A PRELIMINARY REPORT ON THE LATE PLEISTOCENE AND EARLY HOLOCENE ARCHAEOLOGY OF ROCK CREEK MORTAR SHELTER, UPPER CUMBERLAND PLATEAU, TENNESSEE

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Rock Creek Mortar Shelter (40PT209), in Pickett State Forest on the Upper Cumberland Plateau of Tennessee, possesses an intermittent 11,500 year occupation history. This history may be consistent with previous ideas of first colonization of upland rock shelter zones at the end of the Younger Dryas with significant climatic amelioration. However, culturally sterile deposits have yet to be encountered and the site may be older still. This work focuses on the late Pleistocene and early Holocene components, paying particular attention to unifacial, blade, and blade-like tool production and technology, use-wear analysis, and depositional history. Variability in blade production during the late Pleistocene deposits suggests residentially mobile family groups, and could also represent the colonizers' struggles with adapting a blade tool technology to the locally abundant small, rounded Monteagle chert cobbles.

Three field seasons have been completed at Rock Creek Mortar Shelter (40PT209) in Pickett State Forest on the Upper Cumberland Plateau (UCP). The archaeological deposits are comparatively deep and may extend back into the Paleoindian period. Radiocarbon dates suggest this to have occurred perhaps as early as 12,500 years ago but certainly by 11,500 years ago. The shelter lies at what Lane and Anderson (2001) refer to as a migration terminus - the end of early migration routes. The early occupational history of the shelter is thus far consistent with Walthall's (1998) ideas of first colonization of upland rock shelter zones at the end of the Younger Dryas with significant climatic amelioration. The site was intermittently occupied over the course of the next 11,500 years until about AD 1000.

The Upper Cumberland Plateau was likely a very different environment 12,500 years ago at the end of the Pleistocene during the Younger Dryas. Still, some early pioneers ventured their way up on the plateau, perhaps up the Wolf River and/or Big South Fork river valleys that represent the ends of early migration routes as noted by Lane and Anderson (2001). As the climate ameliorated beginning about 11,600 years ago, hardwood forest communities migrated to higher elevations. People began to exploit nut mast resources and associated game animals. A seasonal round, or way of doing, was established. This way of doing things in the uplands set the tone for the next several millennia.

Site 40PT209 is important because it represents the first recorded in 20 years of work on the UCP with late Pleistocene and early Holocene deposits that appear intact and in relative stratigraphic position. The previous work includes intensive surveys of the East Fork Obey gorge (Franklin 2002, 2006), Pogue Creek State Natural Area (Langston 2013; Langston and Franklin 2011), and significant portions of Pickett State Forest (Langston et al. 2012). Culturally sterile layers have not been encountered at Rock Creek Mortar Shelter, thus it is possible that more ancient archaeological levels could

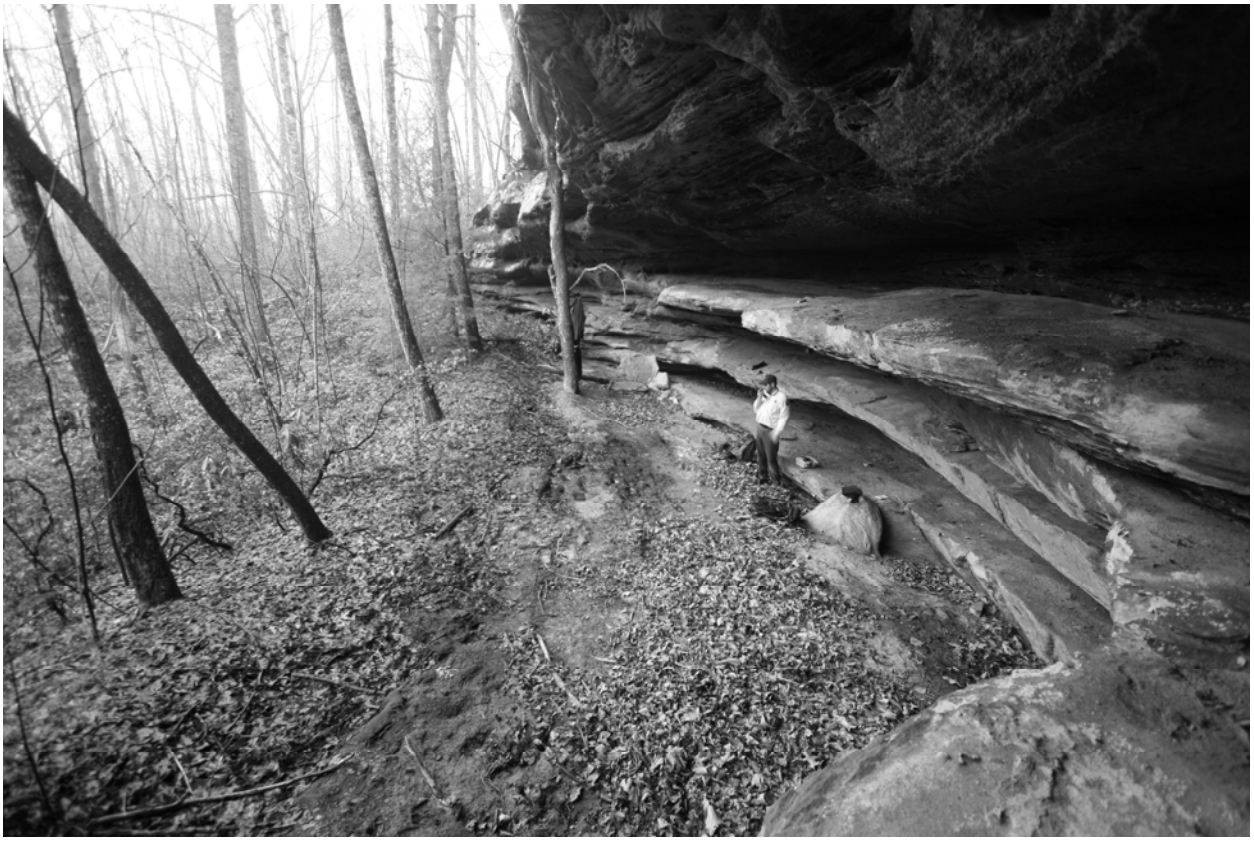

FIGURE 1. Rock Creek Mortar Shelter looking north.

be present. The shelter represents a great opportunity to examine cultural and technological change through time as Early Archaic through Late Archaic and Woodland components are present. This provides not only an extremely rare opportunity to examine colonizing exploitation in an upland region, but also allows an opportunity to examine an 11,000-year prehistoric cultural sequence at one place.

Rock Creek Mortar Shelter faces west and lies at the northern extremity of a long upland bluff line (Figure 1). The shelter is situated within the Rockcastle Conglomerate at an elevation of 464m amsl (about 1520 feet). Rockcastle is a conglomeratic sandstone (consisting of densely packed quartz pebbles) and sandstone (with a few scattered rounded quartz pebbles), gray to brown in color, and fine to coarse-grained (Phillips et al. 2010:189). This formation ranges in thickness from about 46 to 67 meters (about 150 – 220 feet) and is typically the highest elevation formation in this area of the UCP. This high elevation rock shelter is one of tens of thousands in an upland region dominated by rugged terrain, precipitous stream gorges, and hundreds of kilometers of sandstone bluff lines. The shelter does not occur along a major river as the closest stream is Rock Creek approximately 400 meters due north. However, there is a 70-meter high bluff line that separates the rolling uplands where the shelter sits and Rock Creek (Figure 2).

