A Suwannee/Bolen Artifact Assemblage from the Santa Fe River

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In 1999 Don Munroe, a conscientious[1] avocational artifact collector and river diver, found a concentration of lithic tools in the Santa Fe River, near High Springs, Alachua County, Florida (Figure 1). Over the next few weeks, Munroe collected over 100 complete stone tools, including lanceolate-based and Bolen projectile points, a nearly completed Simpson point, unifaces, bifaces, bola stones, and adzes. Although the assemblage contains three Archaic stemmed points, a Hernando point, a probable Columbia point, and a pottery sherd, the rest of the tools are consistent with Paleoindian and Early Archaic lithic assemblages from Florida and other eastern North American sites. The number of Paleoindian and Early Archaic artifacts represents an opportunity to enhance our understanding of lithic tool variation in Florida during this time period.

Introduction

The earliest evidence for people in Florida dates to the early Paleoindian period (ca. 11,200-10,800 B.P.). An ivory tool from the Sloth Hole site (8JE121), which also produced Clovis points, on the Aucilla River has been radiocarbon dated to 11,050 ± 50 B.P. (Hemmings 2004). The working hypothesis in Florida is that Suwannee/Simpson followed Clovis in the middle Paleoindian period (ca. 10,800 – 10,500 B.P.), and Bolen follows Suwannee/Simpson some time after that. Single component Bolen levels have been confidently dated at ca. 10,000 B.P. at 8LE2105 in Leon County (Hornum et al. 1995), the Page-Ladson site in Jefferson County (Dunbar et al. 1988:Table 1), and Wakulla Springs Lodge site (Tesar and Jones 2004). The place of Suwannee and Simpson points in this chronology is still unresolved, however, because no sites producing these artifacts have been dated. Further, the relationship of Bolen and Suwannee tool assemblages is unclear. The similarities of the Bolen and Suwannee tool assemblages support an inference of temporal continuity (Milanich 1994:54), but whether they represent chronologically distinct traditions is uncertain. The Bolen and Suwannee points showed no statistically significant stratigraphic separation at Harney Flats, which may have been due to a hiatus in geological deposition at that time or occupation of the same surface at different times (Daniel and Wisenbaker 1987:33-38). Regardless, no Suwannee or Simpson points have been recovered from the radiocarbon-dated Bolen sites in Florida or from the Greenbrier-age site of Warm Mineral Springs (Cockrell and Murphy 1978; Clausen et al. 1975), and the inference is that people were no longer making Suwannee and Simpson points by 10,000 B.P. The Munroe collection included six lanceolate bases, a Simpson preform, several projectile point tips that may have been Simpson or Suwannee preforms, and three Bolen points. Based on the presence of the projectile points, it may represent a Suwannee/Bolen assemblage like that from Harney Flats.

The Site

The site is located in a wide section of the Santa Fe River approximately 2 km upriver from the Munroe Quarry (Smith et al. 1997) and 1.5 km down river from the Highway 27 bridge. The tools were found in a shallow, 3 x 2 m depression in the limestone bed of the river about 3 m below a lower river stage. The area is located in a wide part of the river, in which a limestone shelf slopes from east to west at a shallow angle. The edges of the depression are about 20 cm deep. In the depression is a layer of rocks of various sizes mixed with organic debris which overlies mousse-like sediments of indeterminate depth. The west side of the river is about 4 m from the western edge of the depression. To the east is low floodplain, and to the west the bank separates the river from a dry flood channel. About 15 m to the west of the bank, a steep river bank rises from the dry flood channel. The assemblage likely did not deflate in place, but gathered, at least in part, in the depression. The lack of "river polish" on the artifacts, however, indicates their origin must have been nearby.

The assemblage does not include all the tools from the site. Other than projectile point parts, it appears Munroe did not collect broken scrapers, biface fragments (unless they were either large or parts of projectile points), slightly modified flakes, or microliths. In order to get a sense of what else was in the depression we screened eight buckets of material from the depression and surrounding area through a ¼ inch screen and recovered debitage, cores, and one core-tool. Most of the artifacts were made from a gray Suwannee chert of varying quality that is locally available. Several tools were made of chert from the Ocala formation. The variation in raw material from our eight bucket samples matches the variation seen in the tools.

Although the assemblage is mixed with younger material, several lines of evidence support an inference of likely assemblage integrity. The Suwannee and Simpson preforms and Bolen points are made of the same gray chert from the Suwannee chert cluster as the majority of the presumptively

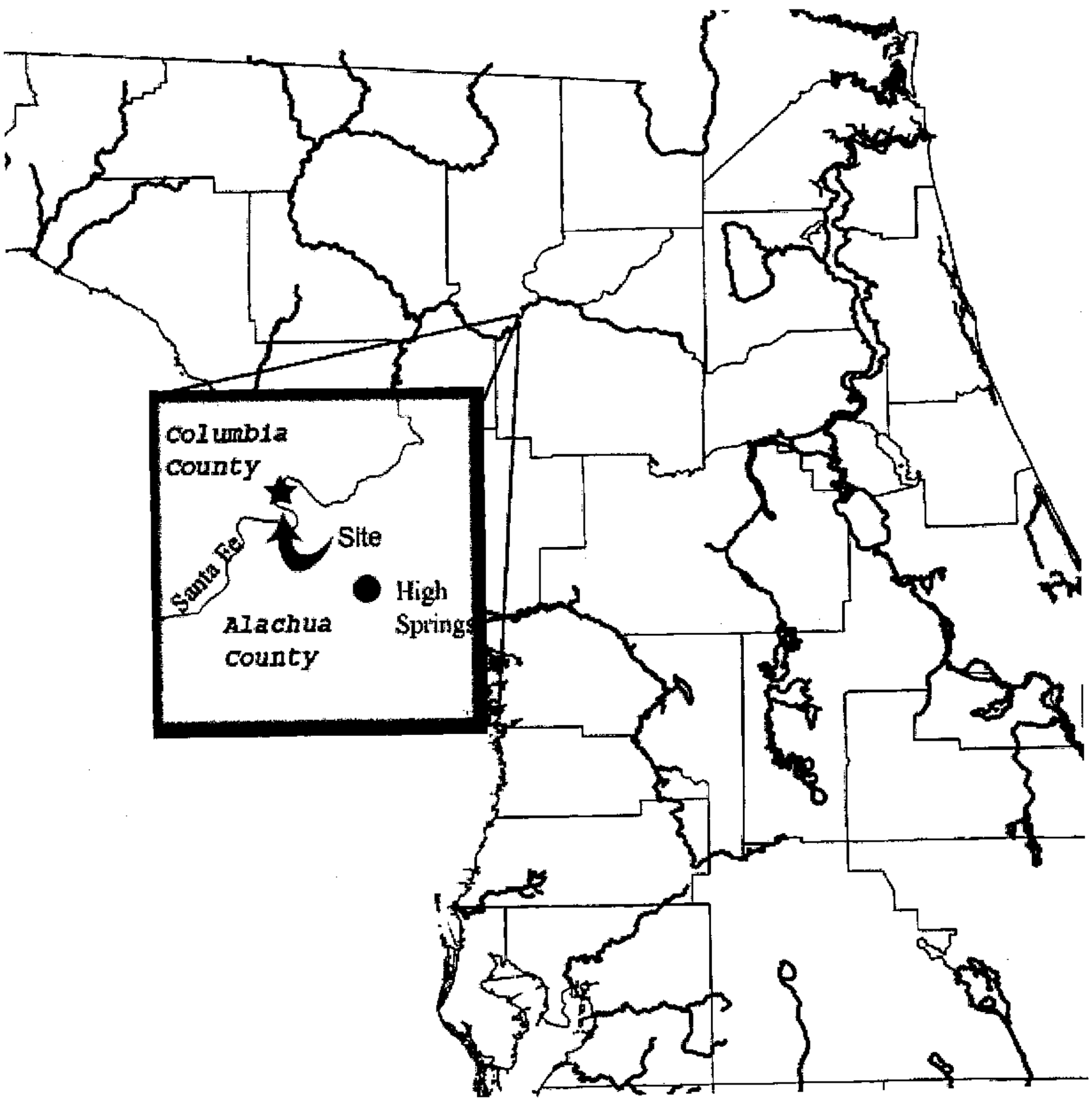

Figure 1. Map showing the location of the Munroe assemblage.

associated tools. In contrast, the Archaic points were made from a yellow chert and are less patinated than most of the presumptive Suwannee/Bolen tools. Finally, the descriptions and dimensions of the tools fall within the tool categories at the Suwannee/Bolen Harney Flats site (8HI507) (Daniel and Wisenbaker 1987), and the Bolen sites of 8LE2105 (Hornum et al. 1995) and Jeanie's Better Back (8LF54) (Austin and Mitchell 1999).

