribes, the Nottoways and Meherrins, who were related culturally to the Tuscaroras and spoke an Iroquoian language. In the Roanoke River drainage, seventeenth-century explorers found the Occaneechi, Saponi, Tutelo, and Sara (Saura), all of whom spoke a Siouan dialect. Since no literate European visited the other parts of Virginia until about A.D. 1700, no tribal identifications exist for areas west of the Blue Ridge Mountains.

Each group shared a material culture and lived in a contiguous area, which we see as a tribal or cultural territory. Archeological work done in recent decades permits us to define cultural areas which seem congruent with areas recognized as tribal territories. Since most populations are stable, both as to important cultural habits and territories, it seems only logical to see these congruencies as a continuum, unless ethnohistoric or archeological data require an alternate explanation. It is of interest, then,

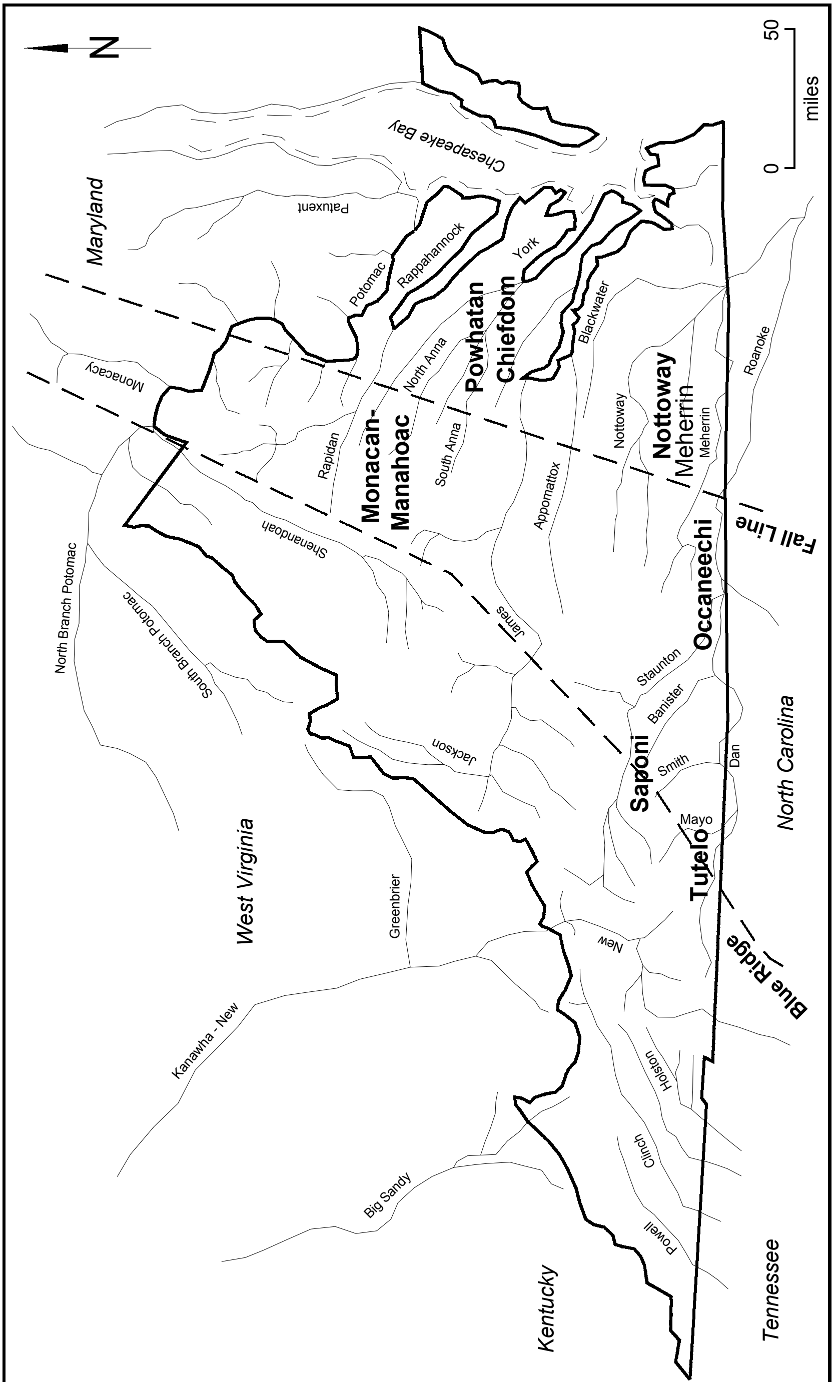

Figure 1. Indian tribal lands in Virginia at contact, circa A.D. 1600.

to see how far back into prehistory we can trace these territories. In this paper, I present a series of maps with *probable* territories outlined (Figures 2–5), along with some of the archeological sites and data which define each culture area. Admittedly, this is a preliminary view, and on-going researches might well change details such as boundaries and dates.

Pre-Late Woodland Territories

On the basis of present knowledge, it seems unproductive to try to outline territories for cultural periods earlier than the Late Woodland period. William Gardner has tried to delimit territories of Paleo-Indians who used the Flint Run jasper quarries in the Shenandoah Valley (Gardner 1974). A recent study by Joseph McAvoy (1992) for the inner coastal plain south of the James River attempts to trace Paleo-Indian movements (annual rounds?) through finds of identifiable lithic types. In a similar effort, studies of trace elements in steatite have been used to plot migrations and trade patterns during the Late Archaic and Early Woodland periods (Luckenbach et al. 1975 and Holland et al. 1981). While these are a beginning, it seems premature to build culture histories on such shaky bases since alternate explanations may be equally valid.

For the Early Woodland and Middle Woodland periods, if we seek to define culture areas, we are forced to rely heavily on ceramic distributions. While we recognize that a ceramic tradition does not necessarily equate with a linguistic or cultural group, ceramics seem to offer the best evidence. For the Early Woodland period, we might plot distributions of Marcey Creek ware in northern Virginia and nearby Maryland and Delaware. Also, Pope's Creek ware seems centered on the Potomac tidewater area, with some spread to the north and south. In southeastern Virginia, flat-bottomed Currituck Beakers (Painter 1977) and Croaker Landing ware (Egloff et al. 1988) *may* reflect a cultural group at the Early Woodland time level. In the Ridge and Valley area, pottery similar to Vinette I has been found at two sites—the Fout Site near Winchester (MacCord 1996) and Thompson's Shelter in Giles County on New River north of Blacksburg (MacCord 1972). Distribution of named projectile points dated to the Early Woodland period also might help define cultural areas. Among these types are: Savannah River, Potts, and Piscataway. Research into this idea should challenge a graduate student seeking a research theme.

For the Middle Woodland period, several widespread pottery types might be evidence for territoriality, if their distributions are plotted.

Among these are: Stony Creek, Vincent, Accokeek, Mockley, and possibly others. Projectile points assignable to this period include Raccoon, Fox Creek, Jack's Reef, and perhaps others. The best evidence for this period is likely to derive from stratigraphic sequences showing continuity into the Late Woodland period, as seen at deep sites such as Elm Hill (MacCord 1968) and Red Hill (MacCord n.d.) on the Roanoke River, and the White Oak Point site on the Potomac River in Westmoreland County (Waselkov 1982). Again, it will be necessary to plot areal distributions, especially with reliable dating, before we can accept the existence of territories inhabited and exploited by any group or culture. For the Late Woodland period, on the other hand, the situation improves greatly.

Late Woodland Territories (A.D. 800–1200)

With the development of agriculture and greater sedentism after A.D. 800, we can define cultural areas with somewhat better precision and reliability. For the centuries between A.D. 800 and 1200, we postulate a hamlet-farmstead phase for most of Virginia, preceding later village complexes. For some later cultures we have archeological evidence of the earlier (ancestral?) hamlet phases. Among these are: the Intermontane Culture in most of southwestern Virginia; the Dan River Culture; and the Lewis Creek Mound Culture. For the Manahoac-Monacan area and for some Powhatans, the hamlet phase seems to have continued into the Contact period, without ever developing a village phase.