Rock Creek Mortar Shelter has not been disturbed by vandals or artifact hunters, a rarity in a region with a 150-year history and tradition of artifact

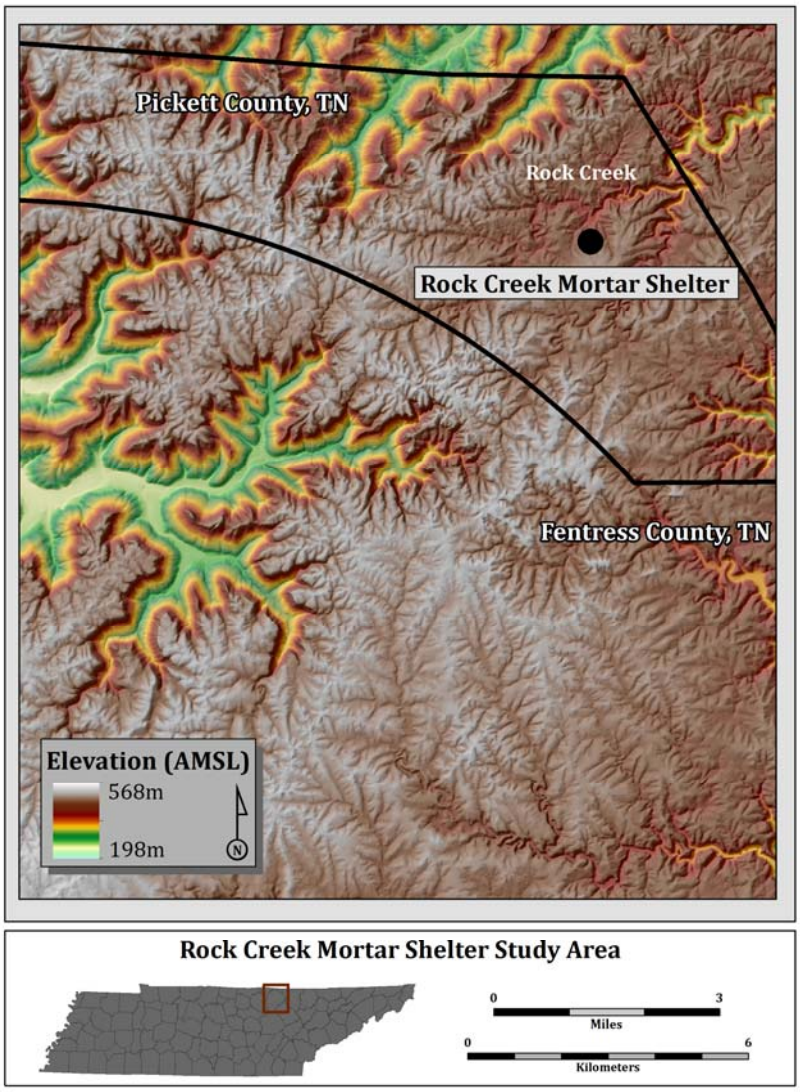

FIGURE 2. Rock Creek Mortar Shelter study area.

hunting and looting (Des Jean and Benthall 1994:139; Franklin 2002:5-6). The site is located near a primary road and Pickett State Park, and its integrity is very much in danger from illegal digging. Park personnel monitor the shelter, but it is unlikely the site can be protected indefinitely. A long term excavation program is planned in conjunction with the 2016 opening of the Pickett State Park Archaeology Museum and ETSU Archaeological Research Station. The site will be an integral part of public outreach at the park.

Rock Creek Mortar Shelter is apparently not the only early site in the Rock Creek drainage of the Little South Fork Cumberland River. Prismatic blades were recovered during survey of sites 40PT216 (open air ridge top) and 40PT241 (Hot Bluff Shelter) in 2012. Research has also recorded several additional pristine rock shelter sites, suggesting the drainage is a high value area to continue archaeological survey and seek out potential Paleoindian and Early Archaic sites.

One issue we propose to address is Lane and Anderson's (2001:92) proposition that the Upper Cumberland Plateau lies at the physiographic end of an early migration route. "There have been no research projects directed to exploring Paleoindian occupations in the area, and large-scale professional excavation of known sites in non-existent" (Lane and Anderson 2001:94). Therefore, what little we do know may actually reflect investigation bias rather than settlement preference on the part of Paleoindian populations. This notion is not surprising as "there is an understandable research bias against examining steeply sloping terrain and this. . . might reduce the likelihood of discovering Paleoindian sites" (Lane and Anderson 2001:90). However, steeply sloping terrain often includes rock shelters, and there are thousands that remain to be investigated

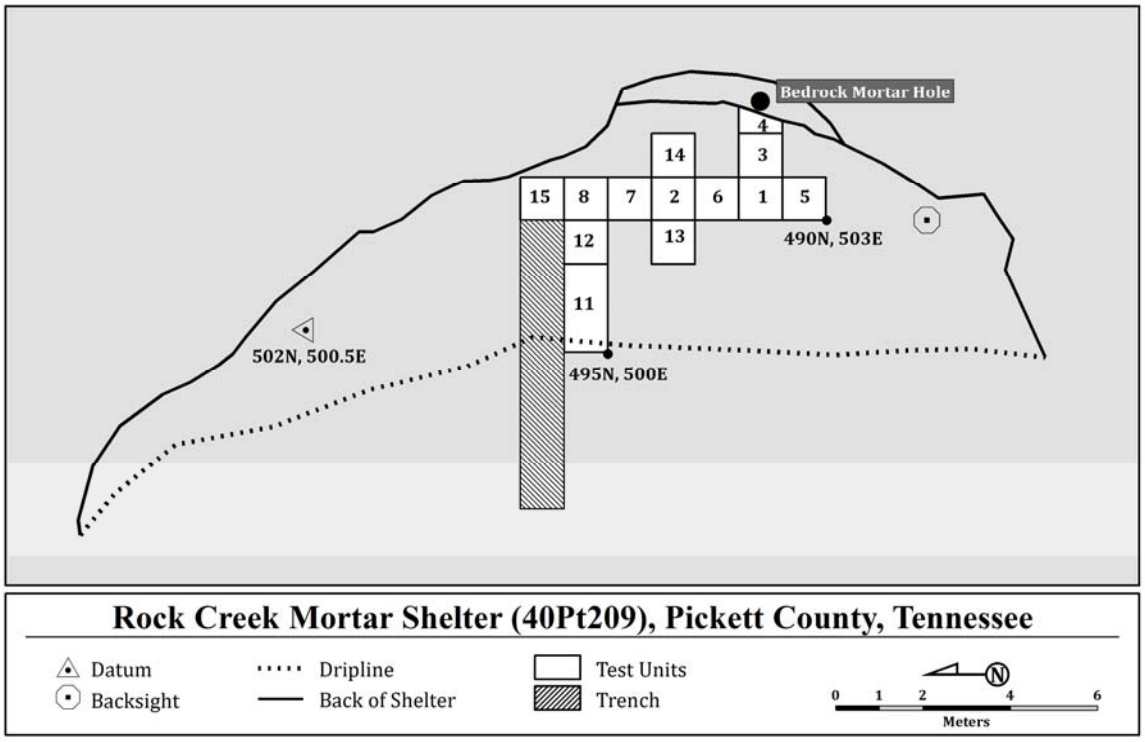

FIGURE 3. Rock Creek Mortar Shelter plan view, January 2014.

on the Upper Cumberland Plateau. The work at Rock Creek will anchor our research program aimed at the late Pleistocene and Early Holocene archaeology of the UCP.