The Artifacts

In this analysis, artifacts were divided into four main groups: unifaces, bifaces, pounding tools, and adzes.[2] The quality of the raw material of the tools ranged from grainy silicified limestone to a smooth texture, high-quality chert. Most of the artifacts were patinated to some extent, obscuring the original color of the chert and some of the finer details of the scar patterns. Some of the unpatinated, higher-quality chert was yellow or black, but the majority was gray, brown, tan, gray-banded, and yellow-banded. Some of the lower quality material had inclusions, geodes, voids, fossils, and bands of lower quality chert. The breaks in most of the broken bifaces could be attributed to fossil or geode inclusions, which appears to be a common problem with Florida cherts (Purdy 1975:135).

Tool use was inferred from edge damage or use-wear. A general dichotomy exists between proponents of low- and high-magnification use-wear analysis (Odell and Odell-

Vereecken 1980); both approaches produce distinct but complimentary information (Odell 2001:50). In this analysis, a 10x loupe was used to identify retouch locations. Inferences about use wear were made using other use-wear studies and experiments, especially George Ballo's (1985) use-wear experiments and analysis of a sample of the Harney Flats assemblage. Ballo used a low-power scope ranging from 20x-50x magnification (Ballo 1985:104). He did not analyze any tools on which the edges were modified or distorted by weathering or patination, which eliminated most of the artifacts from analysis (Ballo 1985:104). In addition, the graininess of the lithic material made some analyses problematic (e.g., Ballo 1985:107). The Munroe assemblage also has some tools made of very grainy chert. Like Ballo's problem with edge-patination, differentiating use-wear from post-depositional damage to tool edges caused by water and transport along the riverbed could be problematic. My research has not revealed any methodology for the systematic assessment of the post-depositional effects of river transport and water erosion, but it appears such damage would be most pronounced at a microscopic level, thereby prejudicing high-power use-wear analysis.

I relied on Odell (1981) for a basic description of how stone tools are used. Scraping with the planar (ventral) surface leading (Figure 2a) would take flakes off the dorsal surface (Odell 1981:200-202), whereas scraping with the dorsal surface leading (Figure 2b) would take flakes off the planar side. However, because of the peculiarities of flake mechanics, the flaking damage in the first instance would be greater than in the second, all other things being equal. Scraping also will round the edge of the tool. Planar surface leading is designated in this analysis as Type 1 scraping and dorsal surface leading as Type 2. Whittling is the process of pushing the tool away from the user transverse to the material being worked (Figure 2c-d). Whittling produces flake scars on both surfaces with feather terminations on the lower and hinge terminations on the upper surface (Odell 1981:202-203). Cutting or sawing results in flakes removed from both sides of the edge. It may also result in a denticulated edge (Odell 1981:203). At 10x magnification I only observed Type 1 and Type 2 scraping, whittling, and cutting. The scar pattern on a tool is a function of the nature of the material of which the tool is made, the material worked, and the method of use. The degree of step flaking on the edge of the tool indicated the relative hardness of the material that was worked; more step flaking and stacked step flaking indicated that the tool had been applied to a relatively harder material.

Unifaces

Unifaces are chipped stone artifacts with flake scars on the dorsal surface and no, or almost no, flake scars on the opposite ventral, or planar, surface. Artifacts that had some flake scars removed from the ventral surface were included in the uniface category if the scars could be attributed to use wear or to small, marginal flakes that manifested an intent to remove the bulb of percussion in order to flatten the bottom of the tool. I tried not to be too dogmatic about the uniface/biface dichotomy because the tool-maker may have intended to flatten a flake with a large bulb of precussion, which would require the removal of at least one flake from the ventral surface. Removal of the bulb may have been done to facilitate hafting (Daniel and Wisenbaker 1987:68). Cross sections of unifaces were defined as plano-convex, triangular, trapezoidal, and irregular. Most flakes were struck from unprepared cores.

There appears to be little uniformity among archaeologists in defining uniface categories in Paleoindian and Early Archaic assemblages. Daniel and Wisenbaker (1987:62-81) created categories loosely based on plan-view morphology to describe the unifaces. Their uniface categories include end scrapers, discoidal scrapers, oblong scrapers, adzes, thick unifaces, thin unifaces, and miscellaneous, but each of these categories is further subdivided by shape, such as irregular, circular, oval, and ovoid (Daniel and Wisenbaker 1987:67, Table 7). These designations confuse the broader categories and create awkward sub-categories where end, discoidal, oblong, thick, and thin scrapers can all be oval. Other site reports list additional unifacial categories (e.g., Coe 1964; Deller and Ellis 1992). In an effort to maintain a means to compare the Munroe assemblage with Harney Flats I relied on plan-view descriptions and added one category, ovoid scrapers, to those used at Harney Flats. My uniface categories include end (meaning triangular), discoidal, ovoid, oblong, adzes, and side scrapers. Side scrapers were subdivided into thick and thin scrapers. The term scrapers and adze are heuristic names and are not intended to infer use, only to facilitate comparisons.

End scrapers. Daniel and Wisenbaker (1987:63) define the end scraper as "roughly triangular or tear-dropped shaped flake with a rounded working edge outline usually opposite the platform end" with a tapering stem and steep and extensive retouch. [3] A review of their sample (1987:64, Figure 21) shows a multitude of forms some of which do not appear either triangular or tear-dropped. Ballo (1985:105) finds that the Harney Flats end scrapers were used to scrape with the planar (ventral) surface as the leading edge (Type 1) in contact with the material, although some of the tools had damage to both planar and dorsal surfaces indicating they also were used in a back-and-forth motion to saw or cut. The degree of damage indicates the end-scrapers were used to work medium to hard substances. The mean edge angle of the Harney-Flats end scrapers was 69°, which Wilmsen (1970:70-71) infers means the tools would have been used for bone and wood working and shredding.

I defined end scrapers as having a broad working edge opposite the proximal end of the flake (or where the proximal end likely was on broken tools), although the working edge of the tool may extend down one or both of the lateral sides. End scrapers were trianguloid or teardrop-shaped, usually unifacial but could include bifacial tools as long as some of the ventral face remained, and it appeared the bifacial thinning was done to make a flat bottom on the tool. All of the end scrapers were used in Type 1 scraping. Some also were used for Type 2