Late Woodland Territories (A.D. 1200–1400)

At the beginning of the second half of the Late Woodland period around A.D. 1200), there are three fairly well-defined culture areas: the Intermontane Culture, the Lewis Creek Mound Culture, and the Montgomery Focus (Figure 2). By A.D. 1400, a fourth culture area—that of the Dan River Culture—can be recognized (Figure 3). These culture areas are described briefly below.

Intermontane Culture

This culture covers most of southwestern Virginia. Key traits are: circular houses arranged in a circle and surrounded by a palisade; flexed burials in single graves, usually with eastward orientation; limestone-

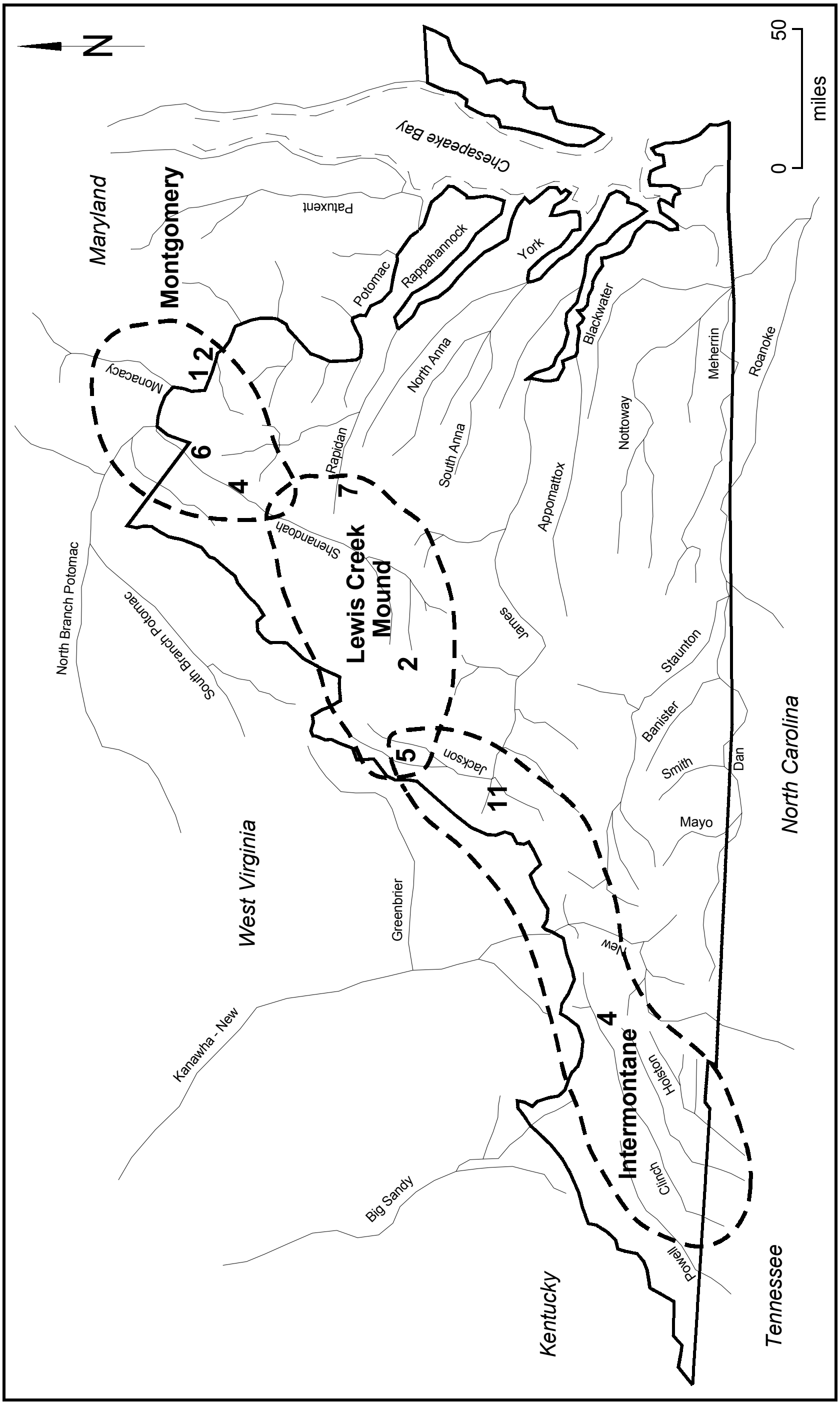

Figure 2. Prehistoric culture areas in Virginia, circa A.D. 1200.

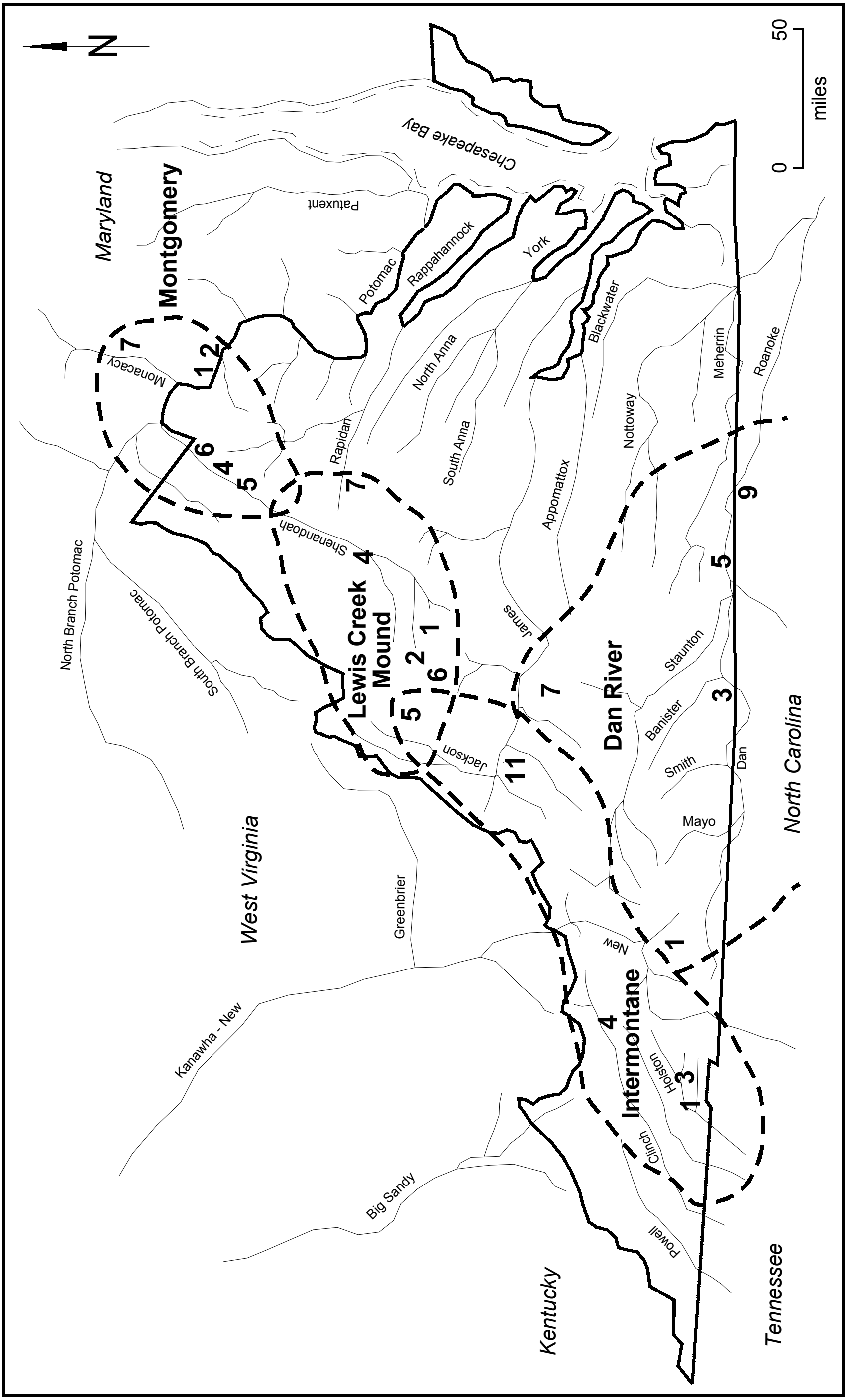

Figure 3. Prehistoric culture areas in Virginia, circa A.D. 1400.

tempered ceramics; medium triangular projectile points; and much use of marine shell ornaments (MacCord 1989).