History of Work at Rock Creek Mortar Shelter

Tennessee State Parks ranger Travis Bow discovered Rock Creek Mortar Shelter in early 2012. Two things drew his attention: (1) the presence of a large bedrock mortar hole in a back ledge, and (2) the site was pristine – something previously noted as an uncommon occurrence on the UCP. Senior author Jay Franklin visited the site with Bow in March 2012, and returned in January 2013 as part of East Tennessee State University's (ETSU) inaugural winter session field school. The focus of the field school was largely survey for new sites in Pickett State Forest, but the last few days were dedicated to test excavations at the shelter. Woodland and Late Archaic period artifacts were recovered within two test units (Units 1 and 2; Figure 3) in good stratigraphic position.

ETSU returned to the site in March 2013 for further testing. In addition to continuing with the two open test units, a 3 x 1 meter test trench was established perpendicular to the shelter's dripline axis. In this trench, at about 85 cm below surface, we encountered Early Archaic artifacts. This discovery was the first time Early Archaic materials had been discovered in stratified contexts on the UCP. Two specimens recovered at 125 cm below surface (a double side scraper made on a blade, and a large biface with possible overshot flaking) favorably compared to Paleoindian artifacts, possibly Clovis (John Broster, personal communication, 2013).

A second winter season of archaeo-logical testing was conducted in

December 2013. The trench was extended another three meters to beyond the drip line. Also, four additional test units were opened along the same east-west line as the two previously mentioned units, in effect creating a trench running parallel to the shelter's axis (Figure 3). Numerous blades and blade fragments were recovered along with a few diagnostic bifaces. Five AMS radiocarbon assays date the late Pleistocene/early Holocene deposits at Rock Creek Mortar Shelter.

A third field season was completed in winter 2014/2015. Several more units were opened, and the trench was extended further beyond the shelter drip line. Additional blades and blade-like flakes were recovered, and the earliest diagnostic bifaces originate from the Early Archaic period. Eight additional AMS dates were obtained during Field Season 3, and all but one AMS date associate these artifacts with the Early Archaic period.

Stratigraphy

Test Units

Stratigraphy in the (eventual) 7 x 1 meter perpendicular trench appears distinct from the test units (farther back in the shelter) that run parallel with the long axis of the shelter. In the test units (Figure 4), Stratum 1 is a recent humus layer that varies between 5-10 cm thick. Stratum 2 is pale yellow to white sand about 20 cm thick in the south part of the shelter that pinches out moving northward, and appears to be the result of weathering of a sandstone ledge 2.5 meters above the surface. Stratum 2 has a horizontal extent of about two meters that is consistent with the ledge. Woodland period artifacts were recovered from the mid to lower levels of this layer.

Stratum 3 is a strong brown loamy sand layer that yielded Woodland period artifacts from the top level, and Terminal Archaic artifacts below that. Stratum 3 also yielded evidence of thin, poorly

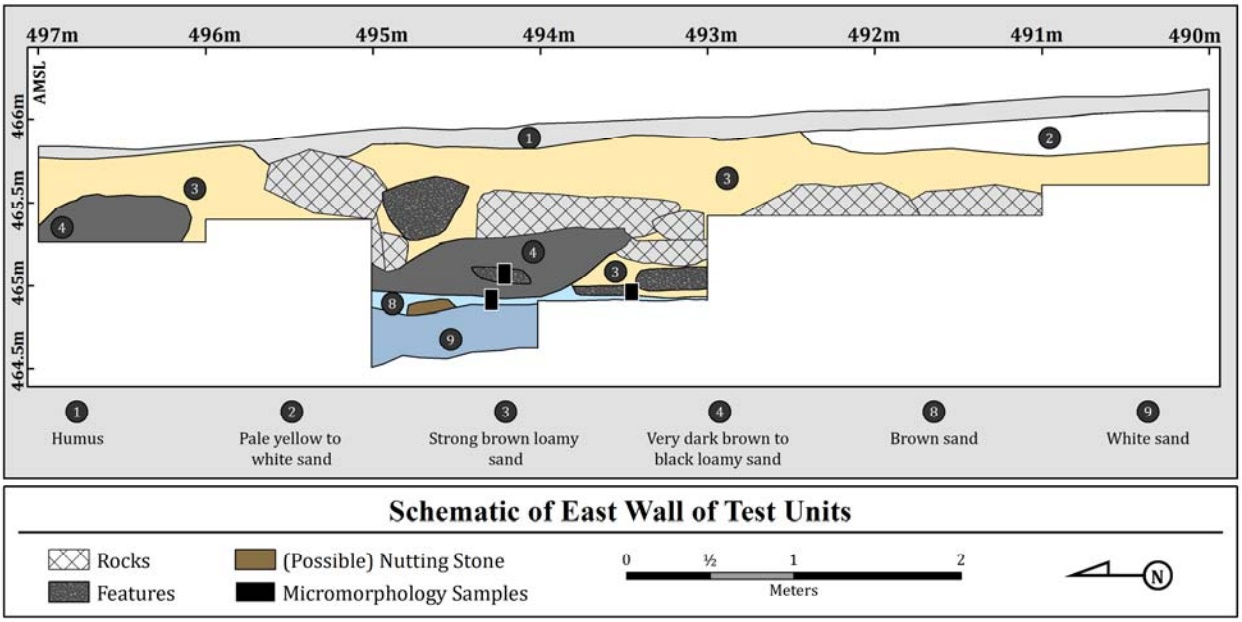

FIGURE 4. East wall profile of test units, January 2014.

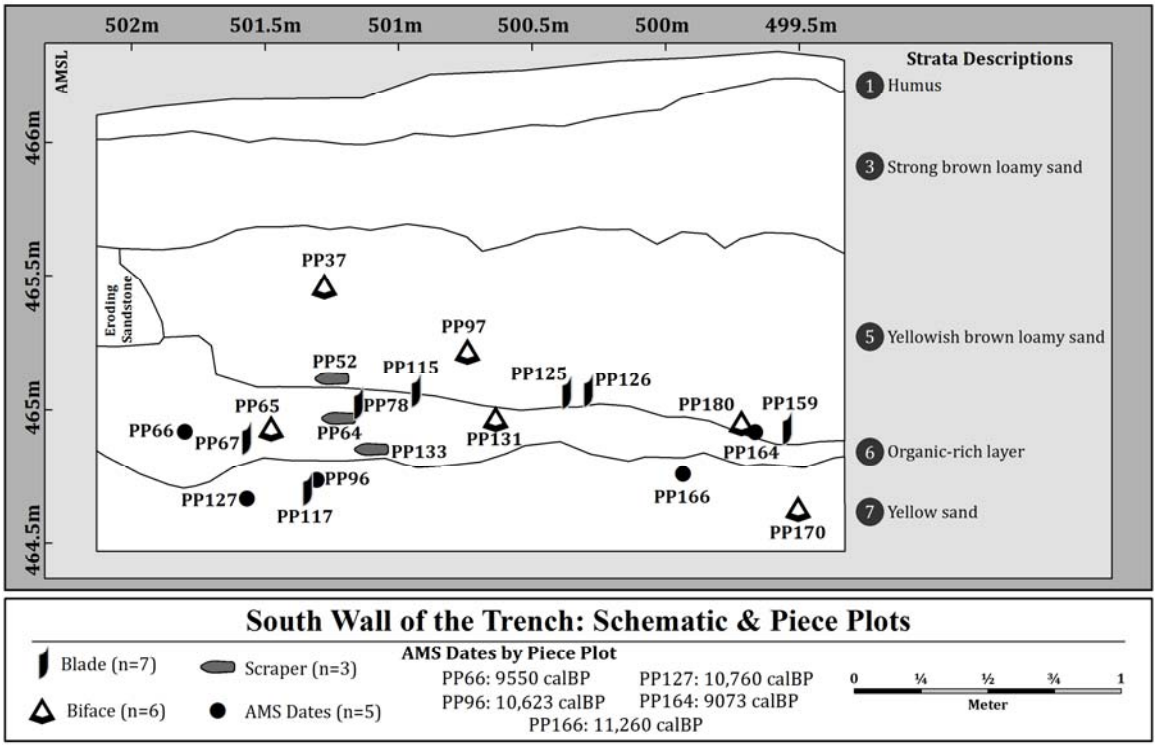

FIGURE 5. South wall profile of trench, January 2014.

preserved, prepared baked clay surfaces.