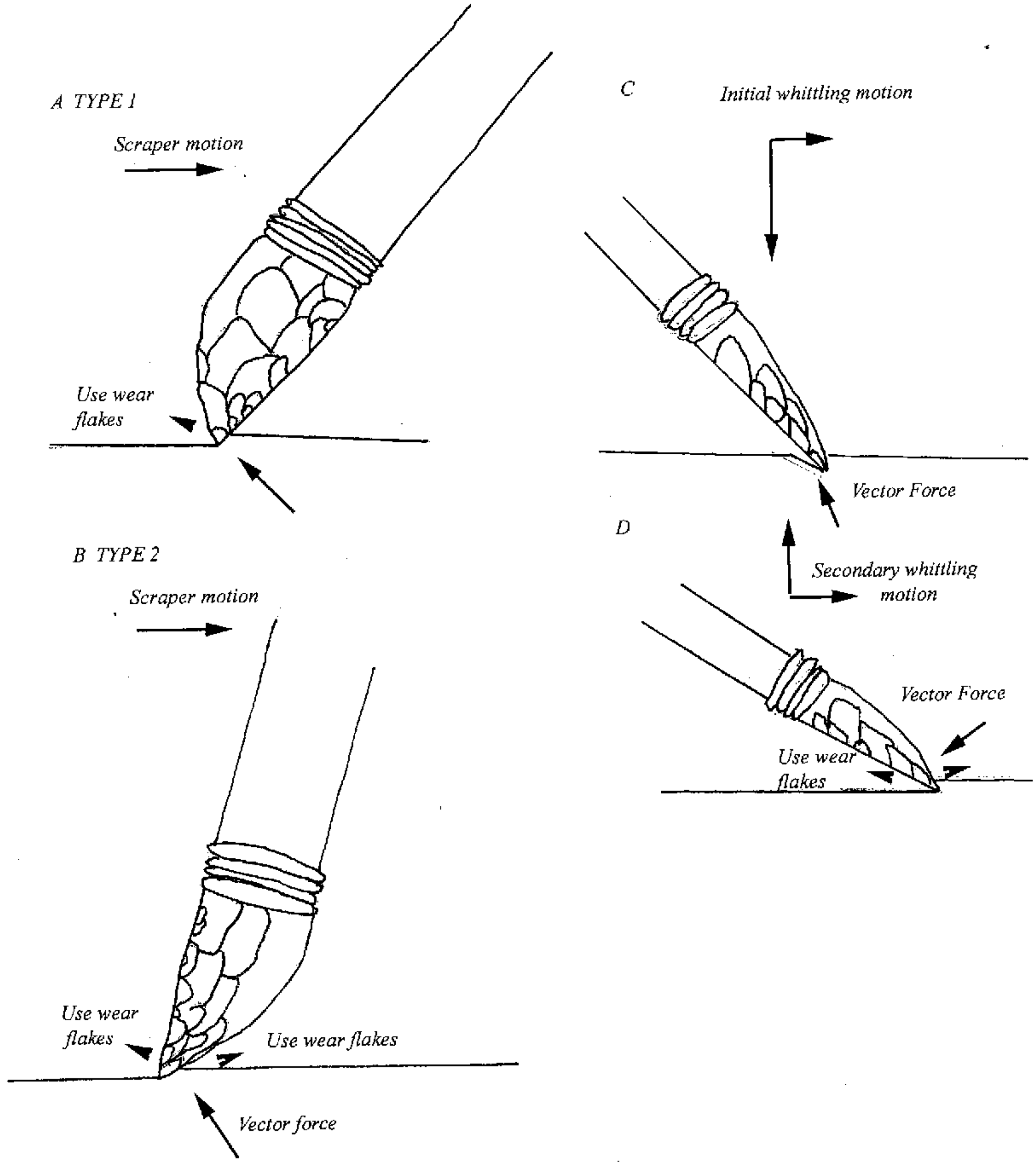

Figure 2. Idealized tool motions: *a*) planar or ventral edge leading (Type I scraping); *b*) dorsal edge leading (Type II scraping); *c*) initial whittling motion; *d*) secondary whittling motion. From Odell (1981:200-203).

scraping or whittling. One may have been used for cutting across the bit edge.

Four complete specimens in the assemblage meet the classic "tear-drop" shape described in other assemblages (Figure 3a-c). The quality of the stone varies greatly on the end scrapers, which may indicate that they were intended for different uses. The specimen in Figure 3b is made on fine-grained black chert, whereas the specimen in Figure 3a is a very coarse material that did not retain small flake scars on the working edge. Figure 4a illustrates one of two end scrapers in the collection that have retained their platform, with narrowed distal ends and worked lateral edges.[4] This artifact meets the criteria for a Hendrix scraper as defined by Purdy (1981) and were recovered at Harney Flats (Daniel and Wisenbaker 1987:72).

Three additional artifacts appear to be the broken bit ends of hafted end scrapers. Figure 3d is the broken bit end of a large end scraper and is made of coarse chert. One broken end scraper has a feather termination that matches the bending snap fracture pattern found on hafted tools (Grimes and Grimes 1985:41).

Several complete end scrapers and snapped end scrapers were recovered at 8LE2105 (Hornum et al. 1995:213-214, Figure 42) and Jeanie's Better Back (Austin and Mitchell

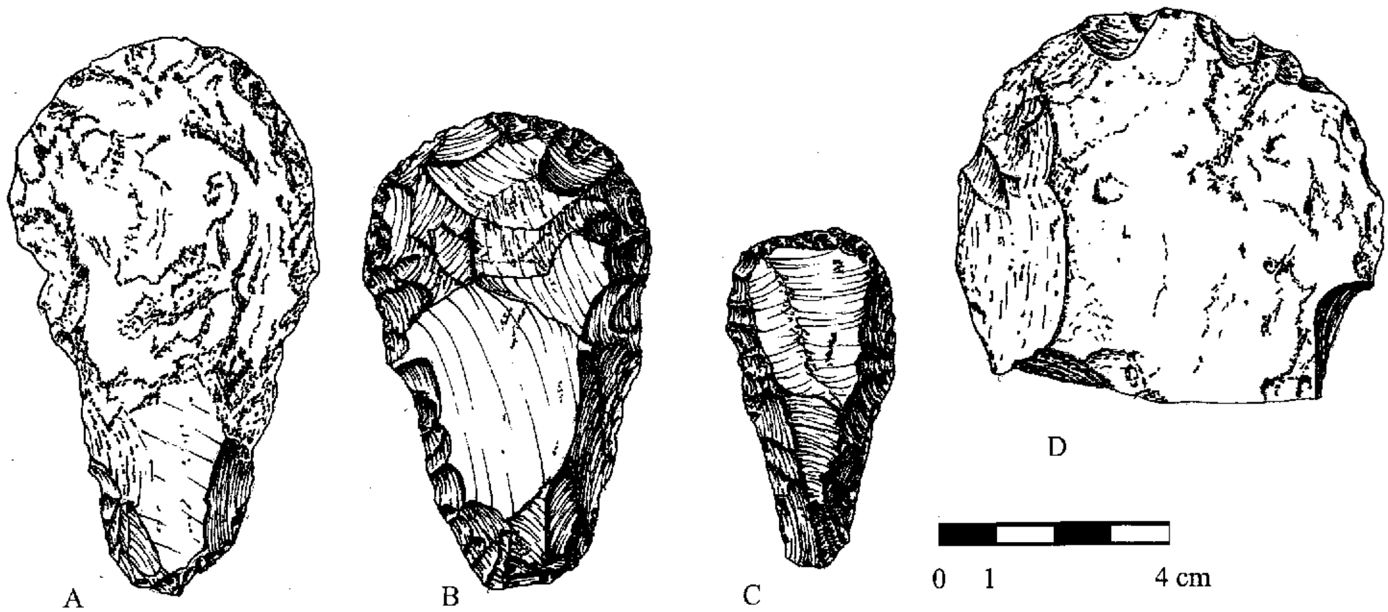

Figure 3. Four endscrapers of different sizes: *a*) and *d*) are made from coarse chert; *d*) is missing the haft end.

1999:56-57).

Ovoid scrapers. I define ovoid scrapers as unifaces that are ovoid in plan view but also may be pointed at one or both ends (Figures 4b-c). Ovoid scrapers are hump-backed, triangular, or plano-convex in cross-section. Daniel and Wisenbaker (1987) would have included ovoid scrapers in the end scraper category. As with all end scrapers, Daniel and Wisenbaker (1987) assume these were hafted.[5] Similarly shaped unifacial scrapers were recovered at Jeanie's Better Back (Austin and Mitchell 1999:Figure 16) and 8LE2105 (Hornum et al. 1995:Figure 44).

The Munroe assemblage contains eleven ovoid scrapers that range from 45.8 – 75.7 mm in length and to 33.6 – 50.0 mm in width. Nine of these are triangular or plano-convex in cross-section, and two are relatively thin. All are retouched around their entire circumference except two, which are retouched on about 80% of the circumference. Two bifacial tools match the shape of the ovoid scrapers with flat bottoms and triangular cross sections.

The ovoid scrapers show evidence of Type 1 scraping, slight Type 2 scraping, whittling, and cutting. Both the thin ovoid scrapers were used for light scraping or cutting. The rest were used for heavier scraping. Artifacts of similar size and shape are known as "Dalton adzes" (Goodyear 1974:Figure 14) or "Clear Fork gouges" (Bullen and Benson 1964:161). Gaertner (1994) determined through use-wear experimentation that Dalton adzes from Arkansas were hafted or socketed and used exclusively for woodworking.

Discoidal scrapers. Discoidal scrapers are described by Daniel and Wisenbaker (1987:69-70) as similar to end scrapers but more circular and likely hand-held.[5] Ballo (1985:106-107) found that most discoidal scrapers at Harney Flats were used for Type 1 scraping, although one specimen showed flaking consistent with Type 2 scraping. They were likely used on medium hard to hard materials based on the degree of edge damage.

