# Alley Mill Revisited: A Reevaluation of the Dalton Midden Deposit

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Revisits to complex sites often yield additional and sometimes unknown data that provide new insights to the interpretations of archaeological deposits (e.g., Ahler et al. 1992; Kay 1982a; Klippel 1971; Wood and McMillan 1976). This is especially true if previous excavations were relatively limited in extent. A return to the Alley Mill site during the summer of 2009 after a 17-year hiatus provided significant new information on some of the earliest deposits at this unique site situated adjacent to the largest spring in the Jacks Fork River valley.

The reason for the Alley Mill revisit was prompted by geoarchaeological reconnaissance in the Current and Jacks Fork river valleys in 2008. This investigation revealed high potential for the presence of buried Paleoindian and earlier deposits at multiple sites (Mandel 2008). Test excavations subsequently were planned for consecutive years at six sites in the Ozark National Scenic Riverways (ONSR) through a collaborative agreement between ONSR and Rolfe Mandel, director of the Odyssey Archaeological Research Fund at the Kansas Geological Survey, University of Kansas. For the first geoarchaeological investigations in ONSR in 2009, the Odyssey project targeted the Alley Mill site and nearby Branson Cave as good places to look for buried Paleoindian and possible pre-Clovis-age deposits (Ray and Mandel 2009). Little was known about the deposits in Branson Cave, but previous work at Alley Mill had documented a buried Dalton component (Lynott et al. 2006). Although the deposits at Branson Cave proved to be relatively shallow and devoid of early deposits, information obtained from the excavations at Alley Mill proved to be surprising and shed new light on the cultural affiliation and age of the earliest deposits.

## Alley Mill Site (23SH83/159)

Prehistoric and historic remains at the Alley Mill site were first recorded by Mark Lynott in November of 1981 and assigned number 23SH83. Cynthia Price submitted a second site form in April 1982 for historic components associated with the late nineteenth- and early twentieth-century Alley community (including the 1868 Barksdale grist mill, 1894 roller mill, mill pond and dam, sawmill, blacksmith shop, and general store) and assigned number 23SH159. As a result, the Alley Mill site has a dual number, 23SH83/159.

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The Alley Mill site is located on colluvial deposits at the base of a steep ridgeslope next to Alley Spring, the seventh largest spring in Missouri (Vineyard and Feder 1974). The site contains multiple prehistoric and historic components. Historical resources associated with the standing historic mill structure were well known (Flanders 1985), but prehistoric deposits at the site were unknown until unprecedented archaeological excavations were conducted around the base of the mill in March of 1992 (Lynott et al. 2006). Excavations were located adjacent to the existing mill foundation to restore and stabilize portions of the mill structure. The 1992 investigations consisted of 11 test units comprising 14.5 $m^2$ placed on the north, west, and south sides of the mill (Lynott et al. 2006:Figure 6). Those excavations revealed the presence of a well-defined, intact, buried midden along the south and west sides of the mill. Although younger Archaic projectile points also were found within this midden deposit, the midden was thought to represent a Dalton occupation based on a preponderance of diagnostic Dalton points and other associated Dalton tools. This midden varied in thickness (25–48 cm) along the base of the mill with the thickest part between 64 cm and 112 cm bs (below surface) (Lynott et al. 2006:12, 18). The 1992 excavations terminated at the base of the mill foundation, which extended to the base of the midden deposit. The focus of the 2009 Odyssey Fund investigations at Alley Mill (Figure 1) was to reexamine the Dalton midden deposit, obtain radiocarbon samples if possible, and search for earlier cultural deposits below the Dalton horizon.

Odyssey investigations were conducted during three eight-day sessions, beginning on May 18 and ending on June 15, 2009. Excavations were conducted in eight 1-x-1-m test units situated south and west of the 11 test units excavated in 1992 (Figure 2). Test Units 12 and 13 were conjoined units oriented east-west 1–2 m south of the southwest corner of the mill foundation, whereas Test Units 16–19 formed a 4 m-long north-south trench 1–2 m west of the southwest corner of the mill foundation. Test Units 14 and 15 (conjoined north-south) were placed 7.7–8.7 m west of the southwest corner of the mill foundation to determine if the Dalton occupation extended farther west across the colluvial fan.

Hand excavations were conducted in 10-cm levels and all undisturbed sediments were dry screened through one-quarter-inch mesh. Site datum was established approximately 1 m south and 0.9 m west of a red fire hydrant, located approximately 16 m west of the northwest corner of Alley Mill. Artifact and feature depths were measured in centimeters below ground surface, following the natural contour of the colluvial apron along the west and south walls of the mill.

## Geomorphology, Stratigraphy, and Soils

The Alley Mill site is situated on a sloping colluvial apron (approximately 6–10º) that formed at the base of a steep slope on the southwest side of Alley Spring (Figure 3). The current topography of the mill yard south of Alley Mill is relatively level, having been modified by CCC work ca. 1933 in conjunction

Figure 1. 2009 Test Excavations in relation to Alley Mill (view to north)

with rechannelizing Alley Branch (Lynott et al. 2006:7–8, Figures 4–5). Photographs of the area prior to the CCC construction show the sloping colluvial apron stretching approximately 7–8 m south of the mill foundation to the original channel of Alley Branch (Lynott et al. 2006:Figure 4) and at least 10 m west of the mill foundation (Lynott et al. 2006:Figure 5).

Four strata were identified in the 2009 test units and numbered I–IV from the surface downward. The strata were defined on the basis of their origin: colluvium, alluvium, and historic-age redeposited material (fill). Lower case letters were used to subdivide the strata where differences in lithology were detected within a body of sediment (e.g., Stratum IIa, IIb, etc.).

Stratum I covers the surface of the Alley Mill site and consists entirely of historic fill. In some test units, Stratum I is stratified. Stratum II consists of undisturbed clast-rich colluvium and was recorded in all test units. Large and small cobbles are common in Stratum II. Stratum III is restricted to the southern margin of the site and consists of alluvium derived from Alley Branch. The alluvium comprising Stratum III is interbedded with small amounts of colluvium. Stratum IV, the lowest sedimentary unit, is colluvium, but it is finer grained compared to Stratum II. Soil development has modified all of the strata below Stratum I.

The stratigraphy and soils exposed in adjoining Test Units 16 and 17 are representative of what was observed in most of the test units (Table 1, Figure

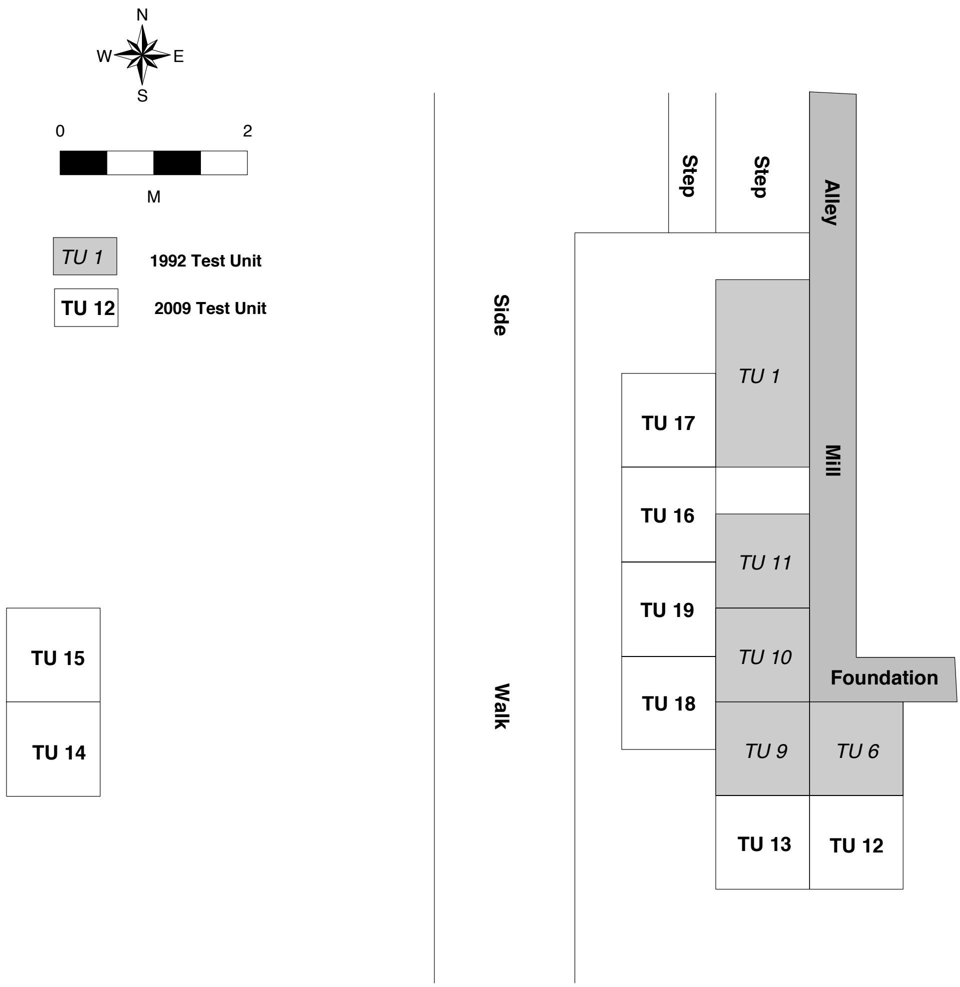


Figure 2. Location of 2009 test units in relation to 1992 test units and the foundation of Alley Mill.