Lewis Creek Mound Culture

Within a 50-mile radius of the city of Staunton are 13 accretional mounds which contained 100 to 1000 burials, usually as individual interments, but sometimes in groups like an ossuary. Other traits are: grit-tempered ceramics; medium triangular projectile points; and marine shell ornaments. Some burials are flexed, extended, or cremated, but most are secondary burials as bundles of cleaned bones. Habitations were hamlets located at varying distances from the mound, which probably served as the community cemetery over centuries. Dates for the mounds range from A.D. 950 to A.D. 1450 (MacCord 1986).

Montgomery Focus

Sites of the Montgomery Focus are located in the middle Potomac valley and extend into the Monocacy and Shenandoah valleys. Cultural traits are: villages on river floodplains; circular or ovate wigwams; ceramics tempered with crushed quartz or granite; medium triangular projectile points; marine shell ornaments; flexed burials in individual graves; and (at one site) the manufacture of chunkey stones. Dates range from A.D. 1000 to A.D. 1400 (Slattery and Woodward 1991).

Dan River Culture

Traits for the Dan River Culture include: palisaded villages on flood plains of major rivers; ceramics tempered with sand or crushed quartz; marine shell ornaments; medium triangular projectile points; and flexed burials in individual graves (one accretional burial mound is located at Leesville on Staunton River). Dates for this culture, including its hamlet predecessor, are from A.D. 820 to the time of contact, about A.D. 1670 (Gardner 1980).

Late Woodland Territories (A.D. 1400–1600)

Between A.D. 1400 and 1500, the Lewis Creek Mound people stopped building mounds and seem to have moved out of the area. Some may have joined the Montgomery Focus people when they vacated the Shenandoah

Valley and moved down the Potomac River to the inner coastal plain [for a discussion of this movement of peoples, see MacCord (1984)]. Other elements of the Lewis Creek Mound group may have remained in place as part of the Saponi and Monacan groups, who lived east of the Blue Ridge.

Around A.D. 1500, the number of defined cultural areas increases to six, with some changes affecting previously-defined areas (Figure 4). The Intermontane Culture and Dan River Culture areas remained the same, while the Lewis Creek Mound Culture disappeared. Montgomery Focus people moved down-river to become the Potomac Creek Focus (Schmitt 1952). Another new cultural expression which appeared was the Mason Island Culture.

Mason Island Culture

As an eastern extension of the Monongahela Culture, this cultural group entered the upper Potomac valley and expanded southward into the Shenandoah Valley as far as present Luray and New Market. They lived in hamlets at first and later consolidated into villages, sometimes palisaded. Their limestone-tempered pottery has been named Page Cordmarked. They used medium and small triangular projectile points, and they had some trade with coastal areas. Burials were flexed in individual graves. Dates for the Mason Island Culture center around A.D. 1450–1500 (McNett & Gardner 1975).

Potomac Creek Focus

Villages of this culture were located on both the Virginia and Maryland sides of the Potomac River, south of Washington, D.C. for about 40 miles. The two main villages were Patawomeke and Moyaone, both of which were palisaded. Ceramics were sand and crushed quartz tempered, and developed out of Shepard wares of the Montgomery Focus. Burials were in individual graves followed by reinterment in ossuaries, usually with no burial accompaniments. Projectile points were usually small chipped triangles (MacCord 1992; Schmitt 1952; Stephenson et al. 1963; Stewart 1992).

During the sixteenth century, two changes which occurred were: (1) the expansion of the Dan River Culture west of the Blue Ridge into the New River valley and northward into the James River valley; and (2) the gradual replacement of limestone-tempered pottery by shell-tempered wares in the Mason Island Culture area, developing into what Schmitt (1952) named the Luray Focus. Like the preceding Mason Island Culture,

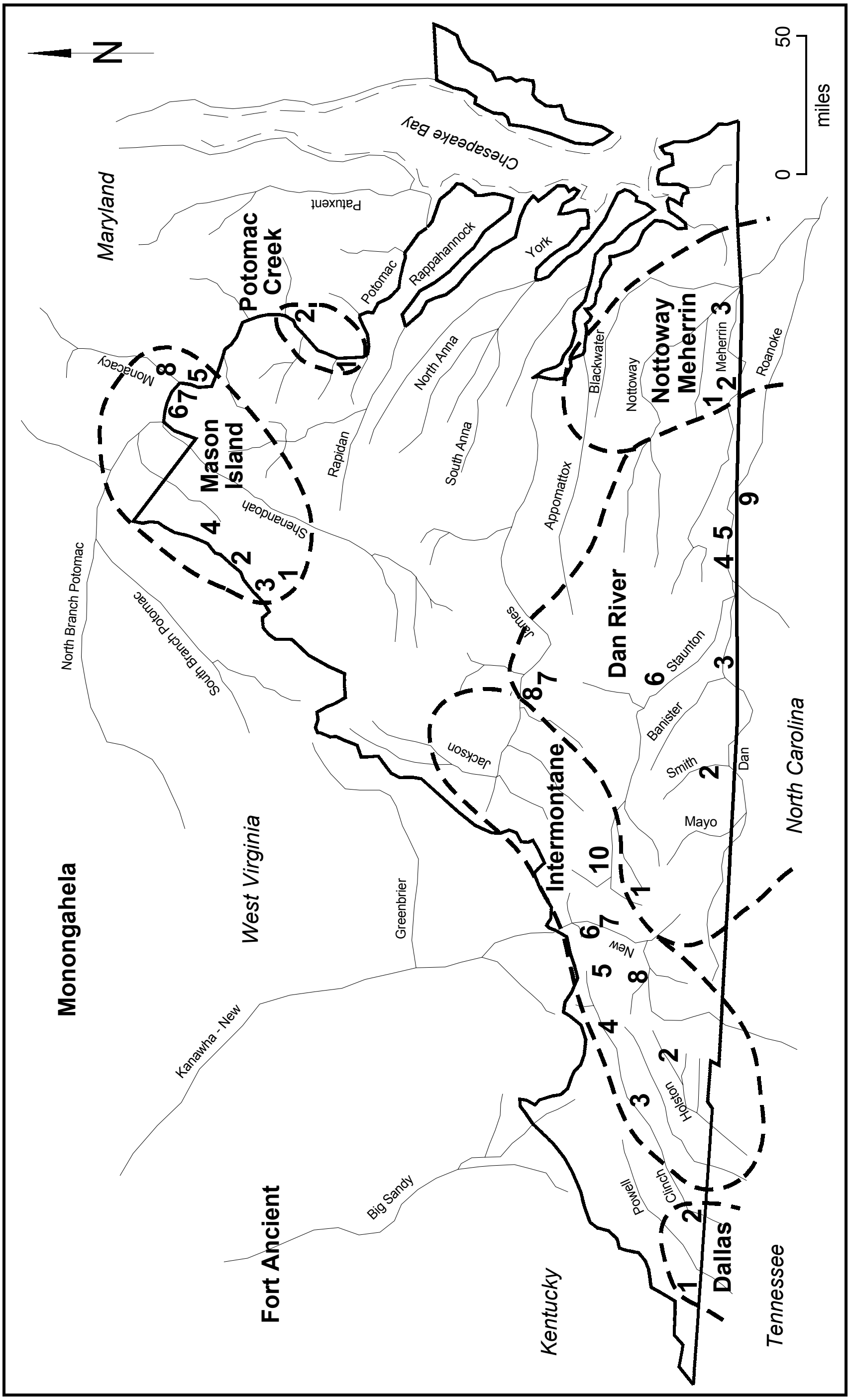

Figure 4. Prehistoric culture areas in Virginia, circa A.D. 1500.

the Luray Focus also was strongly influenced by the Monongahela Culture from the west-northwest. During this century, too, agglomeration of population took place among the coastal Algonkians, leading to the rise of the Powhatan chiefdom (Turner 1976). To the south, agglomeration also seems to have occurred among the Nottoway and Meherrin groups, leading to creation of villages which sometimes were palisaded. Around A.D. 1600, the Luray Focus people moved up-river, leaving empty areas in the Potomac, Monocacy, and Shenandoah valleys.