Stratum 4 comprises a rich organic, very dark brown to black loamy sand that corresponds to the Late and Terminal Archaic periods. This layer varies in thickness and extent and may be better interpreted as a midden rather than a lithostratigraphic unit. It could also be due in part to differential accumulation of organics due to significant rock fall in the shelter. Baked clay surfaces were also encountered in Stratum 4, with some (like Feature 5) better preserved than those encountered in Stratum 3. The presence of baked clay surfaces is consistent with the recovery of nutting stones in Stratum 4. Elsewhere, these surfaces have been described as having been used to parch nuts (Homsey-Messer 2015).

Below Stratum 4 is a brown sand layer defined as Stratum 8 (possibly the result of organics leaching from Stratum 4) containing Middle and Early Archaic period artifacts. Stratum 9 is composed of white sand that may correspond with Stratum 7 in the trench. A few non-diagnostic artifacts were recovered from this essentially sterile layer.

Trench

The trench stratigraphy is different than described for the test units (Figure 5). The humus layer (Stratum 1) is visible, but the yellowish white to white sand Stratum 2 is not present (the trench is removed from the weathering ledge here). Below the humus is a 20-30 cm thick, strong brown to orange brown loamy sand layer similar to Stratum 3. A large steatite bowl fragment in Stratum 3 probably dates to the Terminal Archaic period.

Below Stratum 3 is a 20-40 cm thick layer of yellowish brown loamy sand defined as Stratum 5. Early Archaic artifacts were encountered toward the bottom of this layer. Below Stratum 5 is an organic-rich layer that does not

correspond to the previously noted Stratum 4 midden observed in the test units. This layer (Stratum 6) appears to result from organic materials being trapped under a massive slab of sandstone breakdown as it trails off toward the drip line and away from the slab. Early Archaic artifacts were recovered in this layer.

Below the organic-rich layer is approximately 25 cm of yellow sand (Stratum 7) that may correspond with the white sand layer (Stratum 9) in the excavation units farther back under the shelter. Stratum 7 yielded materials interpreted as transitional Paleoindian/ Early Archaic. Excavations in the trench were discontinued at 1.75 to 2.0 meters below surface. A bucket auger revealed another 62 cm of sediment below this level with more organic content and more clay in the sand. However, bedrock has yet to be reached.

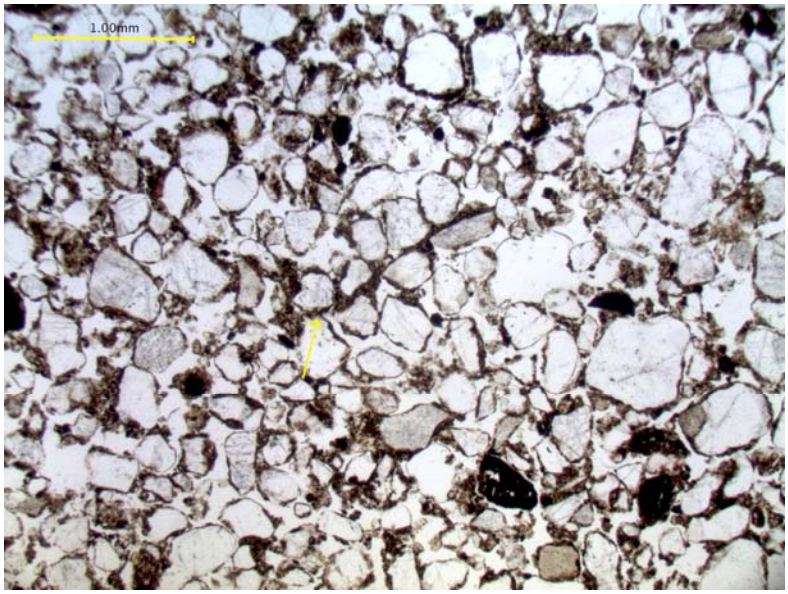

FIGURE 6. Layer 6 composed of well sorted quartz sand and disorthic Mn nodules coated in dusty clay, deposited by alluvial processes.

Micromorphology

Micromophological analyses are ongoing, with some preliminary results from Strata 6 and 7 presented in this work {samples numbers RCMS 15-5 (Stratum 7), 15-6 (Stratum 6/7 contact), and 15-7 (Stratum 6)}. Sample 15-7 (Stratum 6) is composed of sorted quartz sand with dusty clay coatings and rounded disorthic manganese nodules (Figure 6). There is currently no stream nearby the shelter, but the sediments in Stratum 6 have the appearance of being deposited by alluvial processes from a nearby stream or other body of water. There is no evidence in the sample of a living surface. Although charcoal fragments are observed, no ash or burned bone is visible ruling out the presence of an anthropogenic fire. Stratum 6 will need to be sampled in greater detail to clarify questions of provenience and anthropogenic input.

The composition and arrangement of Stratum 7 (RCMS 15-5) suggests the sediments are the result of in-place dissolution of eboulis and roof fall. Post-depositional processes in this layer are minimal. Manganese crusts and staining confirm water saturation for short periods of time, though there is no evidence of the sediment being waterlogged. Bioturbation in the form of plants and insects is not visible, but more analyses are needed to assess the overall impact of bioturbation on this layer.

Preliminary micromorphological analysis suggests that Stratum 7 is not a cultural layer, as the artifacts and charcoal present may be translocated from the layer above. Formation of Stratum 6 is more complex as it resulted from the combination of geogenic and anthropogenic inputs. However, no living surface or intact fire signatures were observed, suggesting Stratum 6

represents ephemeral and intermittent visits to the site by the shelter's early inhabitants. Cultural and technological associations may also be tenuous.

Chronology

Diagnostic artifacts recovered from Rock Creek Mortar Shelter indicate a long temporal span from the Early Archaic through Woodland periods. In addition there are 20 AMS radiocarbon dates from the site (calibrated using CALIB 7.0), and also two OSL (optically stimulated luminescence) dates from a Woodland ceramic sherd and a baked clay surface (Table 1).