4). Stratum I, an historic-age fill consisting of gravel and redeposited soil, is 23 cm thick and overlies a truncated soil (Soil 1) developed in a silty clay loam matrix with many angular pebbles and cobbles (Stratum IIa). Soil 1 is represented by well-expressed reddish brown Bt1 and Bt2 horizons with silty clay loam texture and common to many continuous clay films on ped faces; the A horizon was stripped off before Soil 1 was buried by Stratum I.

The top of a buried soil (Soil 2) with an ABt-Bt-BCt-C profile occurs at a depth of 55 cm. Soil 2 is developed in colluvium comprising Strata IIb, IVa and IVb; Stratum III (alluvium) does not occur in Test Units 16 and 17. The

Figure 3. The colluvial slope on the west side of Alley Mill (view to east). The toe of the colluvial slope is approximately 7–8 m south of the mill (where the wooden table is located). The north side of the original channel of Alley Branch would have been in this area.

ABtb2 horizon consists of reddish brown silty clay loam with subangular-blocky structure, common clay films on ped faces, and many krotovina. Welding of the Bt2b1 horizon of Soil 1 to the top of Soil 2 accounts for clay films in the ABtb2 horizon. The ABtb2 horizon probably represents a former cumulic A horizon that was subsequently transformed into an ABt horizon through soil welding. The archaeological evidence supports this interpretation.

Cultural materials occur throughout the ABtb2 horizon and upper 29 cm of the Bt1b2 horizon. Hence, based on radiocarbon ages determined on charcoal (Figure 4), it is likely that colluviation was occurring at a slow rate between ca. 9,500 and 7800 $^{14}C$ B.P. and relatively stable living surfaces marked by A horizons were available for human occupation during that time. With cumulic soils, which are common on the footslopes and toeslopes of colluvial aprons, pedogenesis and sedimentation occur simultaneously because the rate of sedimentation is very slow (Birkeland 1999). In other words, soil development keeps up with sedimentation, and it is not unusual for the lower part of an A horizon to evolve into a B horizon. During the early Holocene, the combination of soil cumulization and intensive occupation of living surfaces formed an organic-rich

Table 1. Soil Descriptions.

| Depth (cm) | Soil Horizon | Stratum | Description |
|---|---|---|---|
| Test Unit 16 | | | |
| 0–23 | I | - | Historic fill. Brown (7.5YR 5/4) and reddish brown (5YR 5/4) gravelly silty clay loam and loam with common inclusions of dark grayish brown (10YR 4/2) silty clay loam; about 50–55% pebbles and cobbles by volume; abrupt wavy boundary. |
| | | | Soil 1 |
| 23–38 | IIa | Bt1b1 | Reddish brown (5YR 5/4) silty clay loam, reddish brown (5YR 4/4) moist; moderate medium subangular blocky structure parting to moderate fine subangular blocky; hard, friable; common distinct continuous brown (7.5YR 4/3) clay films on ped faces; many angular pebbles and cobbles; poorly sorted; few krotovina; common worm casts and open worm and insect burrows; many fine and very fine and few medium roots; gradual smooth boundary. |
| 38–55 | IIa | Bt2b1 | Reddish brown (5YR 5/4) silty clay loam, reddish brown (5YR 4/4) moist; moderate medium subangular blocky structure parting to moderate fine subangular blocky; hard, friable; many distinct continuous brown (7.5YR 4/3) clay films on ped faces; many angular pebbles and cobbles; poorly sorted; few krotovina; common worm casts and open worm and insect burrows; many fine and very fine and few medium roots; clear smooth boundary. |
| | | | Soil 2 |
| 55–86 | IIb | ABtb2 | Midden. Reddish brown (5YR 4/3) silty clay loam, dark reddish brown (5YR 3/3) moist; weak medium subangular blocky structure parting to weak fine subangular blocky; hard, friable; few distinct discontinuous brown (7.5YR 4/3) clay films on ped faces; many angular pebbles and common large cobbles; poorly sorted; common krotovina; common worm casts and open worm and insect burrows; many fine and very fine and few medium roots; clear smooth boundary. |
| 86–132 | IVa | Btb2 | Brown (7.5YR 5/4) silty clay loam, brown (7.5YR 4/4) moist; weak fine subangular blocky structure; hard, friable; few distinct discontinuous brown (7.5YR 4/3) clay films on ped faces; few very fine, hard, black manganese oxide nodules; many angular pebbles and cobbles; poorly sorted; common worm casts and open worm and insect burrows; common fine and very fine and few medium roots; clear smooth boundary. |
| 132–152 | IVa | BCtb2 | Brown (7.5YR 5/4) silty clay loam, reddish brown (5YR 4/4) moist; very weak fine subangular blocky structure; hard, friable; few faint discontinuous brown (7.5YR 4/3) clay films along root paths and in macro-pores; common very fine, hard, black manganese oxide nodules; many angular pebbles and cobbles; poorly sorted; common krotovina; few worm casts and open worm and insect burrows; common fine and very fine and few medium roots; clear smooth boundary. |
| 152–170 | IVb | Cb2 | Brown (7.5YR 5/4) gravelly loam, reddish brown (5YR 4/4) moist; massive; hard, friable; about 65–70% angular pebbles and fine cobbles by volume; poorly sorted; common very fine, hard, black manganese oxide nodules; few very fine and fine roots. |
| Test Unit 13 | | | |
| 0–21 | Ia | - | Historic fill. Brown (7.5YR 5/3 and 5/4) gravelly loam, brown (7.5YR 4/3 and 4/4) moist; about 60–65% pebbles and cobbles by volume; abrupt wavy boundary. |

Table 1. Continued.

| Depth (cm) | Soil Horizon | Stratum | Description |
|---|---|---|---|
| 21–38 | Ib | - | Historic fill. Reddish brown (5YR 5/4) gravelly loam and silty clay loam; about 60–65% pebbles and cobbles by volume; abrupt wavy boundary. |
| 38–66 | Ic | - | Historic fill. Brown (7.5YR 4/2) silty clay loam, dark brown (7.5YR 3/2) moist; about 30–40% pebbles and cobbles by volume; this fill is a product of the former sawmill; abrupt wavy boundary. |
| | | | Soil 1 |
| 66–101 | II | Btb1 | Reddish brown (5YR 5/4) silty clay loam, reddish brown (5YR 4/4) moist; moderate medium subangular blocky structure parting to moderate fine subangular blocky; hard, friable; common distinct continuous brown (7.5YR 4/3) clay films on ped faces; many angular pebbles and cobbles; poorly sorted; few krotovina; common worm casts and open worm and insect burrows; many fine and very fine and few medium roots; clear smooth boundary. |
| | | | Soil 2 |
| 101–130 | III | 2ABtb2 | Midden. Brown (7.5YR 5/4) silty clay loam, brown (7.5YR 4/4) moist; common fine distinct strong brown (7.5YR 5/6 and 4/6) and yellowish red (5YR 4/6) mottles; weak medium subangular blocky structure parting to weak fine subangular blocky; hard, firm; common distinct discontinuous brown (7.5YR 4/3) clay films on ped faces; common gray (7.5YR 5/1) reduction zones along root paths and in macro-pores; few angular pebbles; common krotovina; common worm casts and open worm and insect burrows; common fine and very fine and few medium roots; gradual smooth boundary. |
| 130–140+ | III | 2Btb2 | Brown (7.5YR 5/4) silty clay loam, brown (7.5YR 4/4) moist; common fine distinct strong brown (7.5YR 5/6 and 4/6) and yellowish red (5YR 4/6) mottles; weak fine subangular blocky structure; hard, firm; few distinct discontinuous brown (7.5YR 4/3) clay films on ped faces; many gray (7.5YR 5/1) reduction zones along root paths and in macro-pores; few angular pebbles; common krotovina; common worm casts and open worm and insect burrows; common fine and very fine and few medium roots. |

archaeological midden that spans the entire thickness of Stratum IIb at the Alley Mill site.

