# AN OBSIDIAN ARTIFACT FROM THE LA PLANT I SITE IN THE CAIRO LOWLAND OF SOUTHEAST MISSOURI

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## *INTRODUCTION*

During recent excavations at the Middle Woodland La Plant I site (23NM51) on Barnes Ridge in New Madrid County, Missouri a single obsidian, or volcanic glass, artifact was unearthed. This discovery is exciting as obsidian artifacts are rare in Missouri and previously no obsidian artifact from Missouri has been analyzed for trace elements. In this article the context of the find is described, the results of XRF analysis of the artifact are presented, and a prehistoric exchange network that could have brought the obsidian from Wyoming to southeast Missouri is modeled.

## *REGIONAL OBSIDIAN DISTRIBUTION*

Previously reported obsidian occurrences in southeast Missouri are summarized by Jack Ray (2002) in a book manuscript that is focused on the lithic resources of the Ozarks and surrounding regions. The only southeast Missouri Mississippi River valley find mentioned by Ray is a stemmed point, possibly Late Archaic in age, that is made of black obsidian. It was recovered as an isolated find in Dunklin County, Missouri (Davidson 1954:35-36). To this we can add that Dick Marshall (e-mail April 11, 2002) recalls that Leo Anderson found an obsidian piece, perhaps a point, at the La Plant site. The possible recovery of another piece of obsidian from La Plant is most intriguing, but unfortunately it can not be confirmed as Anderson's collection was scattered after his death. Thus it appears that the recent La Plant I find is only the second, or perhaps third, obsidian artifact from the lowlands of southeast Missouri.

In surrounding regions obsidian is best known for occurring in trace frequencies at Middle Woodland sites located upstream on the lower Illinois River and at the classic Hopewell sites in the Ohio River valley. At least 17 sites in lower Illinois River valley have yielded obsidian, with blades being the dominate artifact type (Wiant 2000, 2001). Additionally, Ray (2002) notes that the Burkemper site (23LN104), located nearby in Lincoln County, Missouri, has also produced at least two obsidian flakes.

## *THE LA PLANT I SITE*

The La Plant I site is probably the best known Middle Woodland site in the Cairo Lowland of southeast Missouri and it is the type site for the local Middle Woodland phase, the La Plant

phase (Griffin and Spaulding 1952; Phillips 1970), formerly the Barnes Ridge phase (Williams 1954). Marshall (1965) reported the site was destroyed in 1963, but apparently only a portion of the site—a possible burial mound—was land leveled. After the 1973 flood scoured Barnes Ridge Powers phase project personnel took a small surface collection from the site. Randy L. Cottier succeeded in getting the LaPlant site listed on the National Register of Historic Places in 1975. Two recent archaeological projects at the site were sponsored by the U.S. Army Corps of Engineers, Memphis District as a part of the New Madrid Floodway project. During 1990 Mid-Continental Research Associates tested the margins of the site and found areas of deep midden remained intact (Lafferty and Hess 1996). In 2001 Panamerican Consultants, Inc. (PCI) of Memphis, Tennessee conducted a data recovery project at the site. PCI's investigations included the excavation of forty-three 2-x-2 m test pits and a 1 percent sample of the site deposit (127 cubic m) was hand excavated and water screened.

## *RECOVERY CONTEXT*

During the 2001 excavations at La Plant I a single piece of obsidian debitage was recovered from a 2-x-2 m excavation (unit 60) located on the northwest flank of the site (Figure 1). The obsidian was captured in a 0.25-in. mesh screen while water screening the 30-40 cm level. The actual depth of recovery was 50-60 cm below surface because the plowzone was mechanically stripped prior to laying out the 2-x-2 m units.

Unit 60 contained approximately 40 cm of Middle Woodland period midden, a portion of which had subsided, or dropped, another 50 cm into an earthquake crack (Figure 2). The unit 60 recovery was heavy and analysis revealed that it is dominated by clay-tempered cord marked ceramics, with clay-tempered fabric impressed sherds being the leading minority type. Traces of Marksville/Hopewell diagnostics were found in levels both above and below the obsidian find. Even at the preliminary analysis stage these associated artifacts provide compelling evidence that the obsidian flake is part of the strong Middle Woodland component at La Plant I. A short list of the Middle Woodland diagnostics from unit 60 includes:

- A Twin Lakes Punctated rim sherd (from level 2).
- A unique Marksville Incised sherd with a circular motif (from level 4, the obsidian level).

- A Mulberry Creek Cord Marked rim with large "crescent" shaped U punctations on the body and deep cord wrapped dowel impressions notching the rims (from level 5); a rim mode that Toth (1988:78, Plate VIId) considers diagnostic.
- Several Mabin Stamped sherds.
- At the base of cultural deposit in level 9, a chunk of faceted galena was found lying on a ground limestone pallet.