Five small (< 6 cm diameter) discoidal scrapers in the Munroe collection appear clearly differentiated from the ovoid scrapers. These tools are not significantly modified, and the working edges are thin. The width to thickness ratio is about 3:1, whereas in the ovoid scrapers the ratio is about 2:1. All five retain at least some of the original flake platform and are worked around the entire circumference except for the platform. They range in diameter from 36.9 – 56.8 mm. Two of the three larger scrapers have flakes removed from the ventral side to thin the pronounced bulb of percussion. Four are nearly circular in plan view with a low plano-convex or trapezoidal profile. The discoidal scrapers appear to have been used for light Type 1 scraping.

The assemblage also includes one large (118 mm diameter) discoidal scraper (Figure 5a). This tool is retouched around the entire circumference and was not made from a core. It fits neatly in one hand, and judging by the multiple step fractures, it was probably used for heavy Type 1 scraping. A similar-looking artifact was found at the Sloth Hole site in the Aucilla River, Jefferson County (Hemmings 1999).[6]

Oblong scraper. Oblong scrapers have parallel sides and either rounded or snub-nosed ends. Purdy (1981:18-20) describes two oblong scrapers, the Hendrix scraper and a snub-nosed or oblong scraper (Purdy 1981:20-21), but Daniel and Wisenbaker (1987:70-74) view both types as variations of a general oblong scraper-type that changes shape as the tool is resharpened. The variation of the working ends of the oblong

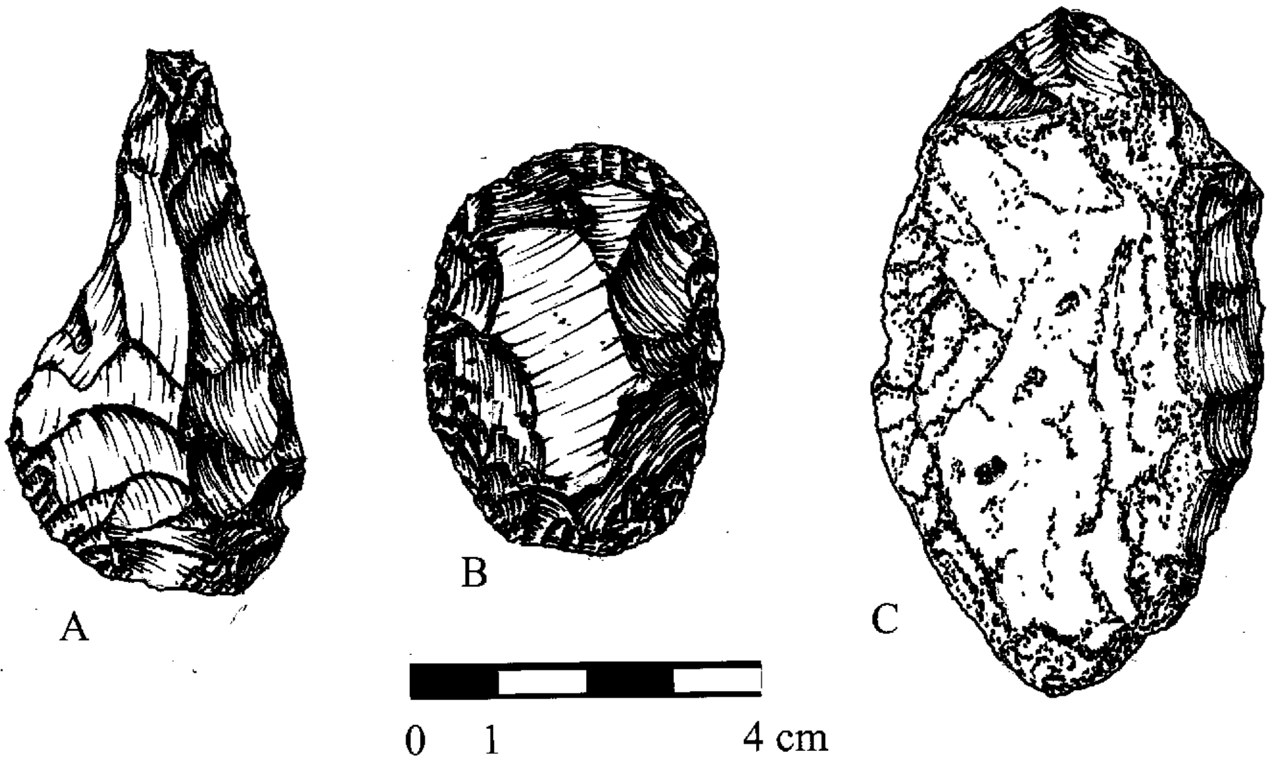

Figure 4. Three scrapers: *a*) narrow-end Hendrix scraper; *b*) and *c*) are two ovoid scrapers.

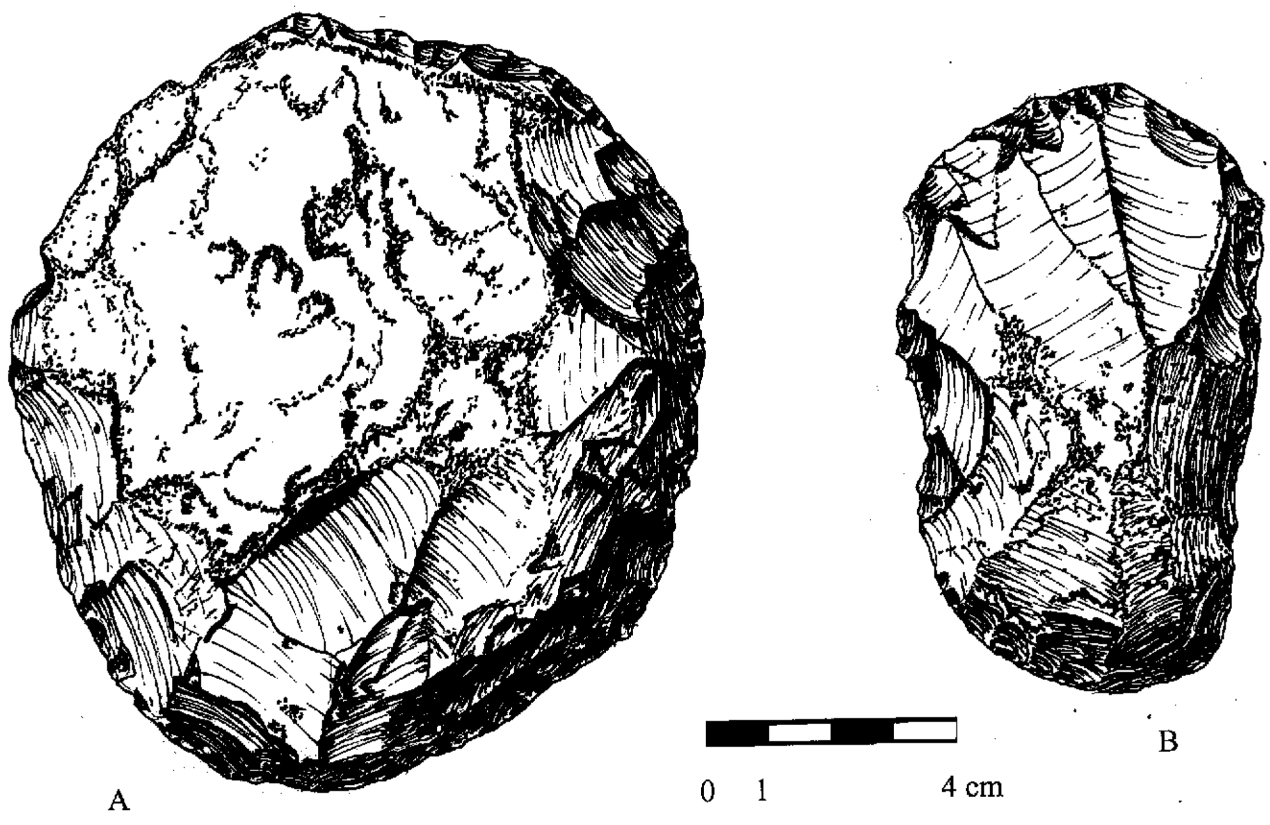

Figure 5. Two larger scrapers: *a*) large discoidal scarper; *b*) core-scraper.