Early Holocene/Late Pleistocene

Eight AMS determinations from wood charcoal date to the early Holocene and one other date to the late Pleistocene. Six derive from the trench excavation, and two derive from Features 4 and 6 in Stratum 8 (Test Unit 2). Two assays from the trench inside the drip line are 9073 and 9550 cal BP, (piece plots 164 and 66, respectively). Spatially associated artifacts are Kirk Corner Notched and Lost Lake bifaces. Piece plots 193 (9594 cal BP) and 198 (9598 cal BP) are from Features 6 and 4, respectively. Spatially associated artifacts are a Hardaway Side-Notched biface and a prismatic blade core fragment from Stratum 8. A calibrated median date of 9269 cal BP was obtained from Level 4 (piece plot 273) in the trench extension beyond the drip line (Stratum 7). Other recovered Early Archaic bifaces from the site include several bifurcated specimens (Figure 7). Two dates precede 10,000 years ago at 10,623 and 10,760 cal BP (piece plots 96 and 127). One assay from the trench (piece plot 166) straddles the Pleistocene/Holocene boundary at 11,260 cal BP. The previous three dates were obtained from charcoal found in spatial association with 18 prismatic and triangular blades and blade fragments. Three bladelets were also recovered. Associated bifaces include a heavily reworked Greenbrier Dalton (see Figure 7). Finally, an assay of 12,554 cal BP was obtained from in Level 5 (piece plot 282) of the trench extension beyond the drip line. Spatially associated artifacts include a blade core fragment and several blade-like flakes.

FIGURE 7. Early Archaic bifaces, Rock Creek Mortar Shelter.

Radiometric dates from Rock Creek Mortar Shelter suggest occupation from the late Pleistocene (Younger Dryas) through the late Holocene. However, Stratum 7 does not appear to be a cultural layer, and Stratum 6 located directly above is problematic with sediments that may be partially cultural but also alluvial.

Table 1. Radiometric Dates from Rock Creek Mortar Shelter (40PT209).

Lab No.	Piece Plot No. (PP)	Provenience	Material	Method	Measure	1σ range(s)	2σ range(s)
Beta-350456	42	TU2, L10, Stratum 4	charred acorn	AMS	2750 ± 30 BP	cal BP 2792 - 2865	cal BP 2772 – 2893; 2902 - 2924
Beta-347963	66	Trench, L4, Stratum 6	wood charcoal	AMS	8640 ± 40 BP	cal BP 9541 - 9622	cal BP 9535 - 9682
Beta-370146	127	Trench, L7, Stratum 7	wood charcoal	AMS	9530 ± 50 BP	cal BP 10717 – 10807; 10847 – 10865; 10954 - 11069	cal BP 10683 - 11091
Beta-370147	166	Trench, Unit 10, L6, Stratum 7	wood charcoal	AMS	9890 ± 50 BP	cal BP 11231 - 11331	cal BP 11202 – 11407; 11451 – 11471; 11558 - 11596
Beta-373685	96	Trench, L6, Stratum 7	wood charcoal	AMS	9390 ± 40 BP	cal BP 10573 - 10673	cal BP 10514 - 10712
Beta-373686	164	Trench, Unit 10, L5, Stratum 5	wood charcoal	AMS	8150 ± 40 BP	cal BP 9022 - 9123	cal BP 9007 – 9145; 9167 - 9251
D-AMS 005776	162	TU8, L10, Stratum 3	wood charcoal	AMS	3405 ± 28 BP	cal BP 3614 – 3650; 3658 - 3691	cal BP 3577 - 3715
D-AMS 005777	168	TU7, L15, Stratum 4	wood charcoal	AMS	4093 ± 25 BP	cal BP 4528 – 4589; 4592 – 4614; 4766 - 4784	cal BP 4453 – 4461; 4521 – 4648; 4672 – 4698; 4760 - 4806
D-AMS 005774	122	TU7, L6, Feature 2, Stratum 4	wood charcoal	AMS	2581 ± 27 BP	cal BP 2726 - 2749	cal BP 2544 – 2556; 2619 – 2629; 2704 - 2760
D-AMS 005775	153	TU4, Feature 3, Stratum 3	wood charcoal	AMS	2444 ± 28 BP	cal BP 2379 – 2395; 2400 – 2415; 2420 – 2496; 2597 – 2611; 2638 - 2684	cal BP 2359 – 2541; 2562 – 2577; 2583 – 2618; 2631 - 2701
D-AMS 005772	110	TU5, L5, Feature 1, Stratum 2	wood charcoal	AMS	1598 ± 23 BP	cal AD 415- 433; 457- 468; 488- 533	cal AD 407- 536
D-AMS 005773	118	TU5, L5, Feature 1 base, Stratum 2	wood charcoal	AMS	1548 ± 24 BP	cal AD 431- 491; 531- 550	cal AD 427- 565
D-AMS 010541	193	Stratum 8, Feature 6	wood charcoal	AMS	8654 ± 31 BP	cal BP 9546 - 9622	cal BP 9542 - 9677
D-AMS 010542	198	Stratum 8, Feature 4	wood charcoal	AMS	8659 ± 31 BP	cal BP 9548 - 9626	cal BP 9544 - 9679
D-AMS 010543	273	Trench, Stratum 7, Level 4	wood charcoal	AMS	8270 ± 31 BP	cal BP 9142 – 9174; 9208 – 9218; 9240 – 9310; 9361 - 9396	cal BP 9132 – 9328; 9343 - 9402
D-AMS 010544	282	Trench, Stratum 7, Level 5	wood charcoal	AMS	10,566 ± 33 BP	cal BP 12437 – 12463; 12527 - 12605	cal BP 12424 – 12498; 12517 - 12651
D-AMS 011162	233	TU5, Stratum 3, Feature 7, Zone A	wood charcoal	AMS	3406 ± 35 BP	cal BP 3610 - 3694	cal BP 3568 – 3724; 3754 – 3757; 3795 - 3819
D-AMS 011163	234	TU13, Stratum 3, Feature 9	wood charcoal	AMS	2183 ± 24 BP	cal BP 2147 – 2162; 2168 – 2178; 2243 - 2302	cal BP 2124 – 2209; 2224 - 2307
D-AMS 011164	236	TU5, Stratum 3, Feature 7, Zone B	wood charcoal	AMS	3272 ± 30 BP	cal BP 3457 – 3509; 3531 - 3556	cal BP 3411 – 3422; 3445 - 3572
D-AMS 011165	258	TU13, Stratum 3, Feature 10	wood charcoal	AMS	3036 ± 30 BP	cal BP 3181 – 3199; 3206 – 3253; 3294 - 3326	cal BP 3160 - 3345
LB1183	3	TU2, L5, Stratum 3	pot sherd	OSL	AD 952 ± 78	na	na
LB1303		TU2, Stratum 4/8 contact, Feature 5	baked clay	OSL	BC 4001 ± 276	na	na

Caution must be exercised when considering the association of these charcoal samples with the archaeological materials. The earliest diagnostic artifacts recovered to date are Early Archaic (early Holocene).

The Technology of Production in the Paleoindian-Early Archaic Transition

Rock Creek Mortar Shelter is the first shelter on the UCP where we have encountered buried Early Archaic deposits in good stratigraphic position. Early Archaic artifacts are very common in the region, but stratified sites are not. The Early Archaic sequence extends from just after the Younger Dryas (Greenbrier Dalton, Lost Lake and Kirk Corner Notched bifaces) through the end of the Early Archaic (bifurcate points such as St. Albans and LeCroy). All but one of our early dates are associated with the Early Archaic period, with both prismatic and triangular blades spatially associated with these dates.

Most of the intentionally-produced blades (*n*=18, and a few bladelets) were made/prepared from unipolar cores. There was a mix of hard hammer and soft hammer percussion used in the blade production, with variable skill level and execution (Table 2; Figure 8). Site 40PT209 has also yielded numerous core edge flakes and crested blade fragments, and far more unifacial tools than any other site on the UCP. Some evidence for overshot flaking is represented by two biface failures (one is an initial large biface recovered in March 2013 that, due to a number of step fractures, was reworked into an end scraper and used for scraping hide).