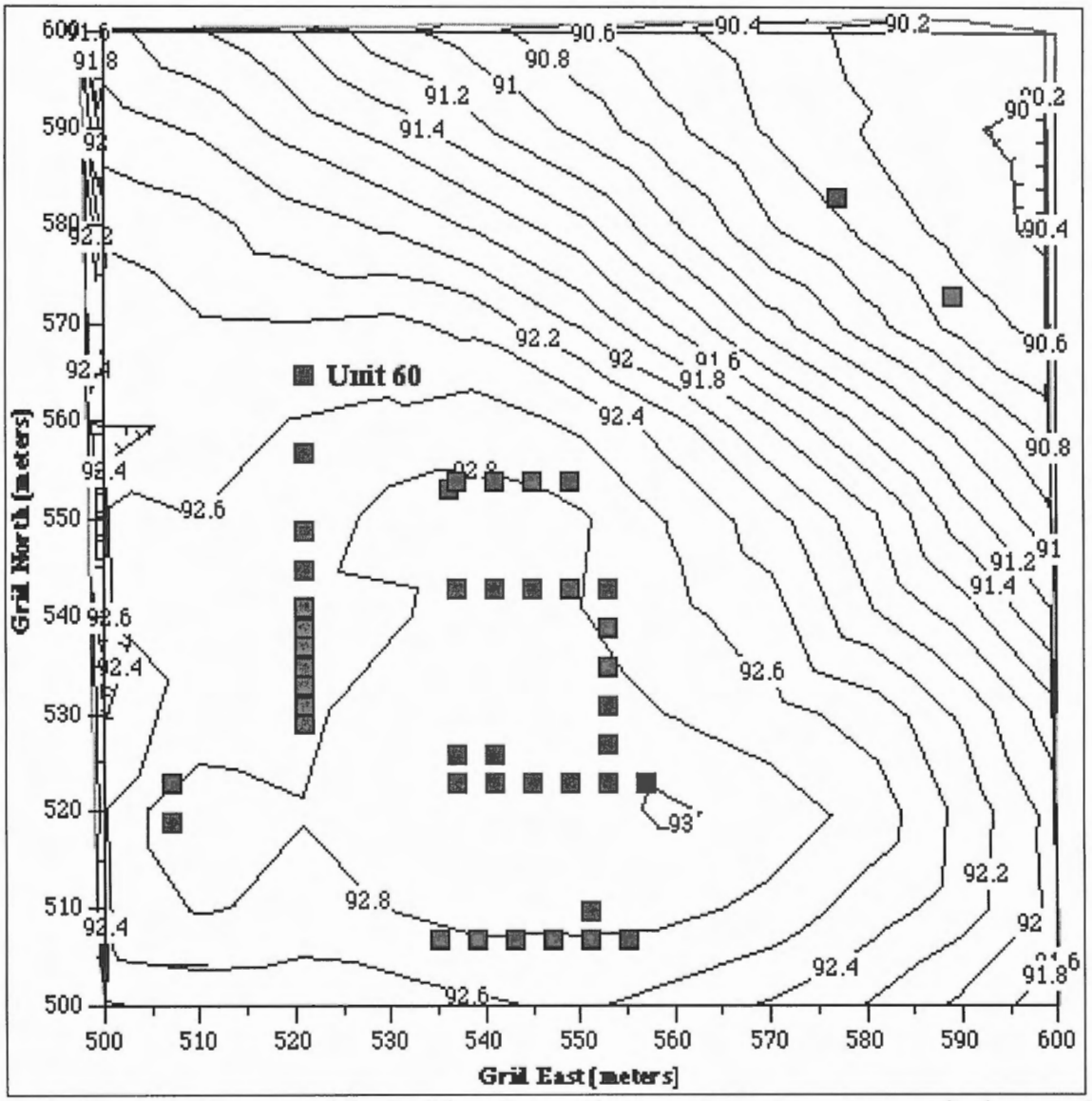


*Figure 1. Topographic map of the La Plant I site (20 cm contours in meters amsl) showing 2-x-2 m unit locations. Unit 60, location of the obsidian find, is labeled. The higher elevations are Barnes Ridge, a sandy late Pleistocene/Early Holocene surface, while the low terrain to the northeast is associated with a relic Mississippi River channel.*