Late Woodland Territories (After A.D. 1600)

Culture areas that can be recognized as of A.D. 1600 are shown in Figure 5. In most cases, these represent areas that continued from preceding centuries, but with boundaries somewhat fluid, and with buffer zones between some major groups. These buffer zones, recognized mainly by the absence of sites and material remains attributable to adjacent cultures, are shown in Figure 6. While buffer zones contain sites that have produced artifacts datable to Archaic and Early Woodland times, they have not (yet) yielded evidence of Late Woodland occupations, other than transient campsites.

During the Contact period and the early decades of European settlement, many tribal groups were named and described (see Figure 1). It seems unnecessary and redundant to link forcibly the named historic groups with the antecedent culture areas shown in Figure 5. No other explanation or model can at this time be substantiated by archeological or historical evidence. Accordingly, I conclude that the late prehistoric cultures in each area are directly ancestral to the groups identified in those areas historically.

During the seventeenth century, almost all indigenous cultures were vitiated and dispersed. Population loss to diseases, intermittent warfare, and culture shock combined to change cultural content and to induce change in locations. By A.D. 1700, Indians either had sold or been forced to yield large areas of the colony. Those who remained in their original homelands were compressed in "reserves" or small enclaves surrounded by non-Indians. Figure 7 shows the distribution of Indian groups as of this period. The following synopses can be offered to summarize the fate of each cultural-tribal group.

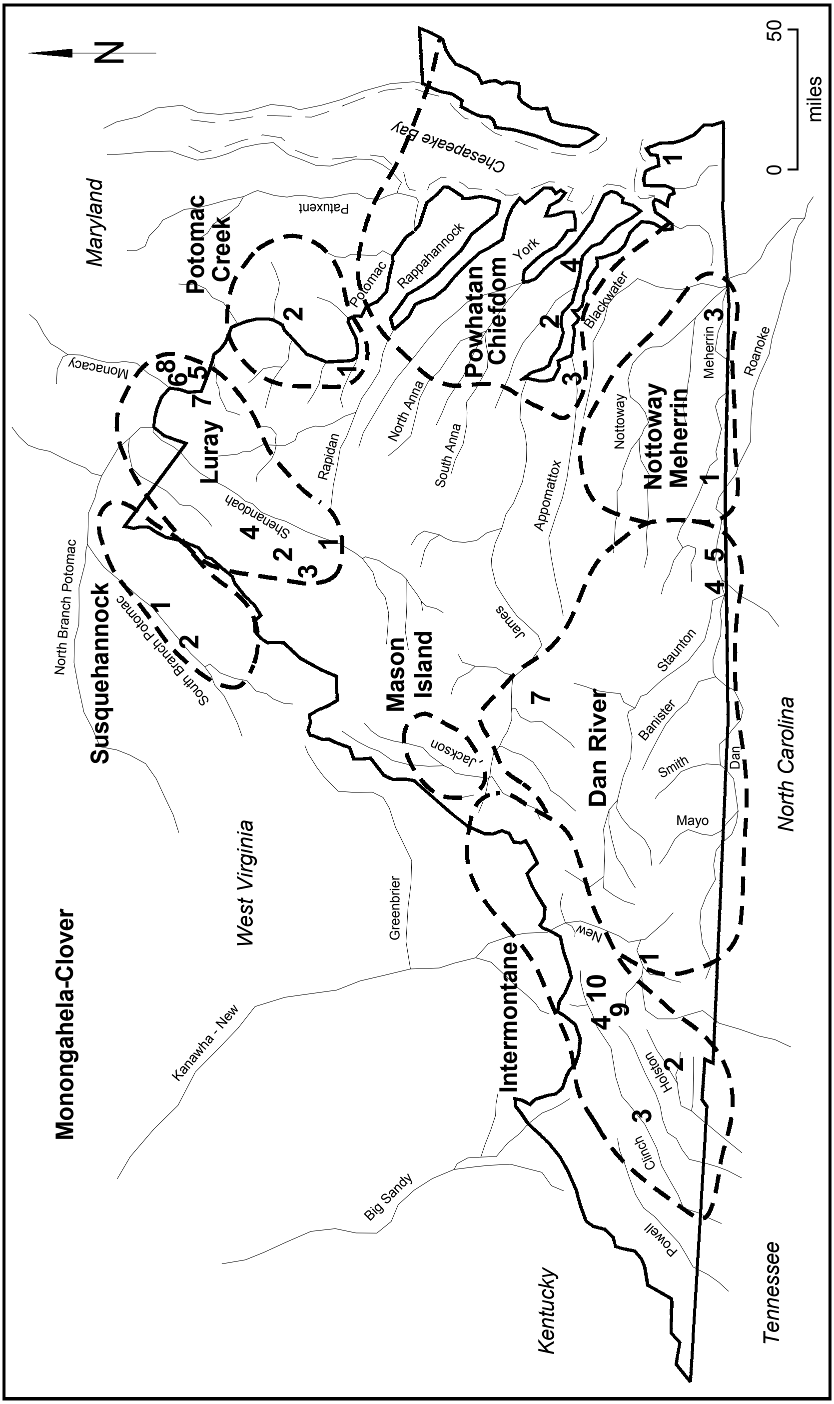

Figure 5. Culture areas in Virginia at contact, circa A.D. 1600.