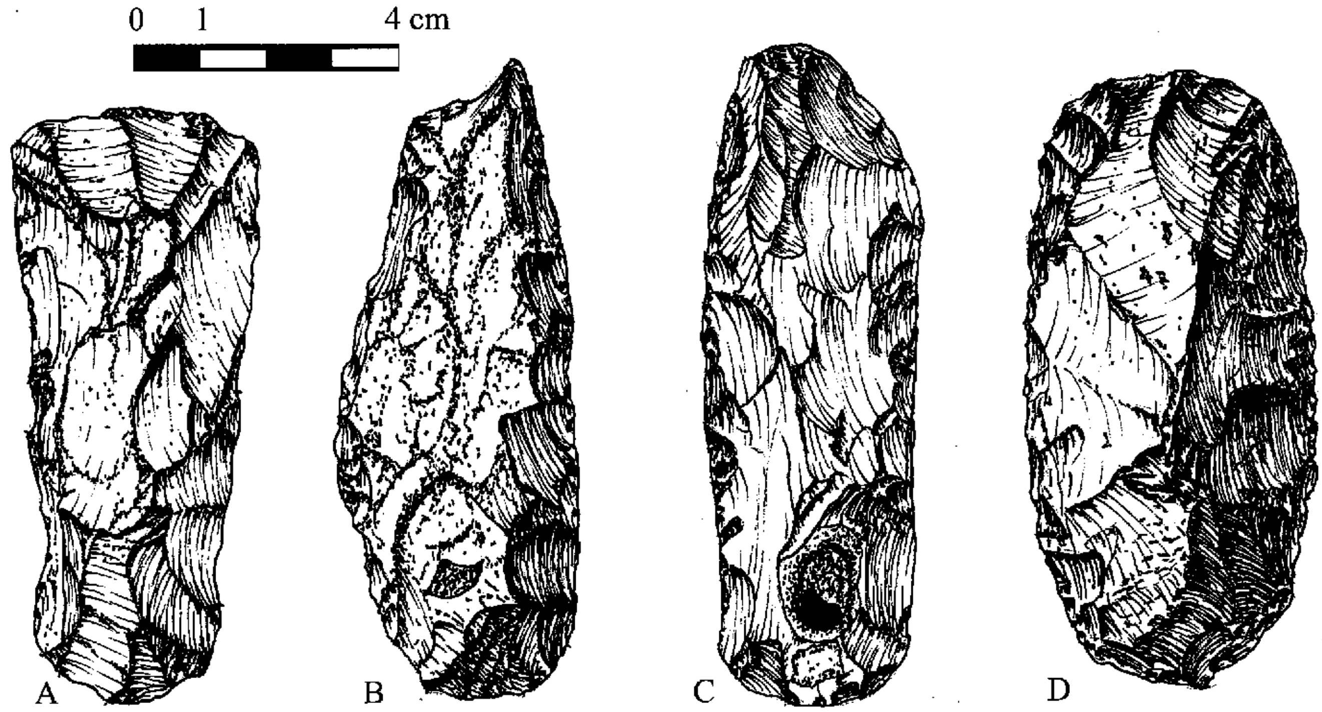

Figure 6. Four oblong scrapers.

scrapers in the Munroe collection support an inference that the tools were created for specific purposes, however. Figure 6 shows four examples from the eight complete specimens from the Munroe collection. Figure 6b appears to match Purdy's (1981:19) examples of a Hendrix scraper, but it has minimal use wear (i.e., only polish) on the tip. Ballo (1985:107-109) analyzed a limited sample of oblong scrapers because most had excessive edge damage. The scrapers he examined indicated that both the dorsal and planar surfaces were used as leading edges.

Along with the eight complete oblong scrapers, the collection also has five broken specimens. The complete scrapers range from 61.7 – 115.5 mm long and 30.9 – 51.0 mm wide. They are generally rounded to slightly pointed on the ends, although the example in Figure 6a has a straight bit at one end. The broken specimens are all of similar length, indicating they broke at the haft. Use wear indicates that some of the ends were used for whittling. Type 1 scraping is indicated on some of the ends and lateral margins, and some of the lateral margins were used for cutting. Most of the scraping appears to have been against harder material.

Grimes and Grimes (1985:50) analyzed oblong scrapers from Bull Brook, which they termed spokeshavers, and determined these tools were likely socketed, hand-held scrapers. The Bull Brook sample showed a regular breakage pattern consistent with hafting. Some of the spokeshavers showed a deliberately narrowed proximal end as if the haft was trimmed to fit a handle. In the Munroe assemblage, the likely haft-end of the oblong scrapers tend to fall in three widths: approximately 26 mm (25, 26, 26), 30 mm (30), and 43 mm (42, 43, 44, 44) wide, which indicates an intent to fit the tool to a particular haft.

Side scrapers. The side scraper category is typically a catchall for unhafted unifacial tools that do not meet other criteria.[7] At Harney Flats Daniel and Wisenbaker (1987:74-79) include all other unifacially retouched flakes that did not meet the end, discoidal, adze, or oblong scraper definitions into either a thin or thick scraper category. Thin and thick scrapers are differentiated on the basis of the width of their working edges: thin unifaces have working edges less than 10 mm thick at the location of retouch, and thick unifaces have working edges thicker than 10 mm. The Munroe assemblage has twelve side scrapers. All are unifacial and all but two of the specimens retain the original platform. In addition to differentiating the side scrapers into thick and thin, they can be generally grouped into four sub-categories: backed steep-sided scrapers, wide distal-end scrapers, low-angle scrapers, and miscellaneous. On the five backed steep-sided scrapers (Figure 7), the working edge is opposite a flat edge that was either formed by the original platform or by snapping or removing the edge of the flake. Two specimens are wide distal-end scrapers formed on expanding angle flakes. Eight specimens are low-angle scrapers on which one or more edges are retouched.

Thick scrapers. Ballo (1985:109-111) found that thick unifaces were used for both Type 1 and 2 scraping. Some showed bifacial damage consistent with sawing. The Munroe

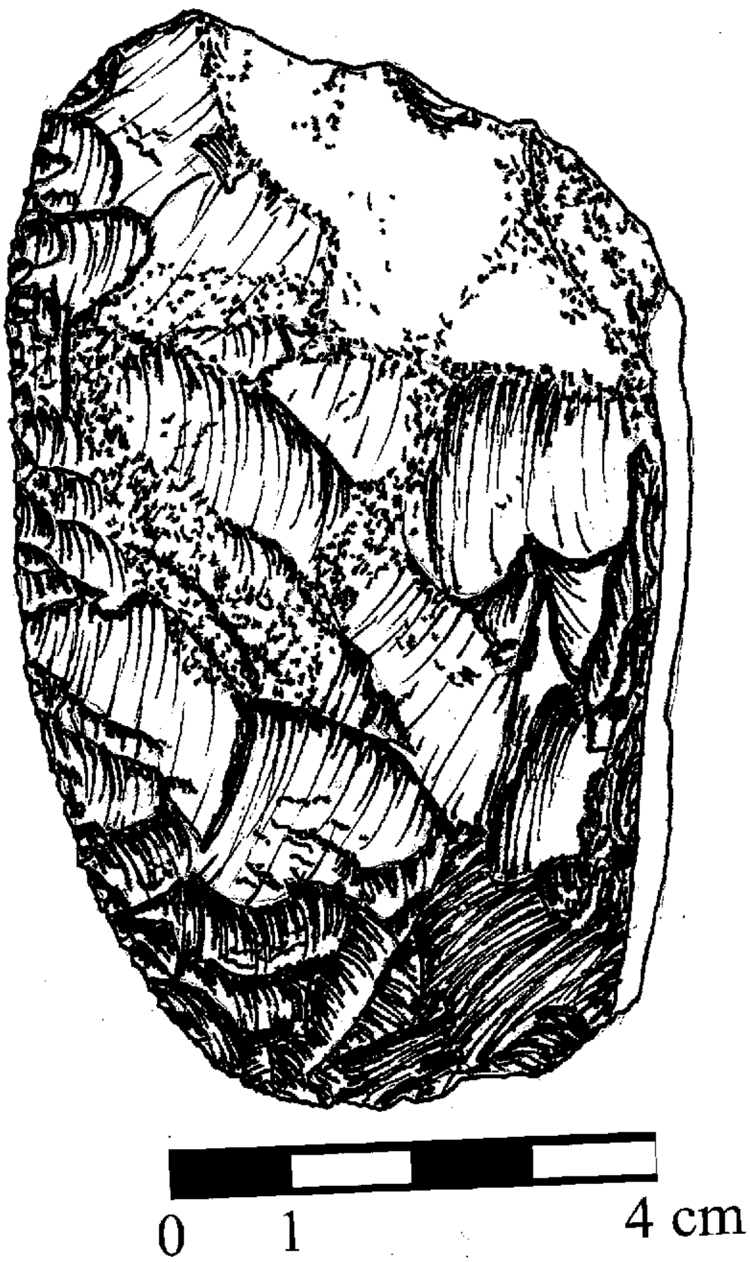

Figure 7. Steep-sided, thick side-scraper.

assemblage has four thick scrapers, which all had use wear consistent with Type 1 and 2 scraping.