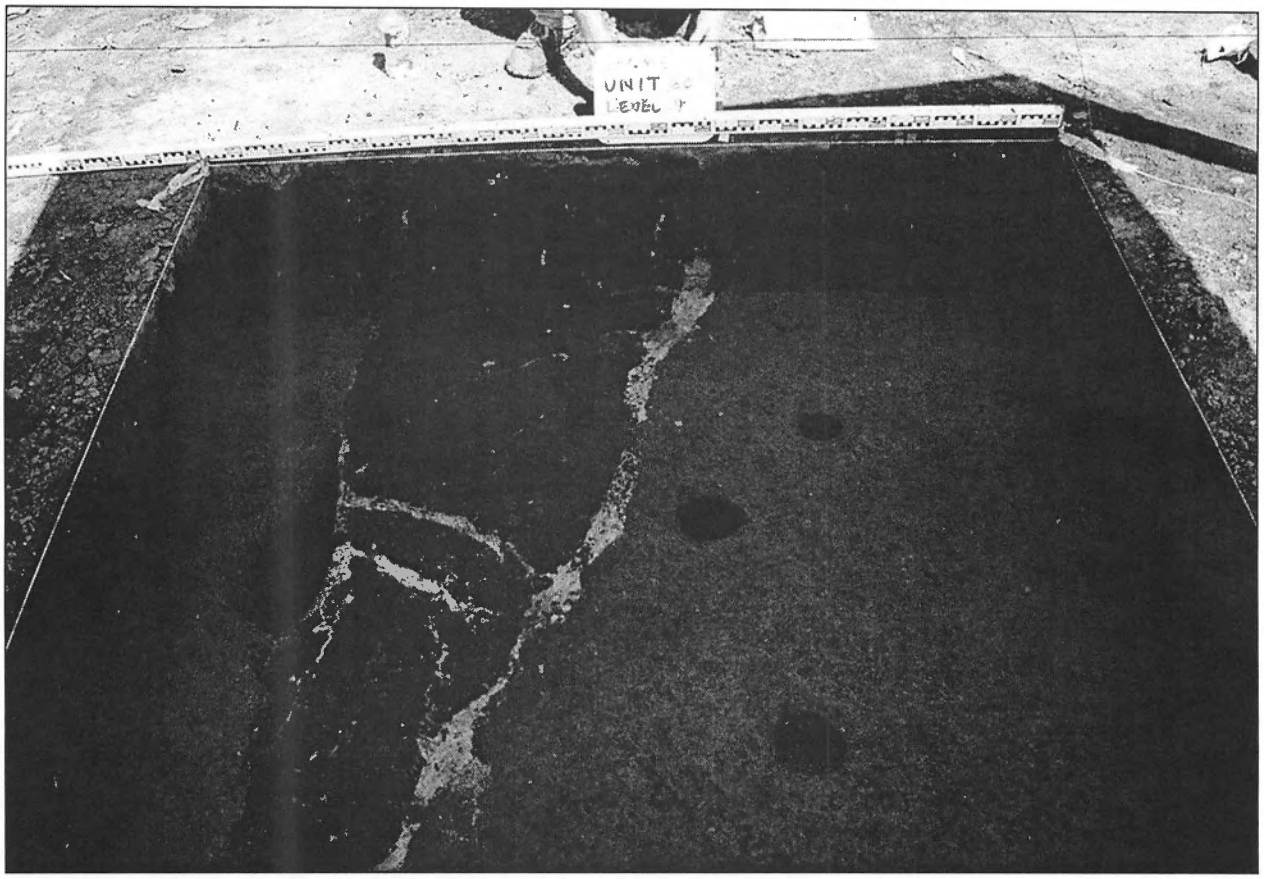


*Figure 2. Photo of unit 60 at the base of the obsidian level (40 cmbd), view east. Note the dark colored midden soil filling the earthquake crack. The light colored line is a sand fissure. To the right of the earthquake crack three postmolds have been excavated and to the left a small pit that was bisected by the earthquake crack has been excavated.*

In addition to the unit 60 diagnostics, Hopewell artifacts were recovered from numerous other feature and unit-level contexts during the 2001 excavations. These artifacts include a variety of Middle Woodland ceramic diagnostics, Copena-like points, a drilled stone bar gorget, and a clay platform pipe section, as well as mica fragments.

## *ARTIFACT DESCRIPTION*

Using Sullivan and Rozen's (1985) terminology the obsidian artifact is a flake fragment. It is small (22 mm x 17 mm by 3 mm thick), weighs less than a gram (0.8-g), and has been snapped medially. Two of the margins exhibit shallow serrations thus it may have been utilized as a cutting tool. The dorsal surface exhibits some polish that may be interpreted as evidence for prehistoric bag wear.