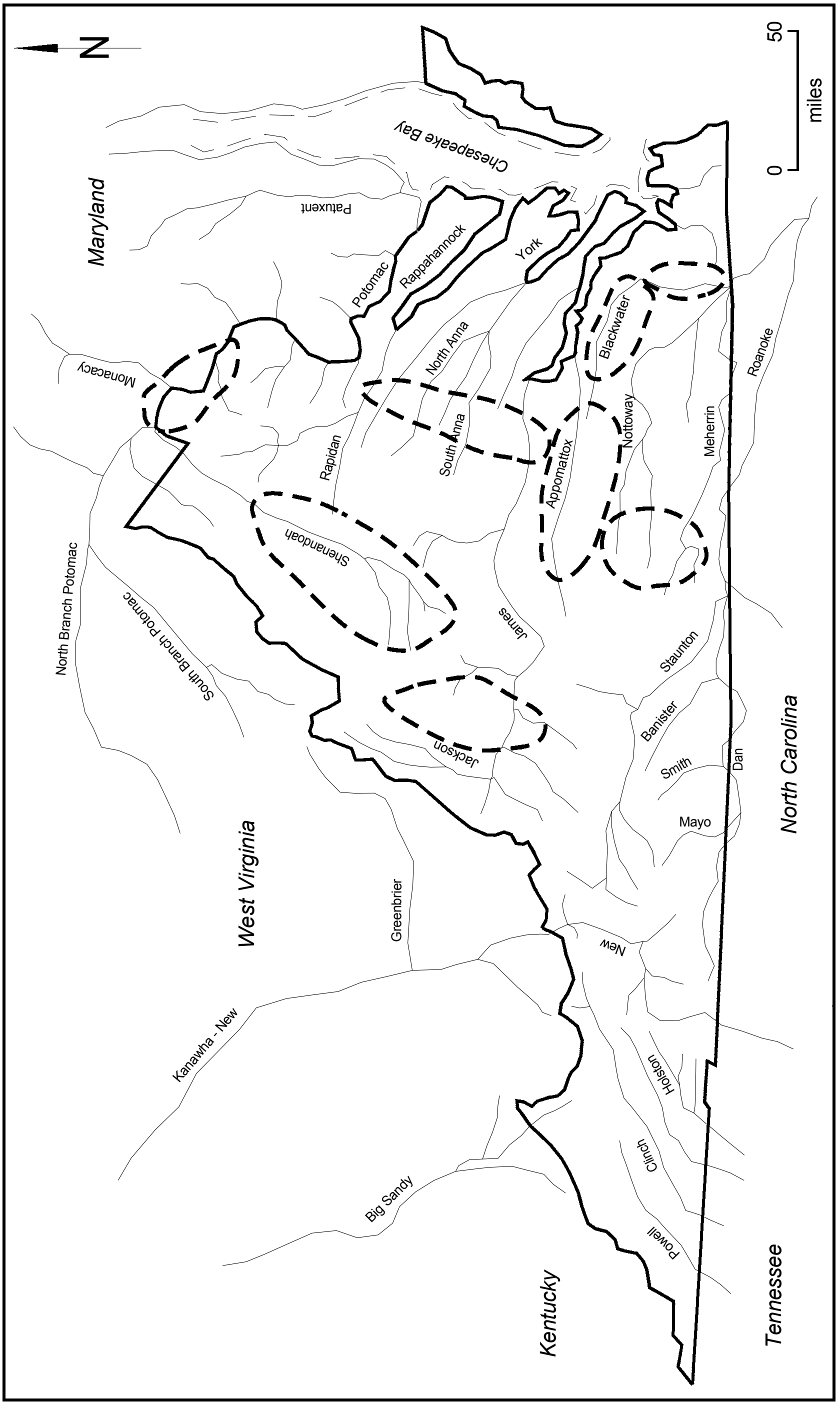

Figure 6. Buffer zones in Virginia at contact, circa A.D. 1600.

Intermontane Culture

With no known tribal identity, the people of the Intermontane Culture moved away or died out around A.D. 1625. The latest village known for this culture was the Trigg Site at Radford, datable by trade goods to about 1620 (Buchanan 1986). The Trigg Site is also a Dan River Culture site, since both cultures were equally represented there.

Luray Focus

The villagers of the Luray Focus retreated westward up the Potomac valley around A.D. 1600 (before European trade goods reached them), and they settled in the area of Cumberland, Maryland, where they emerge in historic times as the Shawnees. They had villages at Oldtown, Maryland, and at King Opessa's Town on the West Virginia side of the Potomac. The Shawnees moved from this area early in the eighteenth century, joining related remnant groups from parts of Pennsylvania and West Virginia who were historic residuals of the Monongahela Culture.

Potomac Creek Focus

By the Contact period, Potomac Creek peoples had split into two antagonistic groups, headed by the upriver Conoys and the downriver Patawomekes. The Conoys with their satellite groups moved up the Potomac around 1690, lived there for about two decades, and then moved north into Pennsylvania. Part of the Conoys remained in southern Maryland, where their descendants live today. The Patawomekes, with their allies the Doegs and Portobackoes, moved to the inner coastal plain of the Rappahannock River valley where they lived in several clusters within a few miles of present-day Port Royal. They later merged with local Rappahannock groups, and their descendants still live in the area. Some of the Patawomekes remained in their ancestral homeland along Potomac Creek, where their descendants still live (MacCord 1992).

Powhatan Chiefdom

The Powhatan Chiefdom lost coherence after the war of 1644–1646. Some groups remained in their original locations, and others moved to designated areas, where they were restricted to lands assigned them by the Colony. Among the latter were the Chickahominies, who moved to the Mattaponi valley near present-day Aylett but later returned to their

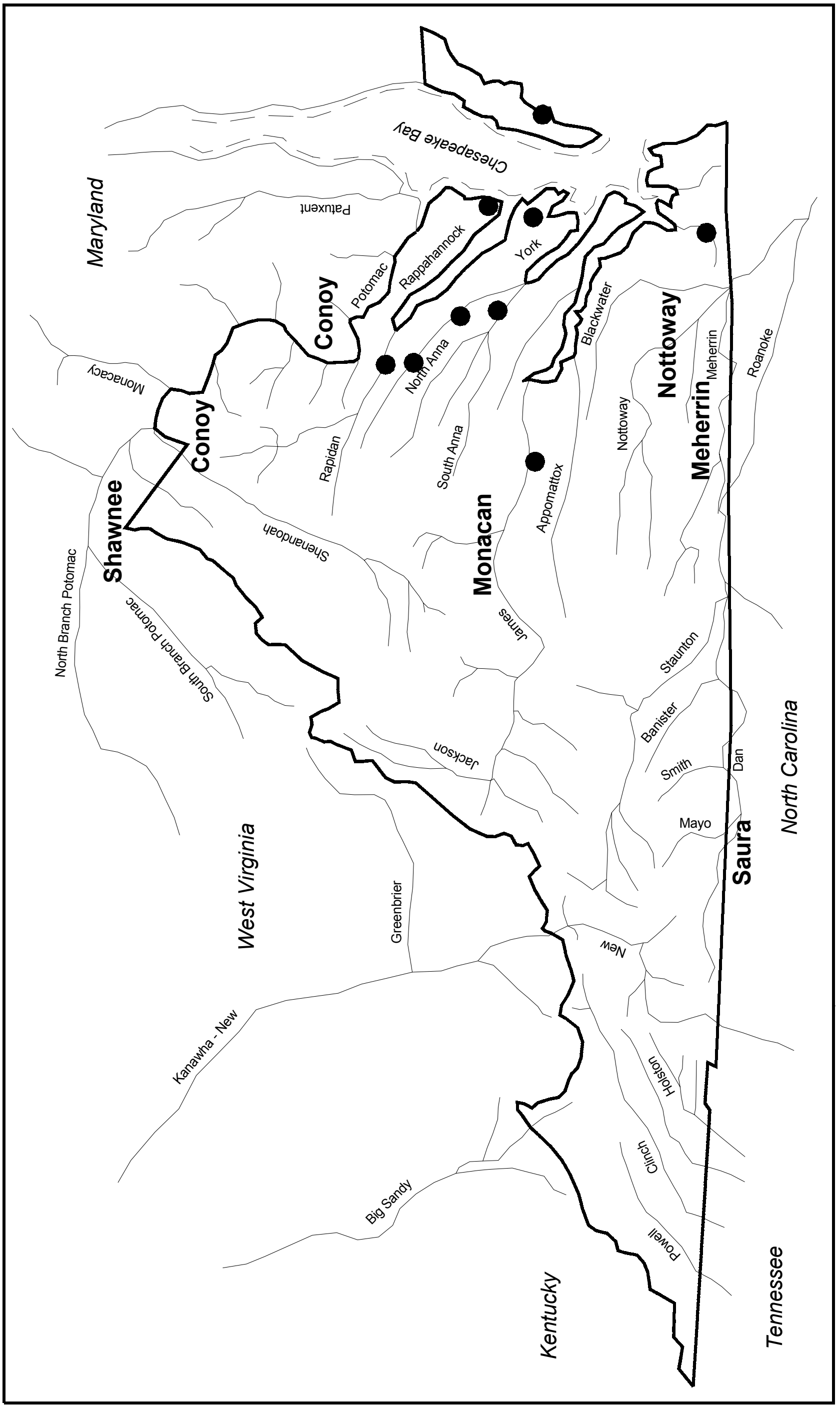

Figure 7. Indian lands in Virginia, circa A.D. 1700.

ancestral domains in the Chickahomimy valley (Stern 1952). The Weyanokes moved south into the Chowan valley and are lost to history by 1700. The Nansemonds continued to live in the Nansemond River area, and their descendants live there yet. The Pamunkeys surrendered most of their land in the 1646 treaty and were restricted to the peninsula between the Pamunkey and Mattaponi Rivers. There they gradually sold their land and now live on two small State reservations. The Appomattox lived in the Petersburg area until about 1700, after which they lived as tenants at William Byrd's plantation. They disappear from history about 1715. In the Northern Neck area, the Wicocomico persisted on a reservation until about 1719 (Potter 1977), and some descendants were still in that area in the early twentieth century (Speck 1928). The Chiskiack moved from the Yorktown area around 1623 and lived later in Gloucester County on the Piankatank River (McCary 1959). On the Eastern Shore, the Accomacs and the Accohannocks combined and lived on a reservation east of Eastville until they sold the last of their lands in the 1820s. For details on the breakdown, dispersal, and survival of the Powhatan, see Rountree (1990).