Thin scrapers. Most of the thin unifaces were used as scrapers with the planar surface as the leading edge (Ballo 1985:111-113). Thin unifaces were used on material of medium hardness. The Munroe assemblage has eight thin scrapers, which all had use-wear consistent with heavy Type 1 scraping. Some showed light Type 2 scraping and cutting, and one may also have a graver spur.

Adzes

Daniel and Wisenbaker (1987:79-81) define adzes as unifacial heavy-duty tools that were apparently hafted. Ballo (1985) did not analyze adzes as a separate category. Odell and Odell-Vereecken (1980:100) state that adzes are used transverse to the working surface and will show unifacial flake scars and striations.

Unifacial Adzes. I included four large unifacial tools in this category. Figure 5b is a unidirectional core that was recycled as an adze. Daniel and Wisenbaker (1987:82) identified similar recycled cores at Harney Flats.[8] The tool is made on poor quality material and the ventral face is particularly irregular. Although it fits neatly in one's hand or could have been hafted, there is little evidence of retouch or heavy use-wear. The artifact pictured in Figure 8a was apparently hafted at the waist. The heaviest retouch is along the rounded bit end. None of the unifacial artifacts in the collection fall within the dimensions of a "typical" Aucilla adze as defined by Gerrell et al. (1991:Figure 5).

Bifacial Adzes. Daniel (1998:63-66) describes the bifacial adze as a somewhat oval biface with a convex bit at the broadest end of the tool. The adzes have evidence of hafting on the rounded butt-end. Bifacial adzes were found at the Dalton-age Brand site in Arkansas (Goodyear 1974) and at Harney Flats (Daniel and Wisenbaker 1987:79-81), where one bifacial and five unifacial adzes are described. Two bifacial adzes are in the Munroe collection (Figure 8b).

Bifaces

Bifaces form the other large category of tools. The bifaces in the Munroe collection are categorized as points, Type I, II, and III bifaces, and adzes (Daniel 1998:50-66). As biface manufacture progresses, the tool generally gets thinner and a more definite shape. The three biface types represent apparent forms along that reduction continuum (Daniel 1998:64). This is not to suggest that the three types are just preliminary stages of a final formal biface type; at any of the stages the biface may be used as a tool and any of the stages could be the intended final form of that tool. However, these types are a convenient way to conceptualize and group bifaces for comparison and analysis.

Projectile points. Although the term "projectile point" is laden with functional implications, it is commonly used as a category of bifaces, and I use it here to refer to a biface that could have been used as a projectile, knife, or both. The Munroe collection does not contain a complete Suwannee point but has five lanceolates with concave bases, one of which exhibits lateral grinding (Figure 9a). One Simpson perform

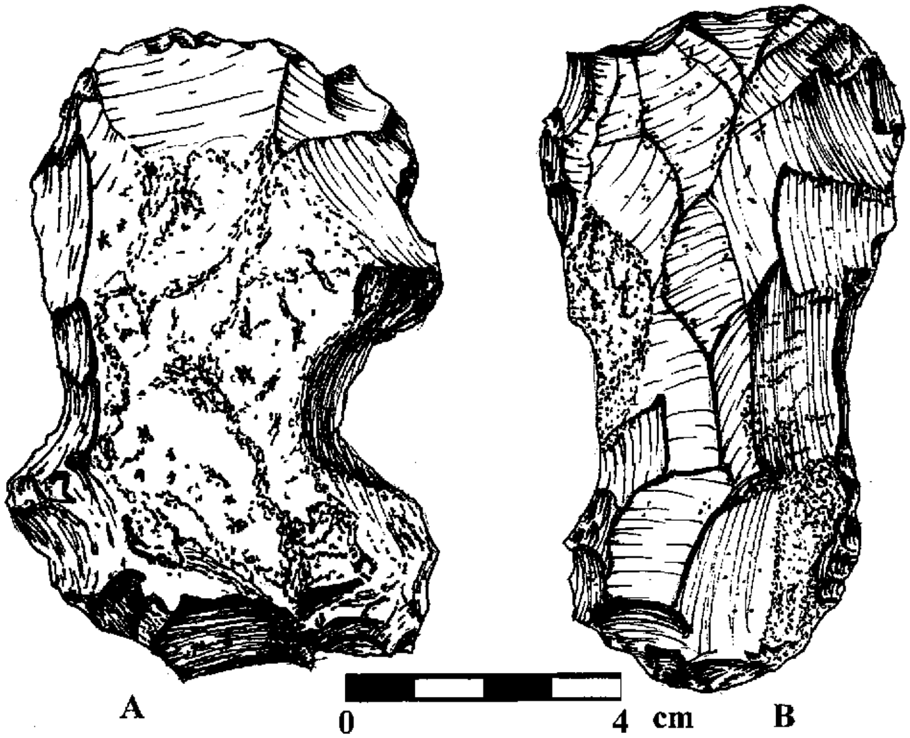

Figure 8. Two adzes: *a*) unifacial; *b*) bifacial.

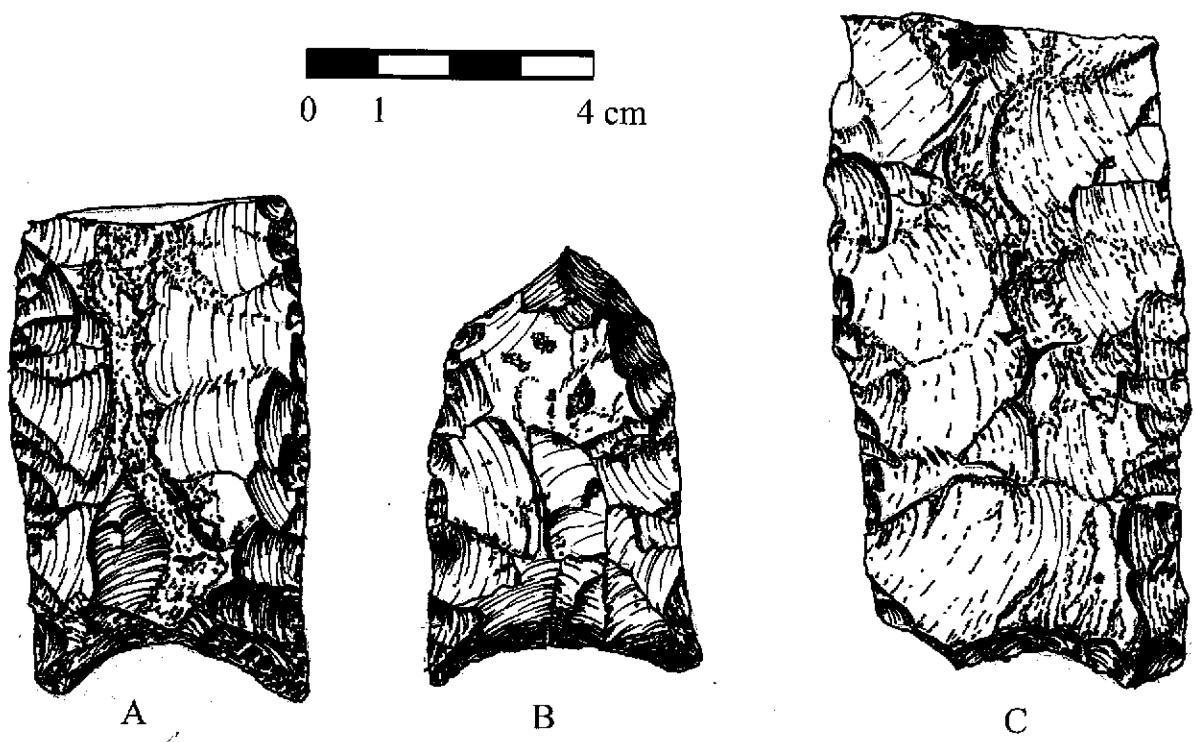

Figure 9. Lanceolate point bases: *a*) has ground basal edges; *b*) burinated and reworked after the tip broke; *c*) snapped at the location of a large geode.