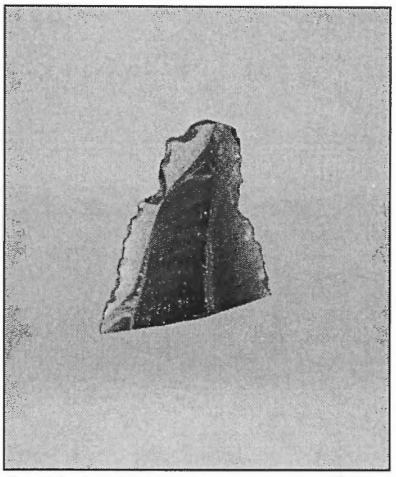

*Figure 3. Scanned image of the obsidian flake fragment's dorsal surface.*

The dorsal surface exhibits three flake scars, two of which terminate at a point near the flake end. The flake pattern is suggestive of a prismatic blade, a well-known characteristic of Hopewell lithic technology. Numerous complete chert blade flakes were recovered from the La Plant I site during the 2001 excavations and others have been previously reported from the site (Griffin and Spaulding 1952).

## *XRF Analysis*

The obsidian raw material is a translucent smoky gray color that is a "visual dead ringer" for Obsidian Cliff glass. To scientifically determine the geologic source of the obsidian used to manufacture the flake, the specimen was sent to the Northwest Research Obsidian Studies Laboratory in Corvallis, Oregon. There, Craig E. Skinner conducted X-Ray Fluorescence (XRF) analysis of the flake. This is a non-destructive technique that quantifies trace elements in obsidian. The results are like fingerprints that are then compared to known geologic sources. Additional details about the specific analytic methods and procedures used for the analysis of the elements are detailed in a technical report (Skinner 2002) and are available on line at www.obsidianlab.com.

The trace element values for the La Plant I site obsidian flake indicate that the source is the Obsidian Cliff, in Yellowstone National Park, Wyoming. A scatterplot for the yttrium and zirconium values for the La Plant specimen conform well with the values for these elements in geological source specimens collected from Obsidian Cliff (Figure 4). The XRF results are not

terribly surprising, as previous trace element studies have demonstrated the Obsidian Cliff locality is linked to most Hopewell obsidian artifacts in Ohio, Illinois and Wisconsin (Davis et al. 1995; Griffin et al. 1969).