In short, there is blade technology at the site along with bifacial reduction and thinning. Numerous biface thinning flakes have been recovered, and the vast majority (about 80%) of the flaking debris and tools are made from locally available Monteagle chert. Other identified raw material types include varieties of Ft. Payne chert, St. Louis chert, and locally

FIGURE 8. Blade fragments recovered from Rock Creek Mortar Shelter.

Table 2. Attributes for Selected Early Holocene Artifacts (40PT209).

Piece Plot No. (PP)	Provenience	Elevation	Description	Percussor	Raw Material	Comments
115	Trench, Unit 9, L2	465.071	proximal failed blade fragment; scratched poorly prepared platform	soft hammer (SH)	Monteagle Chert	good conception, poor execution
139	Trench, Unit 9, L5	464.842	simple core edge removal	hard hammer (HH)	Monteagle Chert	
156	Trench, Unit 10, L4	464.050	blade-like flake; lipped platform w/2-3 facets	SH	Monteagle Chert	3+ dorsal scars
117	Trench, west side	464.701	blade w/linear, flat platform w/pecking & polishing; much retouch on bottom of platform	HH	Monteagle Chert	Similar to Epi-Paleolithic & Mesolithic blades from Les Barraquettes, France; 3+ dorsal scars
126	Trench, Unit 8, L3	465.071	proximal blade fragment; flat platform w/retouch along dorsal edge; pronounced bulb	HH	Ft. Payne Chert	abrading to remove overhang (platform)
103	Trench, Unit 9	found in screen	core edge removal w/cortex	HH	Monteagle Chert	
50	Trench, west side, L1	465.165	biface (drill?) fragment; point nor broken cleanly	SH	Ft. Payne Chert	retouched after break
64	Trench, L4	464.968	side scraper on blade	HH	Monteagle Chert	graver spurs on larger end
78	Trench, SW corner	465.024	prismatic blade; cortex on distal end; linear platform; splintered bulb	SH ?	Monteagle Chert	struck with a strong blow; retouch along lateral edges
120	Trench, Unit 9, L3	464.990	preparation (crested blade) removal for blade production; pecked platform	?	Monteagle Chert	unipolar débitage (production mode)
107	Trench, Unit 9, L2	found in screen	blade w/lipped, abraded platform (4 facets)	SH	Monteagle Chert	unipolar débitage (production mode)
52	Trench, west side, L2	465.117	blade/flake fragment retouched along lateral edges	?	Monteagle Chert (maybe St. Louis Chert)	laminar flake or short blade; very similar to artifacts in Carson-Conn-Short Clivs assemblage (John Borster, personal communication, 2013)
159	Trench, Unit 10, L4	464.930	medial blade fragment (triangular cross-section)		St. Louis Chert	retouched both sides
113	Trench, Unit 9, L2	465.075	large, laminar flake w/battered but unfaceted platform; pronounced blub	HH	Monteagle Chert	retouched along one edge
104	Trench, Unit 9	found in screen	proximal prismatic blade fragment; big, flat, lipped platform	SH	Monteagle Chert	well prepared, well abraded platform; very straight blade edges; unipolar débitage (production mode); maybe HH (Sunnely)
136	Trench, Unit 9, L4	464.045	distal blade fragment; triangular cross-section)		Monteagle Chert	unipolar débitage (production mode)
133	Trench, west side	464.852	end scraper on probable blade (or possibly a big flake)	?	Monteagle Chert	
102	Trench, Unit 9	found in screen	core fragment/dechet?	?	Monteagle Chert	possible graver spurs
108	Trench, Unit 9	found in screen	broken flake w/ flat platform; big bulb; pronounced ripple marks on ventral surface	HH	Monteagle Chert (maybe St. Louis Chert)	originally thought to be a blade-like flake
105	Trench, Unit 9	found in screen	proximal prismatic blade fragment; well-abraded, faceted platform	SH	Monteagle Chert	failed attempt at a blade (hinge termination); novice or made on a very short core
125	Trench, Unit 9, L3	465.063	proximal blade fragment; triangular cross-section; linear, flat platform w/retouch preparation under platform; good technology	SH	Monteagle Chert	antler percussion; strongly struck (splintered bulb); very similar to Magdalenian and Epi-Paleolithic blades
106	Trench, Unit 9	found in screen	distal flake fragment	?	Monteagle Chert	blade-like flake?
177	Trench, north wall cleaning	464.086	core edge removal	?	Monteagle Chert	
67	Trench, L4	464.893	damaged medial blade fragment	?	Monteagle Chert (heavily patinated)	
134	Back ledge, surface	na	Core edge flake prepared as a blade; lipped platform	SH	Monteagle Chert	2 facets on platform; flake is fire-damaged
na	Trench, Unit 9, L1	~465.146	medial blade fragment; triangular cross-section	?	chalcedony	very regular blade lateral margins

available chalcedony. The entire range of lithic reduction is present in the early levels. Only one prismatic blade core fragment (Figure 9) has been recovered from what appears to be an Early Archaic level (in Stratum 8). The authors hypothesize that the function of some, if not most, blade cores may have shifted to bifacial reduction at a certain point in the chaîne opératoire. These early artifacts and blades have come from a very restricted area, about nine square meters, and likely represent just a small sample of materials in the shelter.

While questions remain about stratigraphic associations, a shift in technology can be hypothesized. Prismatic blade tool production (e.g., Paleolithic and Paleoindian) was a very specific type of production involving very

FIGURE 9. Blade core fragment recovered from Rock Creek Mortar Shelter.

FIGURE 10. Long, flat blade-like flakes recovered from Rock Creek Mortar Shelter.

precise core preparation and the production of long, straight blades with regular lateral edges. Such production is apparent at the site, but at a certain point a production shift occurred. Long flakes were still selected, but the manufacturing process changed as cores were no longer intricately prepared. The resulting flakes were long and flat (bladelike) without the regular lateral margins (Figure 10). While prismatic blades tend to be curved in profile, these blade-like flakes are flat. The authors suggest this shift was intentional. Widely available raw materials may have allowed early inhabitants of the plateau the luxury of spending much less time preparing cores for stone tool manufacture in favor of more expedient methods for essentially the same end products.

Use-Wear Analysis of Selected Late Pleistocene/Early Archaic Materials

A functional use-wear study was undertaken as part of the multi-disciplinary investigation at 40PT209 that addresses the question of why were people using this shelter during the late Pleistocene? Traditional methods developed and refined in the 1980's by Keeley (1980) and Odell (1977) were employed to investigate the wear patterns. For this study, a Nikon Eclipse L150 metallurgical microscope was used to assess the damage and a Canon EOS Rebel T3i 18 mp dslr camera was used to document the findings. Each artifact was photographed on both surfaces so that the location of wear traces could be recorded directly on the image during analysis (Figure 11). The stone artifacts were lightly washed, with rubbing alcohol occasionally used to remove finger grease. Interpretations were made with reference to an experimental collection (Hays 1998, Hays and Lucas 2001) that has continued to develop over the last 20+ years with a wide variety of raw materials. The experimental collection represents a wide range of prehistoric activities, including projectile damage, butchering or meat processing, hide processing, bone and antler working, and wood working.