The Btb2 and BCtb2 horizons of Soil 2 are developed in Stratum IVa. Both horizons consist of brown silty clay loam with many angular pebbles and small angular cobbles, and cultural deposits occur in the upper 30 cm of the Btb2 horizon. An abrupt boundary at a depth of 152 cm separates the BCtb2 horizon from brown fine gravelly loam (Stratum IVb) comprising the lower 18 cm of the profile. The Cb2 horizon of Soil 2 begins at the top of Stratum IVb. Most of the coarse clasts in the Cb2 horizon are small, angular pebbles; only a few angular cobbles were observed below a depth of 152 cm.

In Test Unit 13, there are three separate historic-age fills: Strata Ia, Ib, and Ic (Table 1, Figure 5). Combined, these fills form a 66-cm-thick mantle above Stratum II, a unit of colluvium that has been strongly modified by soil development. Soil 1, which is represented by a truncated Bt horizon, is developed in Stratum II. The Btb1 horizon consists of reddish brown silty clay loam with

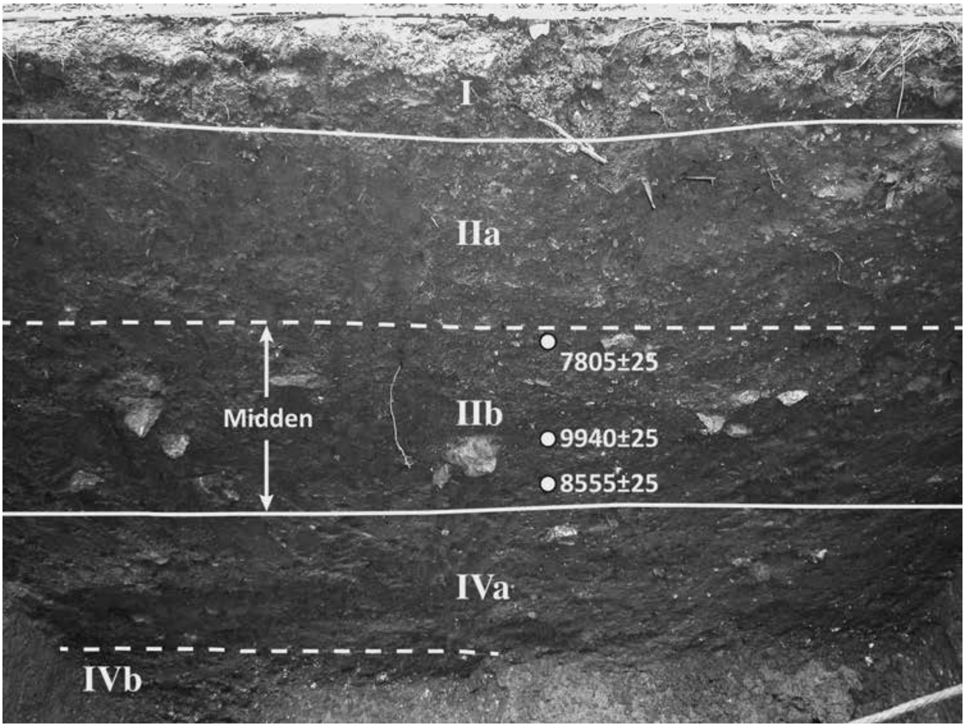


Figure 4. Stratigraphy and soil horizonation exposed in the west wall of adjoining Test Units 16–17. The radiocarbon ages were determined on charcoal or walnut shell fragments. The radiocarbon age of 7805 ± 25 was determined on a walnut shell fragment in the west wall of adjoining Test Unit 18.

many angular pebbles and cobbles. A clear boundary separates Stratum II from Stratum III, a unit of alluvium interbedded with small amounts of colluvium. The occurrence of alluvium in Test Unit 13 is attributed to its close proximity to the former channel of Alley Branch.

Soil 2, which is developed in Stratum III, has a well-expressed ABt-Bt profile. The Btb1 horizon of Soil 1 is welded to the top of Soil 2, which accounts for the clay films in the 2ABtb2 horizon. As is the case with Soil 2 in Test Units 16–17, the 2ABtb2 horizon of Soil 2 in Test Unit 13 probably represents a former cumulic A horizon that has been transformed into an ABt horizon because of soil welding. Also, Late Paleoindian through Early Archaic cultural deposits are concentrated in the 2ABtb2 and 2Btb horizons, forming a midden (Figure 5). Krotovina are common in Stratum III, so it is likely that the vertical integrity of the cultural deposits comprising the midden has been affected by burrowing animals.

Based on the soil-stratigraphic information gleaned from the test units, there is a buried early Holocene landscape represented by Soil 2 at the Alley

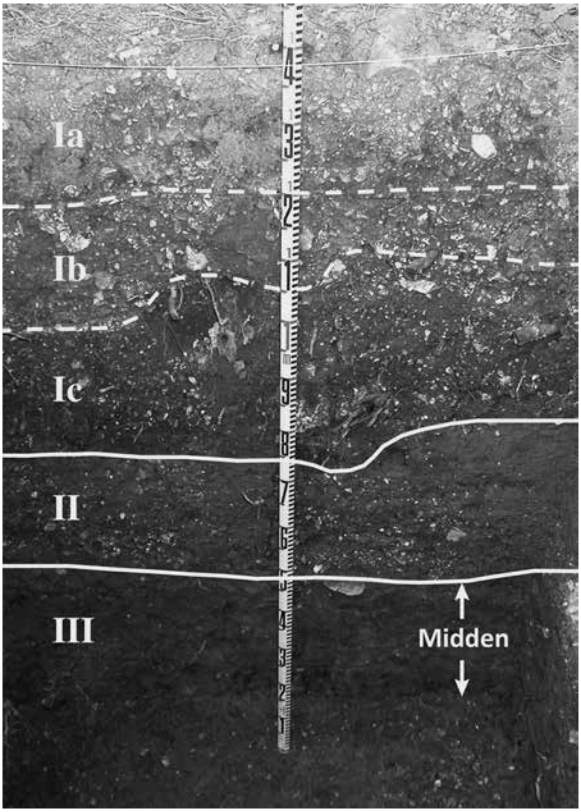


Figure 5. Stratigraphy and soil horizonation exposed in the west wall of Test Unit 13.

Mill site. Soil 2 comprises a paleo-catena; it is developed in floodplain deposits near the former channel of Alley Branch, and rises northward beneath the surface of a colluvial apron, where it is developed in poorly sorted, gravel-rich slope deposits. From an archaeological perspective, Soil 2 is important because Late Paleoindian and Early Archaic cultural materials are concentrated in it. However, bioturbation has affected the vertical distribution of artifacts in Soil 2.

## Prehistoric Components

A large quantity of historic artifacts and several prehistoric artifacts were collected from disturbed sediments around the foundation of Alley Mill. This redeposited fill associated with mill construction ranged from 25–40 cm thick in the vicinity of Test Units 16–19 to 60–70 cm thick in the vicinity of Test Units 12–13. The deeper disturbance in the latter units, designated Feature A by Lynott et al. (2006:13–14) and as Feature 3 during the 2009 excavations, is directly associated with a sawmill that was located along the south side of the mill and extended approximately 6–7 m west of the mill. Lynott et al. (2006:Figure 3) depicted the east end of the sawmill, and the entire sawmill is clearly depicted in a photograph (ONSR archives) taken ca. 1913. Sediments located below the disturbances created by digging the mill foundation and operating the adjacent sawmill represent undisturbed prehistoric deposits.

Diagnostic artifacts recovered in 1992 and 2009 indicate multiple prehistoric components at Alley Mill. Although the majority of the diagnostic artifacts from both excavations are Dalton points, several younger (mostly Archaic) point types are represented. However, during the two seasons of fieldwork that included the excavation of 22.5 m$^2$, no late prehistoric (i.e., Late Woodland/Mississippian) artifacts have been recovered from the Alley Mill site. It is possible that the immediate surroundings of large springs in the central Ozarks were reserved for ceremonial purposes rather than habitation during late prehistoric times. At least four human burials have been found in the immediate vicinity of Round Spring located on the Current River not far to the northeast of Alley Spring (Lynott 1991:2–3). Shell-tempered and/or limestone-tempered pottery accompanied three of the four burials.