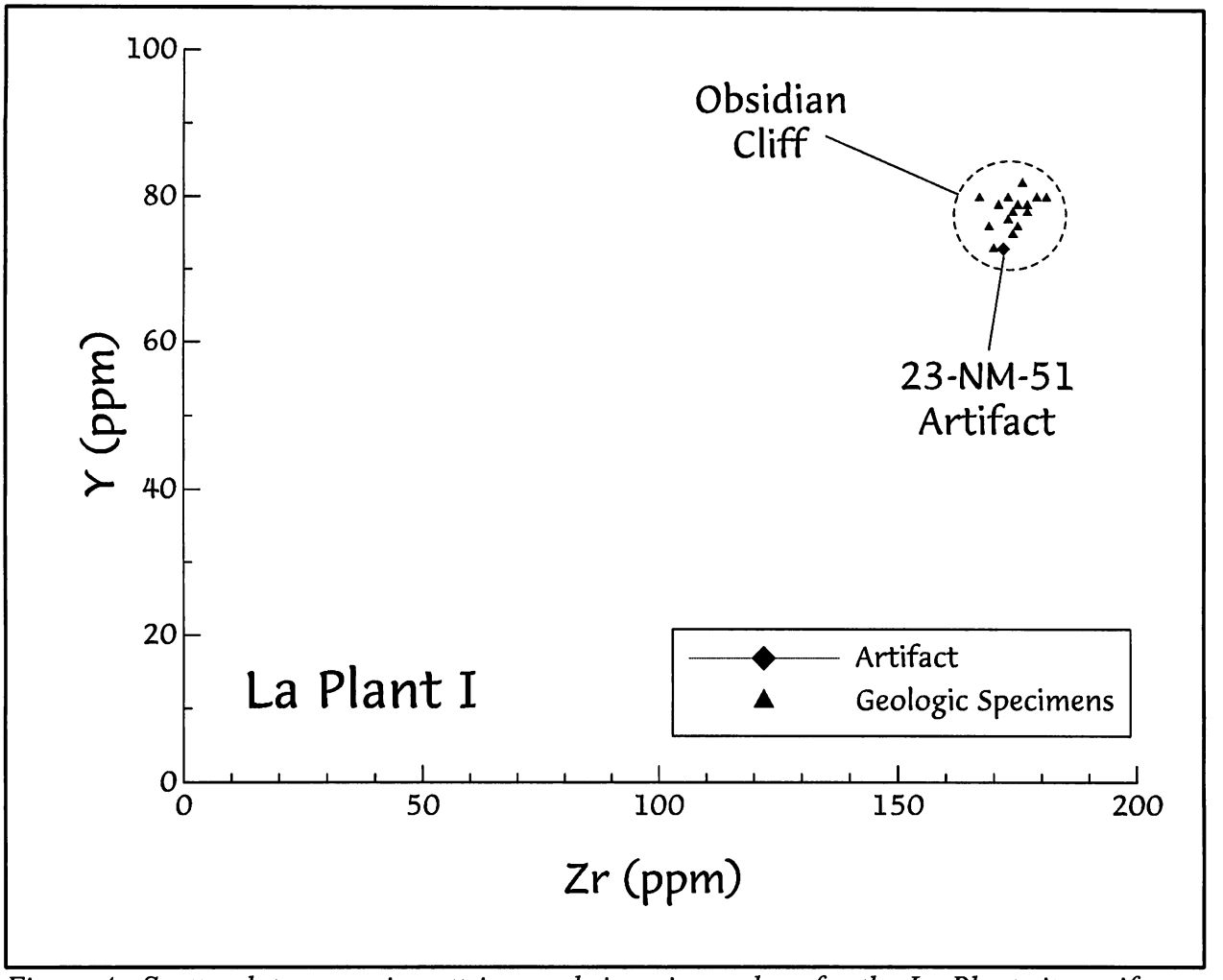


*Figure 4. Scatterplot comparing yttrium and zirconium values for the La Plant site artifact to geological source specimens from Obsidian Cliff, Wyoming.*

There are two other regional examples of XRF analysis revealing the Obsidian Cliff source and both are associated with Middle Woodland sites. A biface from the Fort Hill site in Highland County, Ohio was determined by Skinner and Davis (1996) to be knapped from Obsidian Cliff obsidian based on rubidium and zirconium values. Griffin (1965) suspected this prior to the advent of trace element studies. Hughes (1995:107-108) demonstrated that an obsidian flake

from the Middle Woodland Trowbridge site (14WY1), located near the Missouri River in Wyandotte County, Kansas was also from Obsidian Cliff.

In addition to Obsidian Cliff, only two other sources of obsidian have been reported in XRF analysis of prehistoric artifacts from the trans-Mississippi South. At the Brown Bluff site (3WA10), a rockshelter in the Washington County, Arkansas, a utilized obsidian flake derived from the Malad source in southern Idaho has been documented (Harcourt 1994:24-25; Hughes et al. 2002). Perhaps more significant is the recent identification of a Mesoamerican source for an obsidian scraper from the Craig Mound at Sprio, Oklahoma (Barker et al. 2002).

## *OBSIDIAN CLIFF SOURCE*

The Obsidian Cliff outcrop was first described by Holmes (1879) and Iddings (1888) during the late nineteenth-century. It is located 11-mi. south of Mammoth Hot Spring in Yellowstone National Park. The barren cliff, composed of obsidian columns, extends for 0.5-mi. and ranges from 45 m to 61 m in height (Figure 5).

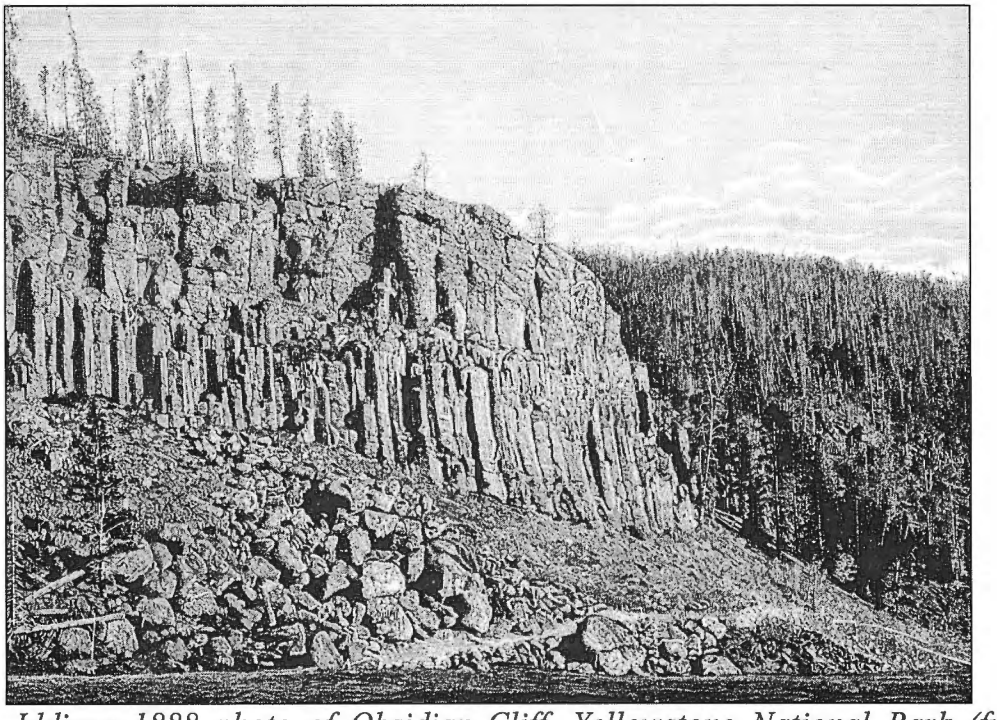

*Figure 5. Iddings 1888 photo of Obsidian Cliff, Yellowstone National Park (from U.S. Geological 7th Annual Report 1885-'86).*