Nottoway and Meherrin

Early in the eighteenth century, the Nottoway lived on two reservations near Courtland on the Nottoway River. While they sold the last of their tribal lands in the nineteenth century, their descendants still live in the area. The Meherrin lived in a series of villages from the time of the first recorded visit by an Englishman in 1650 to their eventual dispersal into an area around the Meherrin River's confluence with the Chowan River around 1710. Their descendants live in that region today.

Monacan and Manahoac

The Manahoacs were seen and described in 1608 by Captain John Smith, but disappeared soon after. It is likely that they merged with their kin, the more numerous Monacans (Bushnell 1935). The Monacans lived in the James River valley west from the Fall Line to the Blue Ridge through the seventeenth and eighteenth centuries, and some descendants still live in Amherst and Nelson counties (Houck 1993).

Saponi and Tutelo

The Saponi, whose main territory was in the drainage of the Staunton

(Roanoke) River, moved frequently after 1671. In 1677 some lived along the Appomattox River for a brief time, then moved south into North Carolina where they lived in several places. About 1708 they moved to the Meherrin River, where they lived in several sites before moving to Fort Christanna about 1715. There they were reinforced by remnants of the Occaneechi, the Tutelo, and others, and around 1730 they moved northward, eventually joining the Cayugas of the Iroquoian Six Nations. The Tutelo had lived along the Dan River, although their Contact period villages have not yet been identified. One group seems to have moved westward and lived at Totera Town in 1671, in the Roanoke-Salem area or near Radford. The others moved eastward to the Meherrin River, where they lived at several sites for short episodes, finally merging with the Saponi at Fort Christanna. As a joint group, they were still known among the Cayuga as recently as World War I. After the Tutelo vacated the Dan River area, another Siouan-speaking group, the Sara, moved into that area and lived in one or two villages near the present-day towns of Eden, Madison, and Walnut Cove in North Carolina.

Discussion

By 1700, the distribution of Indian groups across Virginia bore little resemblance to the late prehistoric cultural groupings. The map in Figure 7 shows those groups which still maintained territories, even though those territories soon disappeared. The bulk of the Powhatans, longest in contact with Europeans, now lived in small reservations or enclaves, as shown by the black dots on the map. Again, the interested reader should consult Rountree (1990) as a source for greater details on this and related topics.

The "Big Picture" is fairly clear, but the scant archeological efforts thus far applied in many areas of Virginia render some specific locations difficult to pinpoint. The key sites for defining the cultural areas shown in Figures 2–5 are listed in the Notes (at the end of this article), and the corresponding number for each site is shown on one or more of the maps. No village site has yet been identified for either the Manahoac or Monacan, and it is likely that they remained in the hamlet phase until historic times. About 10 sites in the Saponi and Tutelo areas have been archaeologically tested, but not yet published. Among these are several sites now under the waters of Smith Mountain Lake.

About nine sites in the Martinsville area, dug or tested by the late R. P. Gravely, Jr., await analysis and reporting. Several Dan River sites west of the Blue Ridge are known along New River in Wythe, Pulaski, and

Montgomery counties. Of these, only the Trigg Site at Radford has been reported in the literature (Buchanan 1986).

An anomalous situation existed in the Gathright Dam area of Bath County at about A.D. 1600. There, the Huffman and Perkins Point sites share attributes with the Intermontane Culture and also with the Mason Island Culture. One explanation is that survivors of the Mason Island group did not phase into the Luray Focus because they were isolated in the mountainous Bath County area. Here, their distinctive ceramic styles may have persisted until Contact times, as evidenced by glass trade beads in otherwise prehistoric contexts at the Perkins Point Site.

In addition to the nine distinct culture areas defined for the second half of the Late Woodland period, two more ephemeral groups should be noted. In the far southwest corner of Virginia a northern intrusion of Dallas Culture people, usually considered as ancestral Cherokees, left several sites dating to around A.D. 1400–1500. One of these is the flat-topped domiciliary mound at Rose Hill, Lee County, Virginia. The other is the Flanary Site, a palisaded village site in Scott County on the banks of Clinch River at Dungannon. No doubt, other Mississippian sites will come to light as more surveys are done in that part of the state.

The other ephemeral group was the Susquehannocks, who briefly occupied the valley of the South Branch of the Potomac River in Hampshire County, West Virginia. Two sites—the Herriot Site at Hanging Rocks, north of Romney, and the Pancake Island Site, south of Romney—have been studied in that area. Other Susquehannock sites may come to light in the upper Potomac area, when that area is studied more intensively. The two known Susquehannock sites date to the first quarter of the seventeenth century.

Summary

Sufficient archeological work, coupled with ethnohistoric research, has been done in Virginia in recent decades to permit the definition of nine or ten cultural areas, often separated by unoccupied buffer zones. The individual cultures represent differing language stocks, geographic isolation, and the movement of peoples and ideas from areas outside the Commonwealth. Refinement and verification of these concepts await further researches.

Notes

This paper was presented at the Middle Atlantic Archaeological Conference at Ocean City, Maryland, 1991, and was updated December, 1995.

The following is a key to the numeric site designations shown on Figures 2, 3, 4, and 5. All sites are in Virginia except where noted.

Intermontane Culture: (1) Sullins Site, Washington Co.; (2) Fox Site, Smyth Co.; (3) Hansonville Site, Russell Co.; (4) Crab Orchard Site, Tazewell Co.; (5) Brown Johnson Site, Bland Co.; (6) Lurich Site, Giles Co.; (7) Snidow Site, Giles Co.; (8) Watson Site, Wythe Co.; (9) Trigg Site, Montgomery, Co.; (10) Shannon Site, Montgomery Co.; and (11) Hercules Site, Alleghany Co.

Lewis Creek Mound Culture: (1) Lewis Creek Site, Augusta Co.; (2) John East Site, Augusta Co.; (3) Bowman Site, Rockingham Co.; (4) Huffman Site, Page Co.; (5) Hirsh Site, Bath Co.; (6) Hayes Creek Site, Rockbridge Co.; and (7) Rapidan Site, Orange Co.

Montgomery Focus: (1) Shepard Site, Montgomery Co., Maryland; (2) Winslow Site, Montgomery Co., Maryland; (3) Fisher Site, Loudoun Co.; (4) Front Royal Pipeline Site, Warren Co.; (5) Sours Site, Warren Co.; (6) Kern Site, Clarke Co.; and (7) Rosenstock Site, Montgomery Co., Maryland.

Mason Island Culture: (1) Keyser Site, Page Co.; (2) Miley Site, Shenandoah Co.; (3) Quicksburg Site, Shenandoah Co.; (4) Fout Site, Frederick Co.; (5) Mason Island Site, Montgomery Co., Maryland; (6) Jeffrey Rockshelter, Loudoun Co.; (7) Jeffrey Village, Loudoun Co.; and (8) Rosenstock Site, Montgomery Co., Maryland.

Luray Focus: (1) Keyser Site, Page Co.; (2) Miley Site, Shenandoah Co.; (3) Quicksburg Site, Shenandoah Co.; (4) Bowman Site, Shenandoah Co.; (5) Hughes Site, Montgomery Co., Maryland; (6) Shepard Barracks Site, Montgomery Co., Maryland; (7) Gore Site, Montgomery Co., Maryland; and (8) Rosenstock Site, Montgomery Co., Maryland.