### *Early Woodland Component*

Whatever the case may be for the apparent lack of late prehistoric deposits at Alley Mill, earlier Ozarkers did live in the immediate vicinity of the spring. The youngest prehistoric component is represented by a contracting-stemmed Waubesa (also known as Adena or Gary) projectile point/knife (PP/K). This displaced Early Woodland point (Figure 6e) was recovered from a depth of 96 cm bs in the southwest corner of Test Unit 14, where a large and deep disturbance (apparently related to tree-stump removal) was recorded.

### *Late Archaic Components*

Two Late Archaic points were recovered from disturbed deposits (27 and 31 cm bs) in Test Unit 18. One (Figure 6c) appears to be a Williams (or Big Creek) PP/K, whereas the other (Figure 6d) is probably a fragment of a Smith PP/K. A large thick square-stemmed point found in 1992 (Lynott et al. 2006:Figure 13e) appears to represent another Smith point. Smith and Williams points have been radiocarbon dated to ca. 4,400–3,600 radiocarbon years before present (rcybp) at multiple sites in the Ozarks and adjacent regions (Ray et al. 2009:178–186). Lynott et al. (2006:35) also reported two small asymmetrical points that were identified as Merom.

### *Middle Archaic Components*

The Middle Archaic period is represented by two side-notched White River points (Figure 6a–b). One was found in Test Unit 15 at a depth of 33 cm, whereas the other was recovered in Test Unit 19 at a depth of 51 cm. Based on a prominent impact scar extending nearly to the haft element, one specimen (Figure 6b) was a dart point. White River points were dated to ca. 6,200–6,000 rcypb at the Hogan Creek site (Ray et al. 2009:174–175). A Jakie point found in 1992 (Lynott et al. 2006:Figure 13l) may predate the White River points.

### *Early Archaic Components*

Several Early Archaic points were recovered from Alley Mill in 1992 and 2009. Although most of the stem was missing, one point with parallel flaking was identified as Scottsbluff (Lynott et al. 2006:34–35, Figure 12a). However, this specimen, which has a biconvex cross section, a relatively narrow blade,

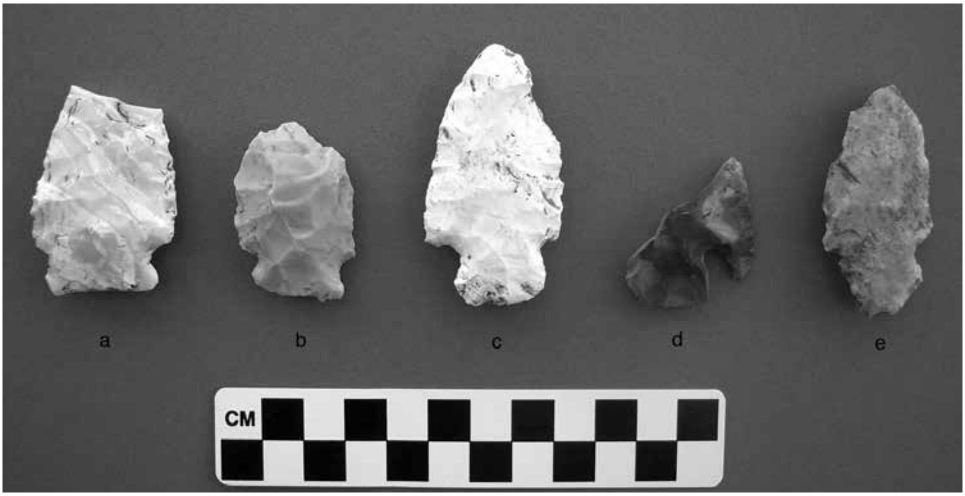


Figure 6. Middle Archaic, Late Archaic, and Early Woodland projectile points/knives: (a–b) White River, (c) Williams, (d) Smith, and (e) Waubesa.

and relict, small, narrow (2 mm wide) notches below the shoulders, represents a Cache River point (Jack Ray, personal observation). Lynott et al. (2006:35) also reported one Graham Cave point, one Rice Lobed point, and one contracting-stemmed point identified as Kirk Stemmed. In the Ozarks, points similar to Kirk Stemmed are generally referred to as Rice Contracting Stemmed (Chapman 1975:252–253) or more recently Taney (Ray 2015a:9–11). Two point fragments with unground bases identified as Kirk Corner Notched are questionable and may not date to the Early Archaic.

Five Early Archaic points were recovered in 2009. One is an extensively resharpened Graham Cave (Figure 7e). It was discovered in Test Unit 12 at a depth of 103 cm bs. However, it was found next to a krotovina and appears to have been displaced to this lower position via bioturbation. The point was re-sharpened along alternate right edges of the blade producing left bevels. Stem and basal margins are lightly ground. The age range for Graham Cave points is approximately 8600–8200 rcybp (Ray et al. 2009:166–168).

The remaining four diagnostic Early Archaic specimens are Searcy (also known as Rice Lanceolate) points. One complete Searcy specimen (Figure 7a) was found in Test Unit 19 at a depth of 78 cm bs. It exhibits limited resharpen-ing along the blade edges. The second specimen (Figure 7b) was found in Test Unit 12 at a depth of approximately 105 cm bs. This point appears to have been displaced by excavation associated with the sawmill. The blade had been exten-sively resharpened prior to discard. The third Searcy specimen (Figure 7c) was recovered from Test Unit 17 at a depth of 71 cm. It is a midsection fragment that snapped at the haft and near the distal end. Relict ground edges (of the stem) are evident immediately above the proximal break. Like the first specimen, it


Figure 7. Early Archaic projectile points/knives: (a–d) Searcy and (e) extensively resharpened Graham Cave.

also appears to have undergone limited resharpening prior to breakage. The fourth Searcy point was found in Test Unit 17 at a depth of 92 cm. It is a proximal fragment that was shattered by heat (Figure 7d). The lateral edges of the stem and base are not ground. The age range for Searcy points is approximately 7800–7100 rcybp (Dickson 2002:87; Ray 1995:35, 1997:Table 6).

Two undisturbed prehistoric lithic features appear to be associated with Early Archaic occupations at Alley Mill. One lithic feature, designated Feature 4, was found at a depth of 62–66 cm bs in Test Unit 19. Based on the radiocarbon age of 7,805 ± 25 rcybp obtained from 63 cm bs in the adjacent test unit, this feature appears to be associated with the Searcy component. Feature 4 consisted of two concentrations of knapping debitage near a large, tabular, alluvial cobble of sandstone that measured approximately 25 cm in diameter and 8 cm thick. Area A of Feature 4 consisted of several large early-stage reduction flakes, two preform fragments, and the distal end of a probable PP/K along the south and west sides of the large sandstone cobble. Area B consisted of a smaller concentration of early- to middle-stage reduction flakes approximately 40–50 cm east of the large sandstone cobble. In addition to the flake concentrations recovered from Feature 4, the densest concentration of flake debitage (N=204) throughout Test Unit 19 occurred in Level 7 (60–70 cm bs). Many, if not the majority of these


Figure 8. Late Paleoindian projectile points/knives: (a–e) Dalton and (f) San Patrice.

flakes probably are associated with the knapping concentration (Feature 4), but were not identified as part of the feature during excavation. One quartzite hammerstone also was recovered from Level 7 in Test Unit 19.

The other lithic feature, designated Feature 2, consisted of a concentration of alluvial cobbles and residual fragments of chert, quartzite, and sandstone in Test Units 16, 17, and 19. The cobbles and residual rocks were deposited on the slope of the colluvial apron between depths of 65 cm bs in the northern portion of Test Unit 17, and 81 cm bs in the northern portion of Test Unit 19. The stream-rounded, alluvial cobbles had to have been manually transported onto the colluvial apron. None of the rocks in the feature appeared to have been intentionally heated. The function of Feature 2 is unknown.

### *Late Paleoindian Components*

A Late Paleoindian Dalton occupation at Alley Mill was well documented by the 1992 excavations (Lynott et al. 2006:31–38). Fifteen Dalton artifacts were recovered from test units at the southwest corner of the mill at depths between 60 and 110 cm. Other Dalton tools found in 1992 include 3 hafted drills, 1 chipped-stone adze, 9 spurred gravers, 2 burins, and 11 scrapers.