The Obsidian Cliff locality is over 1100 airline miles (1760 km) from the Cairo Lowland and the La Plant I site (Figure 6). However the Yellowstone River first flows north and then northeast to its confluence with the upper Missouri River near Fort Buford in North Dakota. This adds considerable mileage to the riverine distance to southeast Missouri. From Fort Buford the Missouri River then flows generally south over the Great Plains before turning east near Kansas City and thereabouts enters the Eastern Woodlands. The estimated distance for the Yellowstone-Missouri-Mississippi riverine route from the Obsidian Cliff to the La Plant I site is over 1800 miles (over 2880 km).

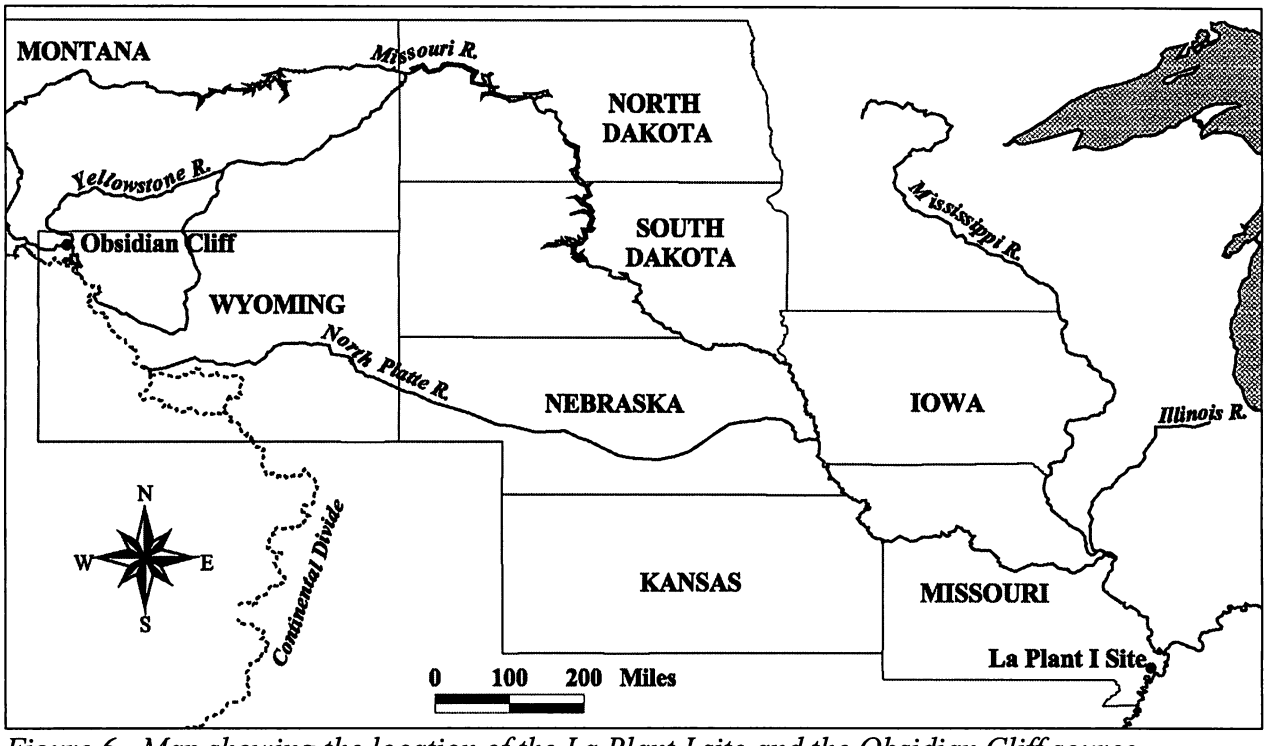


*Figure 6. Map showing the location of the La Plant I site and the Obsidian Cliff source.*

## *DISCUSSION*

Clearly obsidian was transported tremendous distances during the Middle Woodland period, however the mechanism for its movement remains unclear and is debated. There two schools regarding this issue, direct long-range procurement and down-the-line exchange. Griffin (1965) favored the former and suggested that Hopewell people undertook excursions to the western sources. Critics of direct procurement note the difficulties involved in an extended journey in

foreign territory, including language skills and the need for concise knowledge of the source locations (Boszhardt 1998:283).