Potomac Creek Focus: (1) Patawomeke Site, Stafford Co.; and (2) Moyaone Site, Prince George Co., Maryland.

Powhatan Chiefdom: (1) Great Neck Site, Virginia Beach; (2) Hatch Site, Prince George Co.; (3) Kiser Site, Colonial Heights; and (4) Paspeheigh Site, James City Co.

Nottoway-Meherrin Culture: (1) John Green Site, Greensville Co.; (2) Ellis Ossuary, Southampton Co.; and (3) Hand Site, Southampton Co.

Dan River Culture: (1) Martin Site, Wythe Co.; (2) Koehler Site, Henry Co.; (3) Reed Creek Site, Halifax Co.; (4) Clarksville Site, Mecklenburg Co.; (5) Elm Hill Site, Mecklenburg Co.; (6) Onion Field Site, Campbell Co.; (7) Lipes Site, Botetourt Co.; (8) Bessemer Site, Botetourt Co.; and (9) Gaston Site, Halifax Co., North Carolina.

Dallas Culture: (1) Rose Hill Mound, Lee Co.; and (2) Flanary Site, Scott Co.

Susquehannock Culture: (1) Herriot Site, Hampshire Co., West Virginia; and (2) Pancake Island Site, Hampshire Co., West Virginia.

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BOOK REVIEWS

The Prehistory of the Chickamauga Basin in Tennessee (2 volumes), by Thomas M.N. Lewis and Madeline D. Kneberg Lewis. Compiled and edited by Lynne P. Sullivan. The University of Tennessee Press, Knoxville, 1995. lv + 681 pp., illus., tables, appendices, biblio., index. Volume I: $50.00 (cloth), $25.00 (paper); Volume II: $50.00 (cloth), $25.00 (paper).

Reviewed by Christopher B. Rodning

It is interesting and enlightening to reflect not only on the archaeological past but also on the past of archaeology itself. Originally assembled by Thomas Lewis and Madeline Kneberg in the 1930s and 1940s, and masterfully compiled and edited by Lynne Sullivan in the 1990s, *The Prehistory of the Chickamauga Basin in Tennessee* contains several previously unpublished reports of investigations at sites along the Tennessee and Hiwassee rivers in southeastern Tennessee. These sites were excavated prior to the construction of the Chickamauga Dam, which inundated most of them. The report also includes several synthetic essays on the archaeology and ethnohistory of native settlement in the region. As Sullivan notes in the foreword, Lewis and Lewis' *The Prehistory of the Chickamauga Basin in Tennessee* (1995) really represents a companion monograph to their *Hiwassee Island: An Archaeological Account of Four Tennessee Indian Peoples* (1946), a classic in Southeastern archaeology and a presentation of research at this important site in the basin. The authors envisioned these books as stepping stones to more interpretive questions about the actual experiences of Native Americans in the centuries prior to European contact. This initial step in their anthropological project, of course, came through amassing and synthesizing all the relevant archaeological evidence. This evidence is presented in *The Prehistory of the Chickamauga Basin in Tennessee*, a collection of very readable reports, essays, charts, and illustrations.

Although these essays, reports, and appendices were written decades ago, this compilation positions the original research and writing in the context of contemporary archaeology. This pair of volumes constitutes a carefully edited and thoughtfully designed presentation of an old and valuable monograph in archaeology, formerly cited by researchers as a “manuscript on file” at the University of Tennessee's McClung Museum in Knoxville. As Sullivan observes in her foreword, the original manuscript and project notes were archaeological artifacts of sorts, inasmuch as they hail from a different era in the history of the discipline. Consequently, many editorial decisions balanced commitments to keeping true to the original manuscript and to filling gaps left in unfinished chapters. The editorial remarks which preface each chapter of the current book identify which parts of the current text are originals and which were drawn from maps, tables, and illustrations in project files. These editorial comments further note how archaeology in the intervening years has confirmed, rejected, or modified the conclusions which were drawn here.

The first section includes a pair of essays introducing the cultural and natural history of the region. Describing the direct historical approach taken by directors of this archaeological project, Thomas and Madeline Lewis outline the presentation of archaeological findings presented later in this report. They describe the diagnostic material-culture traits of Mississippian-period Hiwassee Island, Dallas, and Mouse Creek components, and those of the Woodland-period Candy Creek and Hamilton components. Nowadays, archaeologists have a much better understanding of the chronological relationships of these material-culture groups and better appreciate the time depth of Woodland and Mississippian traditions in the region. However, many of the artifact types diagnostic of these groups recognized during the 1930s and 1940s remain part of current culture-historical definitions. Following the introduction to prehistoric settlement in the region, Thomas Lewis and A. J. Sharp describe the regional environment, carefully noting which species of plants and animals and which geographical features would have benefited native residents. Together, these chapters provide a good background for the discussions that follow.

The second section includes discussions of artifact typology. As an introduction to chapters on individual crafts and technologies, an essay by Thomas Lewis outlines the approach to archaeological materials collected by members of the Chickamauga project. As he argues, the best archaeological typologies follow as closely as possible item categories which might have been used in the past. The primary goals in the project's field and lab efforts were to generate and arrange archaeological assemblages for comparative studies. Developing classifications of different kinds of artifacts represented an important step in these efforts.

Following these introductory remarks are individual chapters on architectural, pottery, stone, bone, shell, metal, and weaving industries. The chapter on architecture compares dwelling house and community building designs and materials from different periods of settlement and is a comprehensive inventory of the kinds of architecture identified at sites in the basin. The chapter on pottery provides good illustrations and detailed lists of attributes that are common to ceramic groups now identified with the Candy Creek or Hamilton phases of the Woodland period, and the Hiwassee Island, Dallas, or Mouse Creek phases of the subsequent Mississippian period. The chapter on the stone industry provides similarly helpful illustrations and attribute lists of chipped-stone and ground-stone assemblages from sites in the basin, although contemporary archaeologists have significantly different understandings of the chronological associations of different kinds of stone implements. Then as now, projectile points are seen as especially important in identifying different cultural traditions. Several chapters concentrate on more esoteric components of the archaeological record, including settlement patterns, domestic life, subsistence strategies, mortuary customs, and trading practices.

Originally written as separate sections of the typology chapter, commentaries on community plan and domestic life comprise a single chapter. Thomas Lewis views archaeological opportunities to examine domestic life as limited, although chipping stations, grinding tools, stone-tool caches, and rows of household vessels preserved in place provide some clues about domestic customs. Although taking care to make sure that all forms of architecture, burials, palisades, and other features of the built environment of prehistoric communities are represented in interpretations of community plans, he considers these patterns as reflections of group social structure. The notion of a social *community* often extends well beyond the bounds of excavated archaeological *sites*, and Thomas and Madeline Lewis acknowledge this fact in their writing. It is interesting that they describe reconstructions of community organization based on spatial layouts of prehistoric settlements as difficult interpretive steps, since fieldwork during their day often involved the excavation of extensive areas, sometimes far exceeding the spatial coverage of many current excavation projects with similarly ambitious questions.