The 2009 Odyssey excavations recovered several of the Dalton tool types mentioned above. Five are complete or nearly complete Dalton points (Figure 8a–e). Four of these were found in test units located along the southwest corner of the mill foundation, but one was found in Test Unit 15 at least 8 m west of the mill foundation. These points occurred at depths of 65, 75, 76, 80, and 93 cm bs. The Dalton points exhibit various stages of resharpening from initial (Figure 8b) to advanced (Figure 8a, c–e). Three specimens exhibit bevels on the right side of the blade, one has a bevel on the left side, and one is not beveled. Three specimens are serrated, whereas two are not serrated. Grinding along

Figure 9. Probable fragments of Dalton projectile points/knives.

the lateral and basal margins is light to moderate. All were manufactured from local Gasconade and Roubidoux cherts. None were heat treated, although the distal end of one specimen was burned.

Seven proximal, midsection, and distal fragments exhibit attributes that indicate they probably also are from Dalton points (Figure 9). Six of these were recovered from the west and south sides of the mill foundation, and one was found about 8 m west of the foundation. These probable Dalton fragments were found between depths of 67 and 106 cm bs. Three midsection and distal fragments (Figure 9a–c) exhibit right bevels, whereas beveling on the other four specimens is indeterminate. Three midsection fragments (Figure 9d–f) exhibit radial fractures and burin scars. The remaining probable Dalton specimen (Figure 9g) is an ear fragment. At least one other hafted biface, which is not a projectile point/knife, is diagnostic of Dalton. It is the poll (or hafted) end of a chipped-stone adze, the edges of which are heavily ground (Figure 10a). Two thick bifaces with bevels appear to be distal (bit) fragments of Dalton adzes (Figure 10b–c). All three adze fragments were found at depths between 63 and 74 cm bs.

A previously unidentified Late Paleoindian component at the Alley Mill site is San Patrice. One San Patrice point (Figure 8f) was recovered from Test Unit 17 at a depth of 79 cm bs. This specimen represents the Hope variety of San Patrice with shallow incurvate stem edges and a deep concave base (as opposed to the distinct corner notches and shallow concave base of the St. Johns variety). The Hope specimen is fluted on both faces and relict blade edges exhibit slight left bevels, a blade attribute occasionally present on resharpened San Patrice points (Lopinot and Ray 2010:125). The maximum thickness of the blade of the broken specimen is 5.8 mm, which is near the mean of San Patrice points and about 2–5 mm less than the mean thickness of Dalton points. The San Pa-

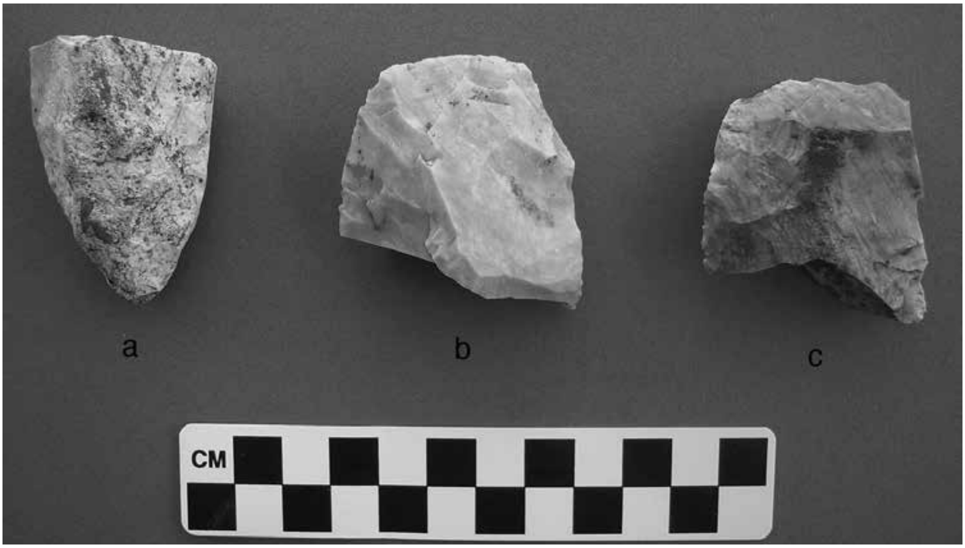


Figure 10. Dalton adze fragments: (a) poll or proximal fragment and (b–c) bit or distal fragments.

trice specimen was manufactured from exotic novaculite, which occurs in the Ouachita Mountains of westcentral Arkansas. San Patrice points were found in the same deeply buried 3Ab horizon as Dalton points at the Big Eddy site (Ray 1998a:163–174). Multiple radiocarbon ages throughout the 3Ab horizon at Big Eddy indicate that it formed between approximately 10,500 rcybp and 9800 rcypb (Lopinot and Ray 2010:121).

Several unifacial tools appear to be associated with Late Paleoindian deposits at Alley Mill. One is a spurred graver made from a biface flake (Figure 11a). It was found in Test Unit 17 at a depth of 85 cm bs. Spurred gravers have been identified in Dalton (Goodyear 1974:53–57; Morse 1997) and San Patrice assemblages (Ray 1998a:152–153; Webb et al. 1971:20–21). Nine gravers, some with pronounced spurs, were found at Alley Mill in 1992 (Lynott et al. 2006:37). A secondary decortication flake with fine serrations along one edge is a denticulate that apparently was used for delicate sawing and/or cutting (Figure 11b). These sawing/cutting tools also have been found in Dalton assemblages (Goodyear 1974:58–59). The most common unifacial tools are scrapers. They consist of three end scrapers (Figure 11c–d), two side-end scrapers, and four side scrapers (Figure 11e–g). These scrapers were recovered between depths of 83 and 116 cm bs. Most were manufactured from local Gasconade and Roubidoux cherts, but two specimens (Figure 9d–e) were made from exotic Penters chert from northeast Arkansas (Ray 2007:122–131).

Several unfinished and broken bifaces represent aborted and failed early-stage preforms (N=5) and middle-stage preforms (N=10) (Figure 12). The early-stage preforms and middle-stage preforms found in 2009 correlate with the terms


Figure 11. Unifacial tools (probable Late Paleoindian): (a) spurred graver, (b) denticulate, (c–d) end scrapers, (e–g) side scrapers.

roughouts and blanks, respectively, used by Lynott et al. (2006:30–31). All of the preforms found in 2009 were recovered between 63 and 112 cm bs. Thick cross sections and squared proximal ends of the middle-stage preforms (Figure 12a–c) suggest that many may be Dalton preforms (Morse 1971:13–14, 1997:Figure 3.13; Ray 1998a:173–174); however, it is possible that some may represent middle-stage preforms of younger Early Archaic points such as Graham Cave and Searcy.

Three bifaces with minimal flaking are not preforms and appear to have been used for a specific purpose. Each of the three specimens was made from a thin tabular slab of Roubidoux quartzite. They measure 14.1, 17.1, and 29.2 mm thick and exhibit minimal bifacial flaking at the distal end and/or lateral

Figure 12. Failed (broken) middle-stage preforms: (a–c) proximal fragments and (d–f) distal fragments.

margins. The limited flaking consists of small steep flake scars made to remove cortical surfaces and form a simple cutting edge (Figure 13a–c). Two were recovered from Level 9 (80–90 cm bs) of Test Unit 18, and one was piece plotted at a depth of 102 cm bs in Test Unit 13. Lynott et al. (2006:29–30) described seven similar artifacts from Alley Mill and referred to them as choppers. Goodyear (1974:65) also reported similar minimally modified cobbles from the Brand site and called them choppers. He noted light use wear along the edges of some specimens and suggested that they may have been used to break the long bones of large animals for marrow extraction.

Nonchipped-stone artifacts found in Levels 8–11 of Test Units 16, 18, and 19 include one quartzite hammerstone, one quartzite anvil/hammerstone, one chunk of lightly ground hematite, and at least seven fire-cracked rocks.

## *Pre-Paleoindian Deposits*

The 2009 excavations at Alley Mill produced no clear-cut pre-Paleoindian (pre-Clovis-age) artifacts. The base of Late Paleoindian (Dalton) deposits was


Figure 13. Choppers made from Roubidoux quartzite. Working edges are at the distal end and one lateral edge on Specimen a and at the distal ends on Specimens b and c.

defined at approximately 120 cm bs by Lynott et al. (2006). A precipitous drop in flakes (Lynott et al. 2006:Table 2) and no tools or cores (Lynott et al. 2006:Table 3) below Level 12 (110–120 cm bs) indicated this lower level of the Dalton horizon. This approximate base of Late Paleoindian deposits at 120 cm bs was supported by the 2009 excavations. Only a sparse scatter of small flakes was noted in Levels 13–15 (120–150 cm bs) in the six test units (Test Units 12–17) that penetrated pre-Dalton and presumably pre-Clovis-age deposits (Ray and Mandel 2009:16).