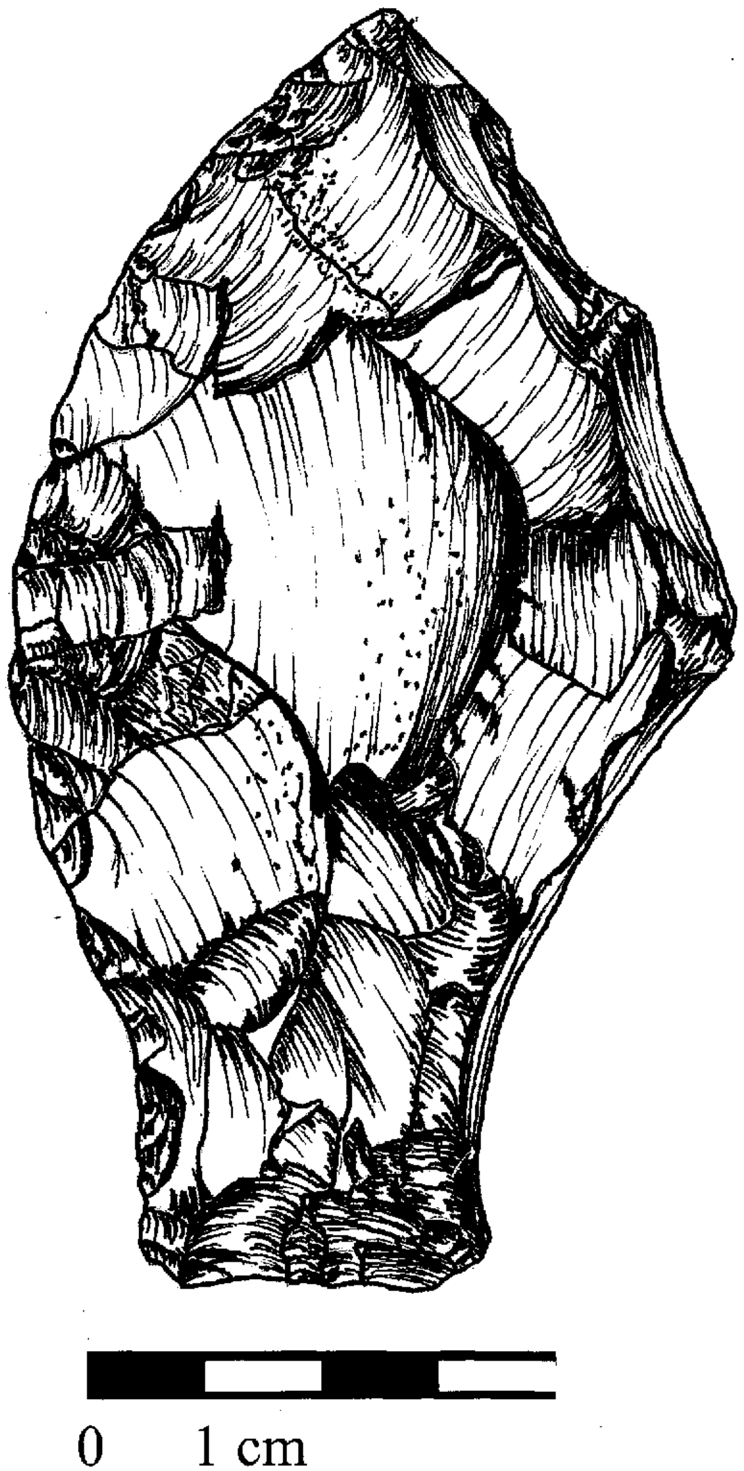

Figure 10. Simpson perform that was abandoned before completion.

was recovered (Figure 10). The Simpson preform was apparently abandoned when the knapper was unable to remove a large mass on the lateral edge. It appears the knapper tried to remove the problem with at least four overshot flaking attempts (Andy Hemmings, personal communication 2002). The collection also includes four Bolen points (a beveled E-notch with a straight base; a partially beveled, corner-notched, with an incurvate base; a partially beveled, corner-notched, with an excurvate base; and an unbeveled with parallel sides), one Hernando point, one complete and two partial Archaic stemmed points, and what may be a Columbia point.

Type I bifaces. Type I are early stage bifaces and typically called "blanks" with irregular or roughly oval shapes and flake patterns, higher width:edge ratios, and sinuous edges (Daniel 1998:60-61). The Munroe collection has ten complete tools that meet this definition. Step fracturing on all these artifacts indicates they were used as tools.

Type II bifaces. Type II may be referred to as "performs" and are thinner, more symmetrical, have biconvex profiles, and less sinuous edges (Daniel 1998:61). The Munroe collection contains one broken and nine complete Type II bifaces, all of which show evidence of tool-use (Figure 11). One is significantly larger and has evidence that its base was used for pounding; it may have been used as a wedge. Odell and Odell-Vereecken (1980:100) state that wedges will have well-defined hinged and stepped fractures on the working edge and evidence of pounding on the opposite edge, and this tool shows evidence of bifacial flaking consistent with these criteria.

Type III bifaces. Type III bifaces typically have pointed ends, squared bases, and closely spaced flake patterns Daniel (1998:62). The Munroe collection has 17 examples of this biface type, but none are complete. Six broken tips are large enough to have been part of Suwannee or Simpson performs, but two others are narrower and may have been from Bolen points. Most appear to have been broken prior to completion of the point because they lack a final fine edge. Five of the six show evidence of a material flaw in the break such as a geode or fossil. However, one shows an impact fracture at the tip and a bending fracture in middle of the point. Three of the artifacts are rounded bases that appear to have been snapped. Figures 9a-c appear to be Suwannee preforms. Only Figure 9a shows evidence of basal grinding.

Other

Groundstones. The assemblage included two dimple, or bola, stones. The function of these artifacts, one of which was recovered from the Bolen level at Page-Ladson, are unknown but the subject of great speculation (Tesar 1994; Rachels and Knight 2004).

Hammer stones. Four artifacts exhibit evidence of use as hammer stones. All are made of cryptocrystalline materials that exhibit one or more surfaces that are rounded by pecking.