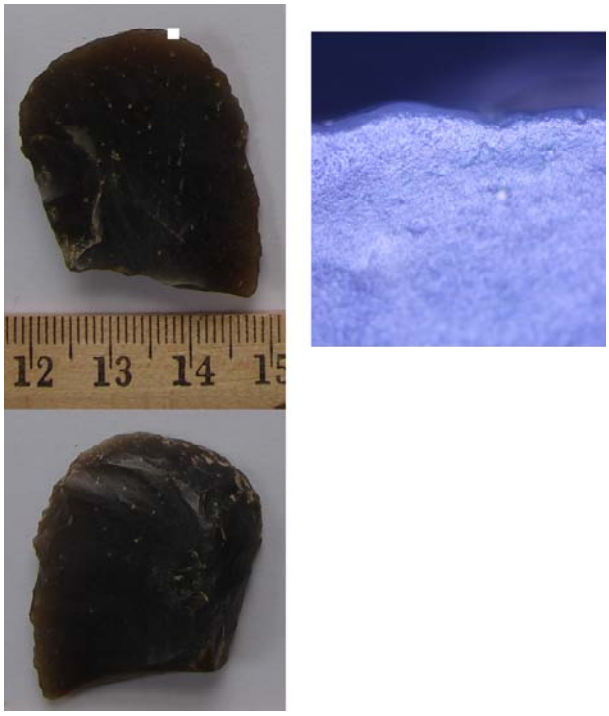

FIGURE 11. Example of recorded wear - PP133, BCL14-011 - End Scraper on Blade Use: Hide Scraping.

Table 3. Microwear Summary for Rock Creek Mortar Shelter Late Pleistocene/Early Holocene Artifacts.

Total (*n*=109)	Unused (*n*= 89)	40Pt209 General Catagories	Used (*n*= 20)	Motion	Material
37	32	Blade/bladelike flake	5	cut/scrape	hide/meat
9	4	End Scraper	1	scrape	bone
			4	scrape	hide
24	20	Flake	1	cut/scrape	hide/meat
			3	cut	hide/meat
16	14	Biface	1	cut/scrape	hide
			1	scrape	wood
2	0	Graver Spur on Blade	1	scrape	hide

The sediments in Rock Creek Mortar shelter are very dry, lending to good faunal and botanical preservation. However, there was microscopic evidence of post- depositional alteration to the surface of some stone tools that presented as an overall sheen. This sheen was probably caused by movement in these sandy deposits that so nicely preserved bone. Every effort was taken to distinguish between polish resulting from use and the naturally occurring sheen. With this phenomenon in mind, the interpretations in this study lean toward the conservative side.

To date, 109 pieces have been analyzed microscopically, with 18% (*n*=20) interpreted as used (Table 3). Represented activities included scraping wood (18%), processing hide, and cutting/scraping meat and hide (80%), and scraping bone (5%) which may be associated with meat processing. Three tools were used to scrape wood (a biface, a blade fragment with graver spurs and a Hardaway Side-Notched point), 16 were used to cut and scrape meat/hide in the early stages of processing, and a single scraper was used on bone. The represented activities are similar to those from the Nuckolls site (40HS60) on the lower Tennessee River (Ellerbusch 2004). Given the distance to the raw material sources (20 to 30 km), it might be expected that a larger number of retouched tools would be used. Also, in consideration of the range of activities identified at Rock Creek Mortar Shelter, the authors believe the lower use rate is a reflection of post-depositional alterations along with the decision for conservative analysis interpretations.

Discussion

When considering the early Holocene assemblage at site 40PT209, a major problem is that we do not yet know how to characterize late Pleistocene/early Holocene assemblages on the UCP, as just a very small portion of Rock Creek Mortar Shelter has been tested. The mix of prismatic blade production with a more expedient blade-like flake production is puzzling. Further, select artifacts appear Paleoindian in character but were recovered from an Early Archaic context. One such artifact, a double side scraper made on a blade or flake fragment (Figure 12, top row, right), would “fit” in the Clovis

FIGURE 12. Unifacial artifacts recovered from Rock Creek Mortar Shelter.

assemblage at the Carson-Conn-Short (40BN190) assemblage (John Broster, personal communication, 2013). Clearly the site does not have a Clovis component defined at this time, but the lithic assemblage is nonetheless interesting because of such artifacts as gravers, gravers on end scrapers, and side scrapers on blades that are more typically associated with Paleoindian assemblages in the Midsouth (Broster et al. 2006).

In a recent synthesis, Anderson and Sassaman (2012) place Early Archaic cultural sequences in the Southeast between 11,500 and 8,900 years ago. This seems to be at odds with some regional chronologies that have middle and late Paleoindian sequences overlapping, e.g., the loose chronology proposed by Maggard and Stackelback (2008) in their thorough survey of the Paleoindian period in Kentucky. In any case, regional comparisons are going to be difficult without comparable chronologies, and comparable chronologies may be tenuous without like assemblages.

Stanfield Worley Bluff Shelter is a massive sandstone rock shelter with some 800m2 of potential living space located a little more than 10 km from the central Tennessee River Valley (Walthall 1998:230). DeJarnette and colleagues (1962) recorded a significant Dalton component in Zone D of the shelter deposits that they dated to between 10,000 and 9,000 years ago. More recently, Hollenbach (2009:101) obtained a calibrated AMS radiocarbon determination from Zone D that straddles the Pleistocene/Holocene boundary like Piece Plot 166 from Rock Creek Mortar Shelter. Preservation at Stanfield Worley was excellent with numerous bone tools and fauna recovered. Similar to Rock Creek Mortar Shelter, side scrapers on blades, unifacial scrapers, and gravers were present (Figure 12). There were also myriad Dalton bifaces recovered (Walthall 1998:230-231). However, thus far the Rock Creek biface assemblage is comparatively sparse.

We seem to have an Early Archaic assemblage at Rock Creek associated with blade (and biface) technology. The timing, if not the technology, is consistent with Walthall's (1998) contention that Dalton peoples were the first to systematically use upland rock shelters. This also seems consistent with Lane and Anderson's (2001) idea that the interior highlands (e. g., the Cumberland Plateau) lie at the end of early migration routes. In any case, there are numerous recovered artifacts that are Paleoindian in character if not in age. Bradbury and Carr (2012)

suggest that blade technology was not necessarily part and parcel of the Paleoindian toolkit, though they do point out that blade manufacture appears more common in Southeastern Paleoindian assemblages. Bradbury and Carr (2012) further suggest that intentional (prismatic) blade manufacture was not part of the Early Archaic tool kit at all. While Early Archaic peoples made some blades and blade-like flakes, true blade (or prismatic blade) technology should date earlier. And yet, at Rock Creek Mortar Shelter, there are blades in an early Holocene chronological context, so perhaps Bradbury and Carr's contention should not be considered hard and fast.

Rock Creek Mortar Shelter is not the only late Pleistocene/early Holocene site we have recorded on the UCP. The Early Times Rock Shelter yielded a late Paleoindian Quad biface with a heavily ground base along with several wedge pieces (pièces esquillées) and an Early Archaic MacCorkle Stemmed biface. Interestingly, all of these items were demonstrated to have been used for wood working. The site was pristine, but the deposits were largely surficial and thus not well dated. Further, no obvious blades were recovered. Technological and functional studies at Early Times Rock Shelter indicate small groups of hunter-gatherers used the shelter as a temporary special purpose locale where a limited number of activities took place. Locally procured nodules of Monteagle chert were reduced at the site with tools occasionally produced and resharpened. Also, some wood working took place and hide and meat processing of animals occurred on a small scale (Dye et al. 2010).