A sample of flakes found below 120 cm bs in Test Units 16–17 was analyzed in detail. Six flakes were recovered below Late Paleoindian deposits in Test Unit 16 (five in Level 13 and one in Level 14), and only two flakes were found below Late Paleoindian deposits in Test Unit 17 (both in Level 13). All eight flakes were measured as to size in increments of 1 $cm^2$, 2 $cm^2$, 3 $cm^2$, etc. All eight flakes measured <3 $cm^2$. It is probable that all eight flakes from Test Units 16–17 were displaced into Levels 13 and 14 via bioturbation from overlying Late Paleoindian deposits. Small krotovina are present throughout the sediments of the colluvial deposits, and they are especially prevalent in the deepest levels (e.g., Levels 8–18). These krotovina are comprised primarily of cicada and crayfish burrows that measure up to 2 cm and 3 cm in diameter, respectively, and are potential conduits for vertical displacement of small flakes.

For comparative purposes, flakes from Levels 7–11 of Test Unit 18 were also size graded. In each of these levels (excavated through Early Archaic and Late Paleoindian deposits), between 14% and 25% of the flakes measured >3 $cm^2$ (i.e.,


Figure 14. Dalton specimens from the 1992 excavation: (a–b) failed late-stage Dalton preforms and (c–d) fluted Dalton points.

between 3 $cm^2$ and 8 $cm^2$) in size. Based on this size-grade analysis, it appears that there are no cultural deposits at Alley Mill that underlie or pre-date the Late Paleoindian (Dalton and San Patrice) deposits.

A late-stage preform that failed during fluting was recovered from the Dalton horizon (90–100 cm bs) at Alley Mill in 1992 (Lynott et al. 2006:34, Figure 12b). Although reported as a possible Clovis point, it appears to us that this specimen is a late-stage Dalton point preform that failed by reverse hinge fracture during an attempt to remove a second flute in the final stage of production (Figure 14a). Although the majority of Dalton points are basally thinned, fluted specimens are not uncommon (Lopinot and Ray 2010:125; O'Brien and Wood 1998). At least four of 16 complete or nearly complete Dalton points recovered in 1992 and 2009 are fluted with flutes measuring between 27 and 30 mm in length (Figure 8a, d) and (Figure 14c–d). Although the failed preform is relatively thin (6.3 mm), two other Dalton points from Alley Mill are as thin or thinner. Finally, the sequence of pressure flake removal on the failed preform is the same as that noted on other Dalton point preforms and unresharpened Dalton points in southern Missouri (Ray 2015b). This flake removal sequence is from the base to the tip along the right edge and from the tip to the base along the left edge, rotating the preform in a clockwise direction. A second failed Dalton preform was recovered in 1992 (Lynott et al. 2006:Figure 11i). It is considerably thicker than the above failed preform and represents a slightly earlier phase of late-stage reduction (Figure 14b).

## Raw Material Use

The bedrock units in the lower portion of the Jacks Fork River valley, where Alley Mill is located, are composed of two Ordovician-age formations: Gasconade and Roubidoux. Both formations contain abundant quantities of chert and the Roubidoux Formation also contains large quantities of knappable quartzite (Ray 2007:77–89). Two other chipped-stone resources are less abundant local resources. Knappable deposits of rhyolite are present in the lower portion of the Jacks Fork River valley and in the upper portion of the Current River valley. Occasional redeposited cobbles of Undifferentiated Osagean chert also occur in the gravel deposits of the Jacks Fork and Current rivers (Ray 2007:219).

Chipped-stone tools and preforms from all of the test units and a sample of flake debitage (from Levels 7–11 of Test Unit 18) were analyzed as to chert type. All of the analyzed flake debitage (N=239) was made from local chipped-stone resources. The vast majority (75.3%) of the debitage was knapped from Gasconade chert, which dominates the residual deposits on the nearby ridgeslopes and the alluvial deposits in local streams. Approximately one-fifth (20.1%) of the debitage was knapped from Roubidoux chert. Roubidoux quartzite (2.1%), Undifferentiated Osagean chert (2.1%), and Aphanitic rhyolite (0.4%) comprise the remainder of the debitage.

Although not in the sample of debitage analyzed as to raw material type, one small resharpening biface flake of fine-grained Red Pierson chert was noted in the debitage from Level 11 of Test Unit 16. Red Pierson chert is restricted to southwest Missouri and northwest Arkansas (Ray 2007:167). Twenty artifacts (primarily tools and resharpening flakes) knapped from Red Pierson chert were recovered from Late Paleoindian (Dalton and San Patrice) deposits at the Big Eddy site (Ray 1998b:240, 2007:169). The fine-grained texture of the chert from which the small flake was knapped suggests that it probably came from an especially high-quality deposit of Red Pierson chert located in the lower Buffalo River valley in Marion County, Arkansas (Ray 2007:169).

Nearly all of the chipped-stone tools (e.g., PP/K, preforms, adzes, scrapers, choppers, graver, and denticulate) also were manufactured from local raw-material resources (94.6%). Gasconade chert (57.1%) comprised the majority of tools, followed by Roubidoux chert (28.6%), Roubidoux quartzite (7.1%), and Undifferentiated Osagean chert (1.8%).

Two exotic chipped-stone resources are represented in Late Paleoindian tools. One end scraper and one side scraper were made from Penters chert (Variegated variety) located in a restricted area around Independence County in northeast Arkansas (Ray 2007:122–131), approximately 150 km (93 mi) south of Alley Mill. Like PP/K and other valued tools, scrapers were often curated and transported considerable distances from where the tools were made (Morse 1971:17). Two end scrapers and a flake fragment that were knapped from Penters chert were recovered from Late Paleoindian (San Patrice) deposits at the Big Eddy site in southwest Missouri (Lopinot and Ray 2010:130, Table 1).

The other exotic raw material that was found at the Alley Mill site is novaculite. The San Patrice point was manufactured from a multicolored (light brown, white, and dark gray) piece of novaculite. Novaculite (Banks 1990:36–40) occurs in the Ouachita Mountains of southwest-central Arkansas approximately 350 km (217 mi) southwest of the Alley Mill site. The Ouachita Mountains are on the northern border of the heartland of San Patrice points.

## Summary and Conclusion

The 1992 and 2009 excavations at Alley Mill have contributed a great deal of information about local prehistoric occupations. The Alley Mill site, located on the slope of a colluvial apron adjacent to one of the largest springs in the Ozarks, was inhabited by multiple prehistoric groups for at least 9,500 years. The earliest documented occupants were Late Paleoindian groups that inhabited the site at ca. 10,500–9800 rcybp. Based on relative numbers of projectile points and other utilitarian tools (e.g., drills, scrapers, adzes, and gravers) that have been recovered during two seasons of fieldwork, the Dalton occupation was the most intensive or possibly the longest. Those who made Dalton points were the first to occupy all parts of the Ozarks and adjacent areas and intensively exploit a wide variety of local plant, animal, and lithic resources. Although test units excavated in 1992 and 2009 revealed the primary Dalton occupation was located on gently sloping colluvial apron deposits a short distance southwest of Alley Spring at the southwest corner of the roller mill, the 2009 excavations also revealed that Dalton use of the site extended at least 9 m to the west.

Also present, but apparently on an infrequent basis, was San Patrice, a contemporaneous and apparently related Late Paleoindian group that mostly resided in the Gulf Coastal Plain area of Louisiana, east Texas, and southern Arkansas. The presence of one San Patrice point made from novaculite from southwest-central Arkansas, one resharpening biface flake knapped from Red Pierson chert from northwest Arkansas, and two end scrapers made from Penters chert from northeast Arkansas indicates periodic interaction between contemporaneous, yet geographically separate, Dalton (northern) and San Patrice (southern) populations. Although the exact mode of transportation of these exotic raw materials into the southeastern Ozarks is indeterminate, it was by either down-the-line exchange and/or periodic seasonal movements.