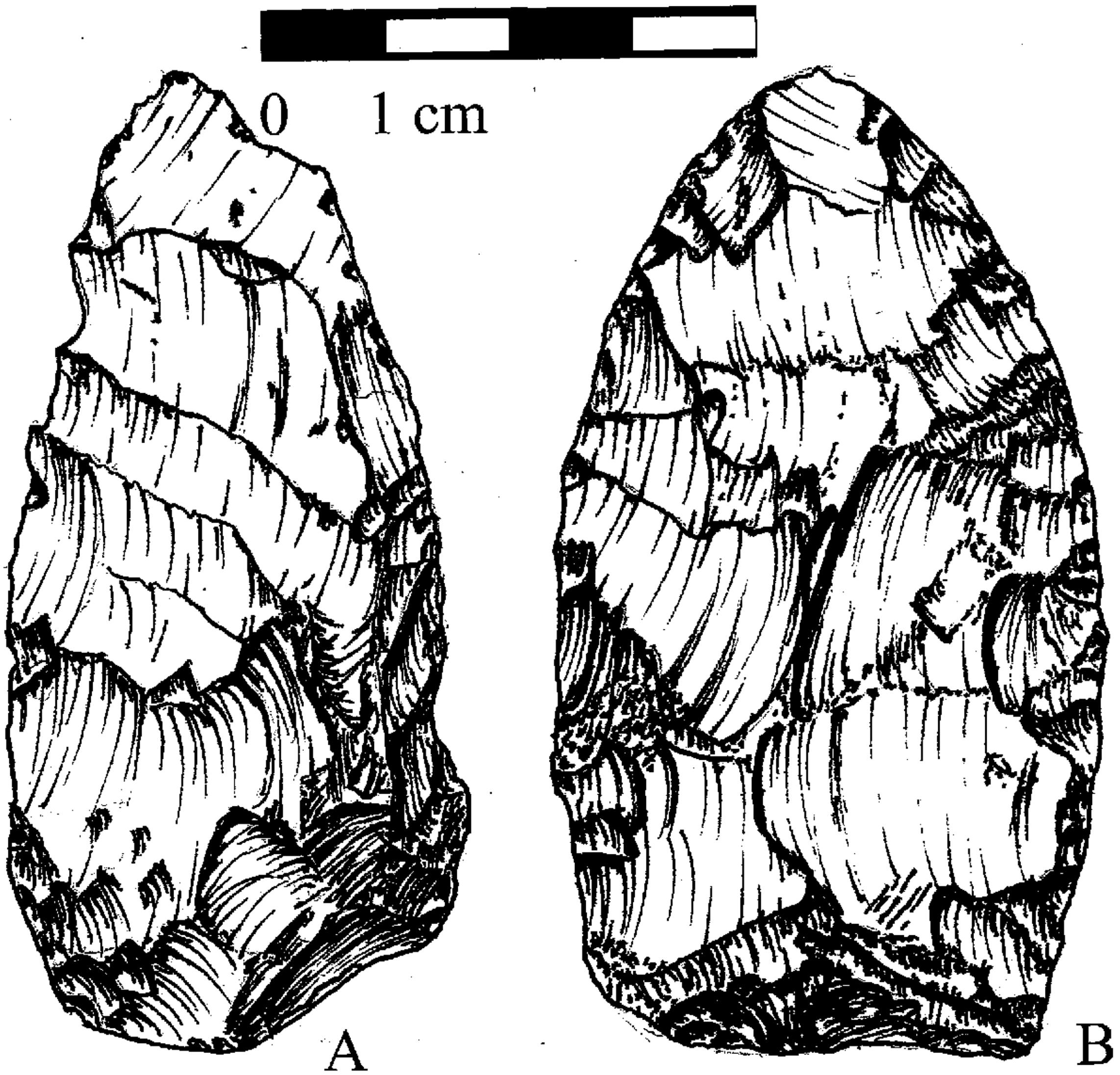

Figure 11. Two type-II bifaces.

The surfaces are pitted and cracked (Odell and Odell-Vereecken 1980:100). Three appear to be recycled cores, one of which was also reused as a scraper.

Discussion and Conclusion

From the foregoing analysis it is safe to conclude that the lithic assemblage (but for the younger projectile points) is consistent with other lithic assemblages from the Paleoindian and Early Archaic periods in eastern North America. The site is deflated, but it is likely located, or was located, in the immediate area of the depression. The tools did not show any obvious effects of river transport or polishing; some of the edges were still sharp and small flake scars were apparent on the working edges. In addition, there was no evidence of the random patterns of flake scars that would be expected if the scars were produced by natural forces (Tringham et al. 1974). Finally, because of the topography of the riverbed, the tools could not have moved more than 50 meters down river. Whether the Santa Fe River was flowing during the Late Pleistocene/Early Holocene in this location is unknown, however, it was not flowing during the late glacial maximum when trees grew in mid-channel. One such tree has been dated at 18,550 ± 200 B.P. (Smith et al. 1997:91).

The site is not single-component, but whether it represents a mixture of Paleoindian and Early Archaic period assemblages is unknowable because many of the these artifacts are found in both Bolen and Suwannee sites in Florida and from Paleoindian and Early Archaic-age sites throughout eastern North America. Other than the large discoidal scraper (Figure 5a), versions of all the tools were also found at Harney Flats. The presence of the Suwannee and Simpson points argues for at least a mixed Paleoindian and Early Archaic assemblage, but other than the large scraper, the lanceolate points, and large projectile point tips, all of the tool forms also are present at the Bolen site of 8LE2105. Assuming that Bolen and Suwannee/Simpson represent temporally distinct cultures there may be temporal continuity in the lithic tools. Other than the diagnostic projectile points, the lithic assemblages are too difficult to distinguish.

Based upon the use-wear analysis it appears that tasks were undertaken at the site that involved the modification of hard materials like wood, bone, and antler. The number of ovoid scrapers that look very similar to Dalton adzes, oblong scrapers, and larger scrapers indicates that wood working was a significant activity. In fact, most of the larger tools look as if they were used for scraping harder material as opposed to scraping softer material or activities involving cutting. Whether significant tool manufacture and raw material reduction was conducted at the site cannot be known, but the presence of broken, unfinished projectile points indicates that some tool manufacture was undertaken. Notwithstanding the sampling issues, because most of the tools were finished and used, we can tentatively conclude that tool production was a relatively minor focus of the site. The number and variety of tools indicates the site may have been a sizable activity area. Hopefully, parts of the site are still intact, either in the river bottom or on the adjacent shore, and await further investigation.

Although these tools were found out of stratigraphic context, there is always some useful information that can be gained if the artifacts are made available for study. Questions of morphological variation, tool use, tool and site distributions, and site formation processes are but a few of the issues that can be addressed by "river finds." Don Munroe is an avocational collector who understands that his hobby can enhance academic archaeology to the benefit of everyone and should be commended for reporting his finds and making them available for study.

Notes

1 He reported the finds to the Isolated Finds program of the Division of Historical Resources, Florida Department of State. The Isolated Finds program has been discontinued.

2 The weight (0.1 gm), and maximum length, width, and thickness (0.1 mm) were measured on all tools. On all tools that still had a platform the maximum length was measured from the platform to the distal end, and the maximum width and thickness were measured perpendicular to that axis. On unifaces that did not have a platform the maximum length was first measured and the other two dimensions were measured perpendicular to that axis. On whole bifaces the maximum length was measured from the tip to the base. On broken bifaces the maximum length was measured along the axis that would have intersected the tip and base. Raw material was measured as coarse or not coarse. Retouch was defined as at least three flakes removed in a row.

3 There is no general agreement on the definition of an end scraper. Deller and Ellis (1992:56) limit end scrapers to steep-bitted tools that were apparently hafted, whereas Goodyear (1974:43-46, Figure 15) identifies both a hafted and unhafted end scraper. Storck (1997:78) defines them in regards to the location of the steep, convex working edge opposite the platform instead of the by their unifacial nature. Daniel (1998:66) defines them as having steep bits on the relatively narrow end of a uniface. Kraft (1973:70-71) differentiates nine end scraper types, Deller and Ellis (1992:55) identify eight, Storck (1997:78) identifies four with three subtypes, and MacDonald (1968:90-95) describes six. End scrapers are differentiated on the basis of retouch location (e.g., Storck 1997), plan-view shape (e.g. Deller and Ellis 1992), spurs (MacDonald 1968), and combinations of these attributes. Most authors surmise that end scrapers were likely inserted in either an antler or bone handle or attached to a wooden handle.

4 These match the narrow end scrapers found at the Thedford II site, a Paleoindian site in Ontario (Deller and Ellis 1992).

5 At the Paleoindian Plenge site in New Jersey (Kraft 1973:71) ovoid scrapers appear to be types 28 and 29 of the end scrapers. At the Paleoindian/Early Archaic Brand site in Arkansas, they appear to be characterized as adzes (Goodyear 1974:40-42). Purdy (1981:11, 23, 35-38) would probably describe them as general unifacial or unifacial hump-backed scrapers. Storck (1997:65-66) describes scrapers with a thick cross-section as "beaked" from the Paleoindian Fisher site in Ontario. Coe (1964) and Daniel (1998) would include them in Type II or Type III end scrapers from the Early Archaic Hardaway site in North Carolina. MacDonald (1985:94) would describe these as humpback end scrapers from the Paleoindian Debert site in Nova Scotia that were not likely hafted because they were retouched around the entire circumference.

6 Purdy (1981) does not differentiate a discoidal scraper. Kraft (1973:71) shows a circular end scraper that is similar to the Munroe artifacts.

7 A tabular core scraper was found at the Paleoindian Wells Creek Crater site in Kentucky (Dragoo 1973:41, 44), and similar artifacts were found at the Paleoindian/Early Archaic Stansfield-Worley site in Alabama (DeJarnette et al. 1962) and the Early Archaic Eva site in Tennessee (Lewis and Lewis 1961).

8 Kraft (1973:100) includes utilized flakes and flakes that were only modified on the working edge in this category. Dragoo (1973:27) defines side scrapers as having straight or nearly straight working edges. MacDonald (1968:95) defines them as unifacial tools with steep retouch. Daniel (1998:83-84) defines side scrapers as having retouch on any edge other than the end.

9 Similar core-tools are described by Dragoo (1973:39-42) at the Wells Creek Crater site.

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