Very near to Early Times Rock Shelter is the Job Site Rock House site where a Beaver Lake biface was recovered from a disturbed context. The Early Times and Job Site shelters are located on the East Fork Obey River.

Franklin (2002) recorded early, middle, and late Paleoindian sites (*n*=7) in previous archaeological surveys of the UCP. Two sites may be classified as early Paleoindian through the recovery of Clovis bifaces. No Cumberland bifaces were recorded during the survey. Five sites are late Paleoindian represented primarily by Beaver Lake and Quad bifaces. One site contained a Dalton biface, and a local collector possesses a spectacular, very large Dalton biface from the area. To date, Rock Creek Mortar Shelter is the only site of more than 600 recorded through surveys that possesses intact and stratified deposits.

Summary

Rock Creek Mortar Shelter is a high elevation rock shelter far removed from major streams and high quality, large package size raw material sources. In fact, the closest possible raw material sources are at least 10 km away (and 200 m below in elevation), and it is not clear these sources were exposed 11,000 years ago. Raw material surveys have not been exhaustive due to the rugged terrain and vegetation cover, but the more likely sources occur some 30 km to the south in the East Fork Obey gorge (Figure 13). This statement runs counter to ideas that prismatic blade production in the Tennessee region was anchored to more localized outcrops of high quality cherts (Broster et al. 2013:304; Ellerbusch 2004:36). Places such as Rock Creek Mortar Shelter may lie at the end of early migration routes, but it is unclear how early peoples accessed the site since it is nearly 30 km from the mouth of Rock Creek at the Big South Fork of the Cumberland River in southeastern

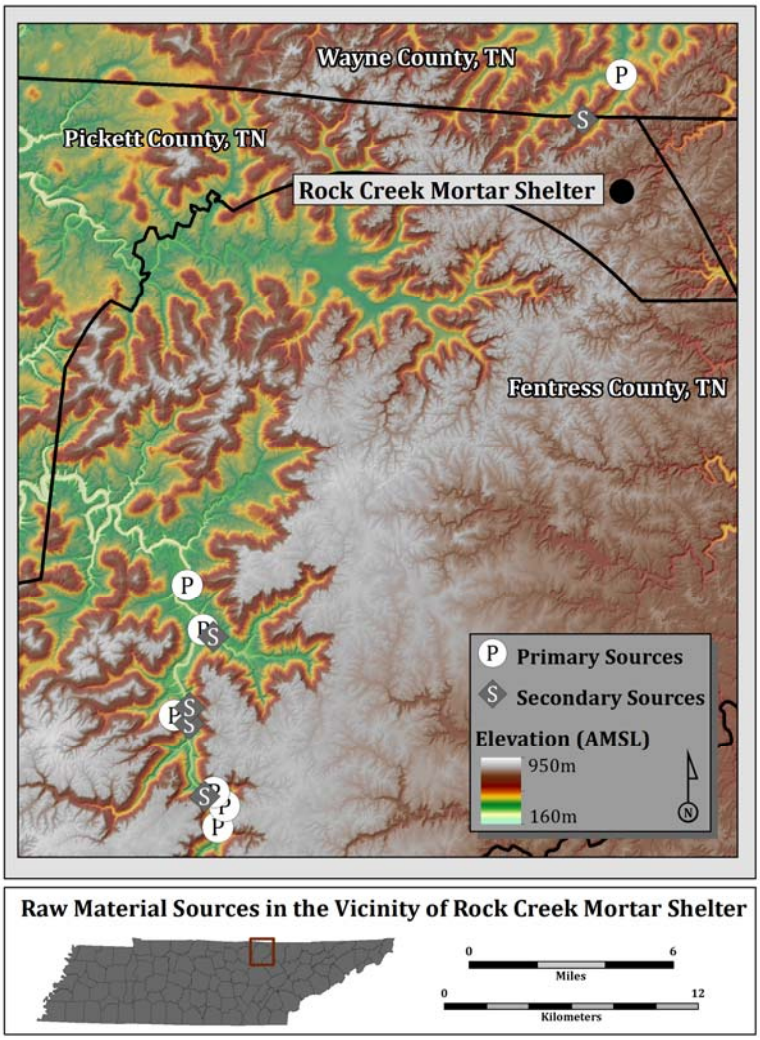

FIGURE 13. Raw material sources in the vicinity of Rock Creek Mortar Shelter.

Kentucky to the shelter near the headwaters of Rock Creek. If the better raw material sources were along the East Fork Obey River (where the Early Times and Job Site rock shelters are also located), then it may be that early pioneering populations were moving up the Obey and across the ridge tops toward Rock Creek. State Route 154, which runs near the site, follows the best passable ridge tops up into Kentucky. Local inhabitants indicate this route was also an old Indian trail "Another trail left the East and West Trail about three miles East of Jamestown and went northwestwardly to the head of Wolf River [Pogue Creek] along the mountaintop to Kentucky." (Hogue 1933:2).

A generally continuous record of human occupation at Rock Creek Mortar Shelter has been recorded from at least the end of the Pleistocene around 11,500 years ago to about AD 1000. The late Pleistocene and early Holocene deposits located 1.25 – 2 meters below surface have yielded many blades, unifacial side and end scrapers, gravers on scrapers, and a few bifaces from a restricted area under the drip line of the shelter. Broster et al. (2006:120) suggest these types of artifacts from the Widemeier site (40DV9) on the Cumberland River in the Central Basin were probably associated with Clovis and Cumberland components, though their excavation areas were often mixed. Dates and general stratigraphy at Rock Creek Mortar Shelter suggest these artifacts are associated with the Early Archaic period. However, there is one AMS date of 12,554 cal BP in (mixed) deposits that possess blade cores, prismatic blades, and other artifacts sometimes considered to be representative of early (Clovis) Paleoindian period assemblages in Tennessee (Broster et al. 2013:299; Collins and Hemmings 2005).

Clearly there is much work to do to sort out the stratigraphic, chronological, and technological relationships at 40PT209. For now, we might hypothesize a transitional assemblage, or set of assemblages. For example, the gravers

FIGURE 14. Back ledge at Rock Creek Mortar Shelter above buried deposits.

and gravers on end scrapers suggest the manufacture of spearshafts and foreshafts (e. g., Broster et al. 2006:126).

There also seems to be a mix of skill level and execution for blade manufacture. A few of the well-made blades would be at home in European Late and Epi-Paleolithic assemblages, while other blades are poorly made. This may suggest a family group on site where older and more skilled knappers taught younger novices to make blades. Also, the earliest inhabitants of the UCP may have been coping with the constraints of using the small rounded local cobbles of Monteagle chert for blade production (as opposed to large tabular cherts encountered in the lower Tennessee River drainage).

The Rock Creek Mortar Shelter is currently interpreted as a short-term hunting camp occupied by residentially mobile foragers. Given the large size of the shelter, we hypothesize that this is consistent with Walthall's (1998) ideas of Dalton rock shelter use. Site 40PT209 would fall in Walthall's (1998) Group I shelters with an estimated 150m2 of living space. Early Holocene family groups likely used Rock Creek Mortar Shelter as a temporary residence during the fall and perhaps winter months.

This article has briefly introduced the archaeology of Rock Creek Mortar Shelter. The authors are excited about additional work at a site with a continuous cultural sequence spanning more than 11,000 years. Of note is that one of the crew crawled back under the lower back ledge to a distance of about 20 feet (Figure 14). Given the depth of the cultural deposits already evaluated, the shelter likely extends much farther back and deeper during the Late Pleistocene and early Holocene.

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