A relatively thick dark midden deposit extending from approximately 64 cm to 112 cm bs was defined as a Dalton stratum by Lynott et al. (2006:12, 18). The 2009 excavations at Alley Mill also exposed a dark midden deposit of variable thickness (20–35 cm) and produced several diagnostic Dalton points and

Table 2. Vertical Distribution of Diagnostic Artifacts in the Colluvial Deposits.

| Depth | Late Archaic | Middle Archaic | Early Archaic | Late Paleoindian | Radiocarbon Age |
|---|---|---|---|---|---|
| 0–10 | | | | | |
| 10–20 | | | | | |
| 20–30 | Williams | | | | |
| 30–40 | Smith | | Rice Lobed | Dalton | |
| 40–50 | | | | | |
| 50–60 | | White River | Graham Cave | | |
| 60–70 | | | Rice Contracting Stem/Taney | Dalton Dalton Dalton Dalton Dalton | 7805 ± 25 |
| 70–80 | Smith | Jakie | Searcy Searcy | Dalton Dalton Dalton Dalton San Patrice | |
| 80–90 | | | | Dalton Dalton Dalton Dalton Dalton | 9940 ± 30 |
| 90–100 | | | Searcy Cache River | Dalton Dalton Dalton Dalton | 8555 ± 25 |
| 100–110 | | | Searcy Graham Cave | Dalton Dalton Dalton | |
| 110–120 | | | | | |
| 120–130 | | | | | |

other associated Dalton tools at similar depths of between 63 cm and 110 cm bs. However, several Early Archaic point types also were found between depths of 60 cm and 110 cm.

Table 2 depicts the location of the majority of the diagnostic points found around the south and west sides of the mill during the 1992 and 2009 seasons. The upper sediments surrounding the base of the mill are highly disturbed because of construction of the mill foundation. This is clearly indicated by the presence of Dalton and Rice Lobed points in these shallow deposits. The disturbance related to mill construction extends to depths of at least 25–40 cm along the west wall and to depths of approximately 50–70 cm along the south wall. The depth of historic disturbance generally is considerably less (8–18 cm) approximately 9 m west of the mill, although localized disturbed areas are much deeper (e.g., the Waubesa point found at a depth of 96 cm in Test Unit 14, probably associated with the removal of a large tree stump).

If the proposition that Dalton and San Patrice are Late Paleoindian manifestations that preceded the onset of the Early Archaic period (Goodyear 1982; Lopinot and Ray 2010; O'Brien and Wood 1998; Ray 1998a) is correct, there also appears to be some post-depositional mixing of artifacts in sediments below 50 cm at Alley Mill. This mixing, as illustrated by the presence of Late Archaic, Middle Archaic, and Early Archaic point types intermixed with Late Paleoindian points (Table 2), appears to be associated with prehistoric activities (e.g., pit digging) and natural disturbance processes (e.g., bioturbation).

### *Radiocarbon Ages and Geochronology*

Unfortunately, very little organic material was recovered in 1992 and later processed for radiocarbon analysis. One AMS age of 7780 ± 80 rcybp was obtained for charcoal from a flotation sample from Feature B, a pit feature (Lynott et al. 2006:15 and Figure 8). Based on this Early Archaic radiocarbon age, Feature B was interpreted as an intrusive pit that originated above the Dalton midden.

Three piece-plotted charcoal fragments taken in 2009 from Test Units 16 and 18 have helped to interpret the age of the prehistoric cultural deposits, including the midden (Table 3). The first radiocarbon sample was taken from the northeast quadrant of Test Unit 18 at a depth of 63 cm, approximately 3 cm below the top of the midden deposit (Bt3b horizon). It consisted of a piece of Juglandaceae (hickory/walnut family) nutshell, which yielded a late Early Archaic radiocarbon age of 7,805 ± 25 rcybp (ISGS-A1436). The second radiocarbon sample was taken from the southwest quadrant of Test Unit 16 at a depth of 83 cm in the Bt4b horizon, approximately 3 cm below the base of the midden. It consisted of a piece of walnut shell, which yielded a radiocarbon age of 9,940 ± 30 rcybp (ISGS 1435). The third radiocarbon sample was also taken from the southwest quadrant of Test Unit 16 at a depth of 94 cm in the Bt4b horizon, approximately 14 cm below the base of the midden. It consisted of a piece of wood charcoal, which yielded a radiocarbon age of 8,555 ± 25 rcybp (ISGS-A1443).

The second and third radiocarbon ages are in reverse stratigraphic order with a middle Early Archaic age underlying a late Late Paleoindian (i.e., late Dalton) age. Vertical mixing of some fine charcoal fragments may have occurred during formation of the colluvial deposits. This could include the downward movement of overlying charcoal and/or the upward movement of underlying charcoal. The difference between the youngest and oldest radiocarbon ages obtained from sediments only 20–30 cm thick is a little more than 2,000 years, which indicates slow upbuilding of colluvial sediments. Relatively slow aggradation of sediments on the colluvial fan reduces the thickness of stratified deposits and increases the probability of component mixing, facilitated by both cultural and natural processes. Upward and downward movement of larger items, such as diagnostic artifacts, is also aptly demonstrated by the mixture of Late Archaic, Middle Archaic, Early Archaic, and Late Paleoindian (Dalton) points (see Table 2).

Nevertheless, the single radiocarbon age obtained from the 1992 excavation and the three radiocarbon ages obtained from the 2009 excavation do allow for a coarse chronological ordering of the thin (ca. 25 cm) midden deposit defined

Table 3. Radiocarbon Ages.

| Provenience | Depth (cm) | Radiocarbon Age (rcybp) | Material Dated | Lab Number |
|---|---|---|---|---|
| TU 10 (1992) | Feature B | 7780 ± 80 | charcoal | Beta-57408 CAMS-4605 |
| TU 18NE (2009) | 63 | 7805 ± 25 | charred Juglandaceae fragment | ISGS-A1436 |
| TU 16SW (2009) | 83 | 9940 ± 30 | charred walnut shell fragment | ISGS-A1435 |
| TU 16SW (2009) | 94 | 8555 ± 25 | wood charcoal | ISGS-A1443 |

in 2009 and the upper half of the thicker (ca. 45 cm) midden defined in 1992. Three of the four radiocarbon samples produced middle-to-late Early Archaic ages. These presumably relate to the upper 20–30 cm or the entire 2009 midden deposit (Bt3b horizon) in the vicinity of Test Units 16 and 18.

Multiple unfluted lanceolate points and the radiocarbon age of 7,805 ± 25 rcybp from near the top of the 2009 midden deposit suggests that the upper portion of this stratum was created by occupants that made Searcy points. Searcy points from multiple sites have been directly associated with radiocarbon ages that range between approximately 7,900 and 7,100 rcybp. These include radiocarbon ages of 7,540 ± 90 and 7,160 ± 180 rcybp from John Paul Cave (Ray 1995:39) and an age of 7,800 ± 80 rcybp from Albertson Shelter (Dickson 2002:87). At Rodgers Shelter, Searcy points were recovered from Horizon 7, which was dated to approximately 8,150–7,550 rcybp (Kay 1982b:Table 4.4). At Big Eddy, a Searcy point was recovered from stratified alluvial deposits dating to approximately 7,800–7,100 rcybp (Ray and Lopinot 2005:247–251). At least one and possibly two lithic features found in the upper and middle portions of the 2009 midden and the deep pit feature found in 1992 (Lynott et al. 2006:15), which dated to 7780 ± 80 rcybp, also appear to be related to the Searcy component.

The middle and lower portions of the 2009 midden deposit may have been created by Early Archaic occupants who made Rice Lobed and Graham Cave points. Rice Lobed points have been associated with ans age of 8,190 ± 60 rcybp at Big Eddy (Ray and Lopinot 2005:252). Graham Cave points have been associated with multiple radiocarbon ages that range between 8,500 and 8,200 rcybp at Koster (Hajic 1990:Table 2), Big Eddy (Ray and Lopinot 2005:255–265), and the Jameson site (Ray et al. 2009:168).

If the above interpretations based on multiple radiocarbon ages are correct, then Paleoindian-age (Dalton and San Patrice) deposits must underlie the 2009 midden and comprise the lower half of the thicker 1992 midden between approximately 90 and 120 cm bs. This interpretation does not dispute the association of at least part of the thicker 1992 midden with Dalton occupations.

The 1992 excavations revealed an approximately 40-cm-thick (64–104 cm bs) midden deposit in Test Unit 1 along the west wall of the mill foundation (Lynott et al. 2006:Figure 8), whereas the 2009 excavations in Test Units 16 and 17 located only a short distance to the west revealed a thinner midden deposit of approximately 22 cm (62–84 cm bs). The midden thickness discrepancy revealed by the two excavations indicates that the lower portion of the midden deposit noted in 1992 thinned significantly only 1–2 m to the west. This suggests that the lower portion of the thicker (1992) midden probably was produced by earlier Dalton occupations that were concentrated closer to Alley Spring, whereas the thinner (2009) western portion of the midden was formed primarily by later Early Archaic occupations.