The third section includes classificatory and comparative essays. Madeline Lewis describes the classificatory approach taken by the Chickamauga archaeologists and presents the trait lists for the several cultural components that were identified through this fieldwork. The text describes the purposes and logic of the old Midwestern taxonomic system and defines such archaeological designations as "focus" (i.e., the basic unit of the classification system) and "component" (i.e., the manifestation of a focus at a particular site). Her essay further draws a clear distinction between an archaeological "component" (i.e., an archaeological dataset) and a "community" (i.e., an historical and social entity which archaeologists study through assemblages of material culture). Her point is to demonstrate that basic archaeological classification, which requires typological distinctions, represents an important, but only an initial, step in archaeological research. Ultimately, the ambition of archaeology is not to tally checklists of traits from different components of various sites and to compare them, but rather to understand the cumulative experiences of diverse communities in the past. For this and other contemporary projects, checklists of the subsistence strategies, community plans, architectural traditions, lithic craftsmanship, ceramic manufacture, and mortuary customs represented an initial step towards this ambitious goal. Attempting the next step, Andrew Whiteford links material-culture assemblages dating to different episodes of settlement in northeastern Tennessee, southeastern Tennessee, and northwestern Alabama, demonstrating the checklist approach common in archaeology at that time. Building on these preceding essays, Joseph Bauxhar seeks to connect specific material-culture traits to historically known native groups of the Southeast. Although neither the trait checklists nor the specific affiliations of archaeological and ethnic groups as presented here are accepted anymore, these chapters nevertheless present valuable archaeological and historical information.

The fourth section of the book, comprising most of Volume II, includes the individual site reports. All of these sites are located in the Chickamauga Basin and are now submerged under Chickamauga Lake, except for the Ocoee site in extreme southeastern Tennessee at the edge of the Appalachian range. The other Chickamauga sites included in this report are: Candy Creek, Sale Creek, Dallas, Hixon, Davis, Rymer, Mouse Creeks, Ledford Island, Varnell, Spivey, and McGill.

Archaeological highlights include discussions of: burial clusters associated with household compounds and community buildings at the Mouse Creeks, Ledford Island, and Rymer sites; the diversity of engraved designs on shell gorgets from the Hixon site; the careful dissections of the Mississippian mound and both dwelling houses and community buildings at the Dallas site; a Hiwassee Island phase mound built to incorporate two earlier truncated earthworks at the Davis site; the community building compound at the Sale Creek site which includes multiple structures in a pattern resembling townhouses at Overhill Cherokee and Middle Cherokee settlements; Woodland and Mississippian burials concentrated in two distinct clusters at the Candy Creek site; and a unique Overhill Cherokee log stockade at the Ocoee site. Of course, it is difficult to summarize briefly all the lessons awaiting analysis of the excavated material. Now that this report has been completed and published, that material is widely accessible in its original form.

Several appendices form the last part of the text. The first appendix is a list of plants which probably would have been available to native communities in the Chickamauga Basin, as well as their possible roles in human consumption. The second appendix includes an annotated bibliography of early maps drawn of the Southeast, especially those related to the sites discussed in these volumes and to the historical residents of this region. The third appendix represents a handbook for the Chickamauga Basin archaeological project, written as a guide for all the personnel involved in the field investigations. This essay describes protocol and the philosophy behind the organization of this major archaeological project.

The Prehistory of the Chickamauga Basin in Tennessee is an outstanding contribution to Southeastern archaeology. For making available site reports and syntheses which until now were only accessible as a manuscript on file in the Knoxville museum, archaeologists owe Sullivan great thanks. For filling gaps in original text and illustrations by drawing from tables, maps, sketches, and notes in Chickamauga project files, and for insightful editing, archaeologists owe Sullivan great compliments. The first volume includes general essays which are very readable introductions to the original archaeological investigations on native settlement and material culture in the region. That and the second volume, which includes the site reports and the appendices, belong on the shelves of specialists interested in Tennessee and Cherokee archaeology and anyone interested in the history of archaeology in the Southeast. The editor, museum, press, and the Tennessee Valley Authority, who funded the recent publication effort, are commended for taking this report from the gray literature and transforming it into a pair of very handsome volumes (available in hard-bound or paperback format) which provide valuable information about the archaeological past and meanwhile lend some insights into the past of archaeology itself.

Exploring Ancient Native America: An Archaeological Guide, by David Hurst Thomas. Macmillan, New York, 1994. xxii + 314 pp., illus., biblio., index. $19.95 (cloth).

Reviewed by Elaine Davis

Speaking and writing for general audiences has become a professional imperative in the field of archaeology. For, if the past is to be saved for the future, it must be a past that belongs to everyone. The challenge, however, is in communicating in a responsible way—a way that moves outside the specialized language of research, yet does not compromise the complexity of the story being told. In *Exploring Ancient Native America: An Archaeological Guide,* it seems that David Hurst Thomas has achieved this difficult balance.

Visually, this book is well designed and inviting. The text is greatly enhanced by both color and black-and-white photographs, as well as other forms of graphic information. Sidebars that present alternative perspectives and technical information are particularly effective features and appear throughout the book.

Although Thomas has chosen to classify this book as a "guide," it would be a mistake to equate this work with the sort of guides that are typically produced for a popular market. Whether it be a guide for traveling to a particular geographic local or for navigating on the information super-highway, guides are rarely more than a simplified set of details for maneuvering from one point to another and are, for the most part, one dimensional in focus. In contrast, Thomas has prepared what might be better described as a journey—one that, in his own words, "sketches both the diversity and texture of American Indian lifeways."

Sometimes, a reader is tempted to skim past the introductory portion of a text, the acknowledgments, forward, and prologue; particularly if it is depicted as a reference or a "guidebook." To do so with this book would mean omitting the heart of the work. In these opening pages, Thomas makes explicit not only what the book is about, but what he is about as well. He provides a discussion of his background, his intent, his ethics, and values. Of particular significance is his position regarding how the past should be told:

> As a practicing field archaeologist, I am qualified to tell you about ancient Native America from a scientific perspective. But it is vitally important that you, the reader, likewise understand that American Indian people cannot, and should not, be viewed strictly in either scientific or historical terms. Fortunately for us all,

> Native American people are still with us, and they are today very active in telling the story of their own past.

Thomas reveals himself and his objectives to the reader in this introductory section and, in so doing, manages to escape the heavy authoritative voice that often dominates text prepared for the lay public.

Throughout this work, Thomas reminds the reader that his voice and his opinion are indeed just that, but he consistently explains the logic supporting his position. In some instances he moves a step further and provides criteria for evaluating evidence. This is an expected practice when writing for an audience of peers, but is sadly neglected in more popular works. The implication in such omissions is that a lay audience is either not sophisticated enough to appreciate explanation or that they should simply accept the author at his word because he is the expert. In either case, the end result is a "dumbed down" text. In giving justification and rationale for his positions, Thomas elevates this genre of writing to a more intelligent level.

The history that Thomas tells is organized in a fairly linear way; his stories of the past are arranged according to time and cultural groups. He starts this journey at the beginning or, more accurately, at the beginnings; with explanations of human origin. While he devotes most of this prologue to archaeological constructions, he also presents three Native American perspectives regarding human origin. These creation stories are presented not as myth, but as alternative perspectives. It is in this opening that Thomas's stated intentions begin to become apparent in practice, and that his approach to guiding the public through the past emerges. This approach might be characterized as one of respect: respect for the native cultures both past and present, respect for the intelligence of the reader, and respect for the science that can provide insight into an otherwise excluded past.

Following the global prologue, Thomas moves into a discussion of the earliest human occupation of the Americas and characteristics of Paleo-Indian tradition. Section 2 is devoted to exploring regional adaptations by human populations during the American Archaic. The American Southwest and the emergence of agriculture are the focus of Section 3. Sections 4 and 5 move eastward, and detail variation in the Woodland Tradition and Mississippian Transformation. The final sections are devoted to the dynamics of encounter, including those of the past and the act of continual encounter in the present. In each of these sections, Thomas enriches the text with illustrations, photographs, maps, alternative perspectives, and technical information that together provide an informative and compelling account of America's native history. Lists of museums and archaeological sites that are open to the public, as well as directions for visiting them, are given for each of the cultures discussed. This same information is also listed in an appendix, but is arranged in alphabetical order by state to better serve those who might be planning a trip to a specific locale.

For a work of this length, the picture of America's rich and extensive native past must, out of necessity, be painted with very broad strokes. This book is successful in providing a global perspective without sacrificing the diversity and complexity which characterize that past. *Exploring Ancient Native America* sets a standard that will serve as a valuable model for future efforts.

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