Obsidian trade may have been facilitated by an exchange network, such as what Wood (1980) refers to as the "Middle Missouri System". This Native American trading network had major nodes at Arikara[1], Mandan[2], and Hidatsa[3] villages that are located about half way between Obsidian Cliff and southeast Missouri and a secondary node, the Shoshone[4] Rendezvous, in the Great Basin. Wood (1980:100) remarks that archaeological evidence suggests this route was "very ancient." Prior to the destruction of tribal economies about 1850, the "Crows came to the at Arikara, Mandan, and Hidatsa villages from the upper Yellowstone River area" in the spring carrying "goods they obtained at the Shoshone Rendezvous" (Wood 1980:100). Recall that Lewis and Clark's guide Sacagewea (Bird Woman) was a Shoshone who was captured by a Crow raiding party and sold to the Mandan (Yenne 1986:155).

Recent research by Craig Smith (1999) regarding obsidian curation behavior in Wyoming reveals that volcanic glass from various western sources, including Bear Gulch, Malad and Obsidian Cliff, was obtained by mobile hunter-gathers during their seasonal rounds then exchanged with peoples to the east for perhaps 5,000 years. In eastern Wyoming sites exhibit less than 1 percent obsidian—similar to the LaPlant site frequency—and it is thought that the few obsidian artifacts there were simply being maintained. At such sites Smith (1999:287) proposes that obsidian was obtained via exchange of biface blanks. The exchange is characterized as not "extensively formal" and imbedded in seasonal movements (Smith 1999:287).

We speculate that Plains nomads introduced obsidian into the Hopewell periphery (i.e., Middle Missouri River valley) as a by-product of seasonal movements. An evaluation of the Middle Woodland cultural landscape on the Plains is required to fully understand this, especially with regards to the Middle Woodland inhabitants of the primary nodes in Wood's (1980) "Middle Missouri System" exchange network.

Beginning at the core and moving outward, the western extent of Hopewell culture is generally considered a cluster of at least 23 sites known to as "Kansas City Hopewell" (Johnson 1979).

Among these sites is Trowbridge that we previously noted has yielded a volcanic glass flake from the Obsidian Cliff source. Kansas City Hopewell ceramics are remarkably similar those from western Illinois Havana contexts and there is evidence for long-term social interaction between these two groups with the Missouri River serving as a corridor.

Upstream in Nebraska, the Middle Woodland period is characterized by the "Valley variant" (Bozell and Winfrey 1994:128). There are at least 12 Valley variant sites on the Middle Missouri River in Nebraska. Valley variant ceramics, referred to as Valley Ware, are similar to Havana pottery with rim modes including dentate stamping, cord-wrapped dowel impressions and lip-notching (Bozell and Winfrey 1994:133). Burials in the Eastern Valley variant are, similar to Kansas City Hopewell, found within or below mounds (Bozell and Winfrey 1994:135). Bozell and Winfrey (1994:137) describe the Valley variant as being a "coalescence" of Middle Woodland manifestations—that diffused upriver from Kansas City Hopewell ca. 100 B.C.-A.D. 200—and resident Archaic bands. The Valley variant is extremely significant in the East-Central Plains because it represents the "first real subsistence, social and technological alteration of a traditional Plains nomadic foraging pattern" that been static for 5000 years.

Farther upstream, the local Middle Woodland is characterized by Sonata-Besant, a reference to widespread related Middle Woodland complexes dating from 50 B.C. to A.D. 600 (Gregg et al. 1996:84). Importantly, Sonata sites occupy the area where the Mandan, Hidatsa and Arikara villages—Wood's (1980) primary nodes in the "Middle Missouri" exchange system—are located. Sonata ceramic assemblages are predominately cord-marked with dentate stamping as a minor decorative technique (Toom 1996:67) and, as Boszhardt (1998:284) points out, are "distinctly related to…Valley Ware." Another obvious Hopewell-like trait is that Sonata burials are in or below conical mounds[5]. Many of these earthworks were excavated during the River Basin Survey projects, for example Newman's (1960) work at the Truman Mound (39BF224). Newman (1975) and later Benn (1990) have both suggested that Sonata diffused into the Middle Missouri valley from the Eastern Woodlands.

Sonata populations have been interpreted as semi-sedentary horticulturists that retained the Plains Archaic emphasis on bison hunting (Toom 1996:68). During seasonal bison hunts on the Great Plains Sonata-Besant people could have procured a variety of western lithics directly.