Given these apparent ages to the midden and underlying deposits, how did so many Dalton artifacts end up in the Early Archaic midden deposit as depicted in Table 2? As indicated above, relatively slow aggradation of sediments reduces the thickness of stratified deposits and increases the probability of component mixing. In addition to various prehistoric human activities that involve the movement of dirt (e.g., pit digging), the periodic toppling and uprooting of trees (via wind storms) on relatively stable paleogeomorphic surfaces overlying the midden over a period of several thousand years could easily have brought Dalton points up into the Early Archaic midden deposit and displaced Searcy, Graham Cave, and Cache River points into the underlying Dalton-age deposits.

Based on relative numbers of diagnostic artifacts and flake debitage, the prehistoric occupations of the Alley Mill site appear to have waned after the Early Archaic period. Only a few Middle Archaic points (e.g., Jakie and White River) and Late Archaic points (e.g., Smith and Williams) and only one Early Woodland (Waubesa) point have been recovered. Compared to Levels 7–10, flake debitage was significantly less abundant in Levels 5–6 (40–60 cm bs) in the 2009 test units, and lesser quantities of debitage were also evident in the same relative levels in the 1992 excavations (Lynott et al. 2006:Tables 1–2). The colluvial apron next to the spring appears to have been occupied infrequently, if at all during subsequent Middle Woodland, Late Woodland, and Mississippian times. Accordingly, the area immediately surrounding Alley Spring may have been reserved primarily for religious or ceremonial purposes after the Archaic.

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## References Cited

Ahler, Steven R., Mary J. Bade, Frances B. King, Bonnie W. Styles, and Paula J. Thorson
1992 *Late Archaic Components at Modoc Rock Shelter, Randolph County, Illinois*. Report of Investigations No. 48. Illinois State Museum, Springfield.

Birkeland, Peter W.
1999 *Soils and Geomorphology* (3rd Edition). Oxford University Press, Oxford, United Kingdom.

Banks, Larry D.
1990 *From Mountain Peaks to Alligator Stomachs: A Review of Lithic Sources in the Trans-Mississippi South, the Southern Plains, and Adjacent Southwest*. Memoir No. 4. Oklahoma Anthropological Society, Norman.

Chapman Carl H.
1975 *The Archaeology of Missouri, I*. University of Missouri Press, Columbia.

Dickson, Don R.
2002 *Prehistoric Native Americans in the Ozarks*. Special Publication No. 1. Ozark Resources and Historical Publications, Fayetteville, Arkansas.

Flanders, Robert
1985 *Alley, An Ozarks Mill Hamlet, 1890–1925: Society, Economy, Landscape*. Center for Ozark Studies, Southwest Missouri State University, Springfield.

Goodyear, Albert C, III
1974 *The Brand Site: A Techno-Functional Study of a Dalton Site in Northeast Arkansas*. Research Series No. 7. Arkansas Archeological Survey, Fayetteville.
1982 The Chronological Position of the Dalton Horizon in the Southeastern United States. *American Antiquity* 47(2):382–395.

Hajic, Edwin R.
1990 *Koster Site Archeology I: Stratigraphy and Landscape Evolution*. Research Series Vol. 8. Center for American Archeology, Kampsville, Illinois.

Kay, Marvin (editor)
1982a *Holocene Adaptations within the Lower Pomme de Terre River Valley, Missouri, Vol. I*, edited by Marvin Kay, pp. 1–8. Illinois State Museum Society, Springfield.
1982b Stratigraphic Studies at Rodgers Shelter. In *Holocene Adaptations within the Lower Pomme de Terre River Valley, Missouri, Vol. 1*, edited by Marvin Kay, pp. 81–106. Illinois State Museum, Springfield.

Klippel, Walter E.

1971 *Graham Cave Revisited, A Reevaluation of its Cultural Position During the Archaic Period*. Memoir No. 9. Missouri Archaeological Society, Columbia.

Lopinot, Neal H., and Jack H. Ray

2010 Late Paleoindian Interaction and Exchange at the Big Eddy Site in Southwest Missouri. In *Exploring Variability in Early Holocene Hunter-Gatherer Lifeways*, edited by Stance Hurst and Jack L. Hofman, pp. 119–134. Publications in Anthropology No. 25. University of Kansas, Lawrence.

Lynott, Mark J.

1991 *Round Spring Archeology, Ozark National Scenic Riverways, Southeast Missouri*. Technical Report No. 2. Midwest Archeological Center, Lincoln, Nebraska.

Lynott, Mark J., James E. Price, and Roger Saucier

2006 The Alley Mill Site and the Early Prehistory of the Current River Valley, Southeast Missouri. *The Missouri Archaeologist* 67:1–47.

Mandel, Rolfe D.

2008 *Reconnaissance of the Current River Valley, Ozark National Scenic Waterway, Southeast Missouri*. Report of Investigations submitted to the National Park Service, Kansas Geological Survey, Lawrence, Kansas.

Morse, Dan F.

1971 The Hawkins Cache: A Significant Dalton Find in Northeast Arkansas. *The Arkansas Archeologist* 12:9–20.

1997 *Sloan: A Paleoindian Dalton Cemetery in Arkansas*. Smithsonian Institution Press, Washington, D.C.

O'Brien, Michael J., and W. Raymond Wood

1998 *The Prehistory of Missouri*. University of Missouri Press, Columbia.

Ray, Jack H.

1995 *An Archaeological Investigation at John Paul Cave (23CN758) in Northern Christian County, Missouri*. Research Report No. 977. Center for Archaeological Research, Southwest Missouri State University, Springfield.

1997 *Additional Excavations at John Paul Cave (23CN758), Christian County, Missouri*. Research Report No. 1022. Center for Archaeological Research, Southwest Missouri State University, Springfield.

1998a Cultural Components. In *The 1997 Excavations at the Big Eddy Site (23CE426) in Southwest Missouri*, edited by Neal H. Lopinot, Jack H. Ray, and Michael D. Conner, pp. 111–220. Special Publication No. 2. Center for Archaeological Research, Southwest Missouri State University, Springfield.

1998b Chert Resource Availability and Utilization. In *The 1997 Excavations at the Big Eddy Site (23CE426) in Southwest Missouri*, edited by Neal H. Lopinot, Jack H. Ray, and Michael D. Conner, pp. 221–265. Special Publication No. 2. Center for Archaeological Research, Southwest

Missouri State University, Springfield.
2007 *Ozarks Chipped-Stone Resources: A Guide to the Identification, Distribution, and Prehistoric Use of Cherts and Other Siliceous Raw Materials*. Special Publications No. 8. Missouri Archaeological Society, Springfield.
2015a To the Point: Taney. *Missouri Archaeological Society Quarterly* 32(1):9–11.
2015b Late Paleoindian Components. In *The Paleoindian and Pre-Clovis Record at the Big Eddy Site*, edited by Neal H. Lopinot and Jack H. Ray. Manuscript on file, Center for Archaeological Research, Missouri State University, Springfield.

Ray, Jack H., and Neal H. Lopinot
2005 Early Archaic. In *Regional Research and the Archaic Record at the Big Eddy Site (23CE426), Southwest Missouri*, edited by Neal H. Lopinot, Jack H. Ray, and Michael D. Conner, pp. 223–283. Special Publication No. 4. Center for Archaeological Research, Southwest Missouri State University, Springfield.

Ray, Jack H., Neal H. Lopinot, and Edwin R. Hajic
2009 Archaic Prehistory of the Western Ozarks of Southwest Missouri. In *Archaic Societies: Diversity and Complexity across the Midcontinent*, edited by Thomas E. Emerson, Dale L. McElrath, and Andrew C. Fortier, pp. 155–197. State University of New York Press, Albany.

Ray, Jack H., and Rolfe D. Mandel
2009 *Preliminary Report on the 2009 Investigations at the Alley Mill Site and Branson Cave in Ozark National Scenic Riverways, Southeast Missouri*. Unpublished manuscript on file at the Midwest Archaeological Center, Lincoln, Nebraska.

Vineyard, Jerry D., and Gerald L. Feder
1974 *Springs of Missouri*. Missouri Geological Survey and Water Resources, Rolla.

Webb, Clarence H., Joel L. Shiner, and E. Wayne Roberts
1971 John Pearce Site (16CD56): A San Patrice Site in Caddo Parish, Louisiana. *Bulletin of the Texas Archeological and Paleontological Society* 42:1–49.

Wood, W. Raymond, and R. Bruce McMillan (editors)
1976 *Prehistoric Man and His Environments: A Case Study from the Ozark Highland*. Academic Press, New York.