Plains Archaic nomads contemporary with the Sonata could have transported obsidian blanks from the Shoshone Rendezvous during their seasonal rounds—as suggested by Smith (1999)—and exchanged them at the villages on the Middle Missouri or at hunting camps on the Plains. These Middle Woodland era Plains Archaic hunters fulfill the role of the historic Crow in the Wood's (1980) scheme.

This scenario is buttressed by Boszhardt's (1998:283-284) argument that it was the Sonota-Besant peoples who were responsible for the introduction of western lithics into Hopewell sites in the Upper Mississippi Valley (Trempealeau-La Crosse locality). Therefore is reasonable to suggest that Sonata-Besant people also introduced similar material, including Obsidian Cliff glass, into the Hopewell interaction sphere via the most obvious corridor, the Middle Missouri valley.

Once obsidian blanks were in the possession of Sonata populations on the Middle Missouri, Griffin's (1965) direct procurement model works to explain obsidian movement to the Hopewell core. Only one of the two major difficulties pointed out by Boszhardt (1998:283) would remain to be overcome—language. Given the cultural similarities of the Middle Woodland cultures just reviewed and the path of Hopewell diffusion or radiation up the Missouri River, we speculate that this obstacle could be readily overcome, as it was by Lewis and Clark during 1803-06. Thus Hopewell trading parties from the Eastern Woodlands could have trekked to Sonata villages on the farthest northwestern periphery of Hopewell influence and be confident of their ability to obtain obsidian blanks. During transport back to the Hopewell heartland obsidian blanks were probably wrapped in hide pouches that could have resulted in the "bag wear" or polish noted on the La Plant specimen.

The model just discussed is in effect a duality that blends both the direct procurement and exchange schools. Initially obsidian blanks are obtained by the Hopewell influenced Sonata

peoples via exchange with mobile hunter-gathers who inhabited sites near Obsidian Cliff. This exchange was informal and tied to ancient seasonal rounds. Knowing that obsidian would be seasonally "snared" by the Sonata, trading parties from the Hopewell heartland could conduct long-range procurement missions to the Sonata villages in the Dakotas with reasonable certainty of success. This part of the exchange duality was systematic and formal, and was almost certainly imbedded within ceremonial mechanisms including the calumet ceremony. The corridor of Hopewell-like cultures along the lower and middle Missouri River would have provided "cultural uniformity" that leveled cultural differences (Wood 1980:106). Institutionalized trade for commodities, including obsidian, along this corridor probably went hand-in-hand with the general diffusion of Hopewell traits into the Great Plains ca. 100 B.C.-A.D. 200.

## *CONCLUSIONS*

To summarize, the recently excavated La Plant site volcanic glass flake is the first XRF analyzed obsidian artifact reported from Missouri. Its chronological position—Middle Woodland—and source location—the Obsidian Cliff in Wyoming—conforms to a pattern documented at related lower Illinois River and Ohio River valley Middle Woodland sites, as well as at one Kansas City Hopewell site. Although the quantity of obsidian transported was not great, the vast distance that was overcome in this prehistoric exchange is often cited as a measure of the influence of Hopewell culture. In this exchange the Hopewellians may actually have given more than they received, as their quest for obsidian may have been one of the developmental "triggers" that sparked the rise of Plains Woodland culture.

## *ACKNOWLEDGEMENTS*

Jack Ray and Dick Marshall graciously provided information and comments to the authors that significantly improved the manuscript. The landowner Dr. Joe Hutchinson is gratefully acknowledged for granting permission for the 2001 excavations to take place at the La Plant site.

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## *ENDNOTES*

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[1] The Arikara (Arikaree) spoke Caddoan (Swanton 1952). They were associated with the Pawnee in Nebraska until the eighteenth-century when they moved north and settled near the Mandan and Hidasta. In Plains sign language they were referred to as "corn eaters" because of their sedentary lifestyle (Yenne 1986:20).

[2] The Mandan spoke Siouan (Swanton 1952:276-277). The Mandan are unusual among the Plain tribes for being sedentary and making pottery (Yenne 1986:94). George Catlin (1973[1844]) visited the Mandan in 1833 and much of what is known regarding the Mandan is based on his observations and illustrations. The Mandan were nearly wiped out by smallpox in 1837 (Catlin 1973[1844]:Appendix A).

[3] The Hidasta, or Gros Ventre (Atsina), spoke Souian (Swanton 1952; Yenne 1986:68).

[4] The Shoshone (Shoshoni) spoke Uto-Aztecan. They were the most wide-ranging of the Great Basin tribes (Swanton 1952; Yenne 1986:153).

[5] Some of the Sonata villages were occupied hundreds of years later by the Mandan and Hidasta, whose mortuary practices include placement of secondary burials within the old Middle Woodland mounds at these sites.