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N'omi B. Greber
Curator of Archaeology Cleveland Museum of Natural History, ngreber@cmnh.org

Frank L. Cowan
National Park Service

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1. A Preliminary Comparison of 1997 and 2002 Limited Excavations in the Great Circle Wall, High Bank Works, Ross County, Ohio

By N'omi B. Greber, Cleveland Museum of Natural History

The High Bank Works (33Ro24) are located southeast of Chillicothe on a glacial outwash terrace about 17 m above the active floodplain of the Scioto River. They are one of the more complexly designed sets of enclosures among the numerous enclosure sites found in the Central Scioto region. The major sections include a relatively rare octagonal enclosure, small and large circular features, and linear walls **(Figure 1)**.

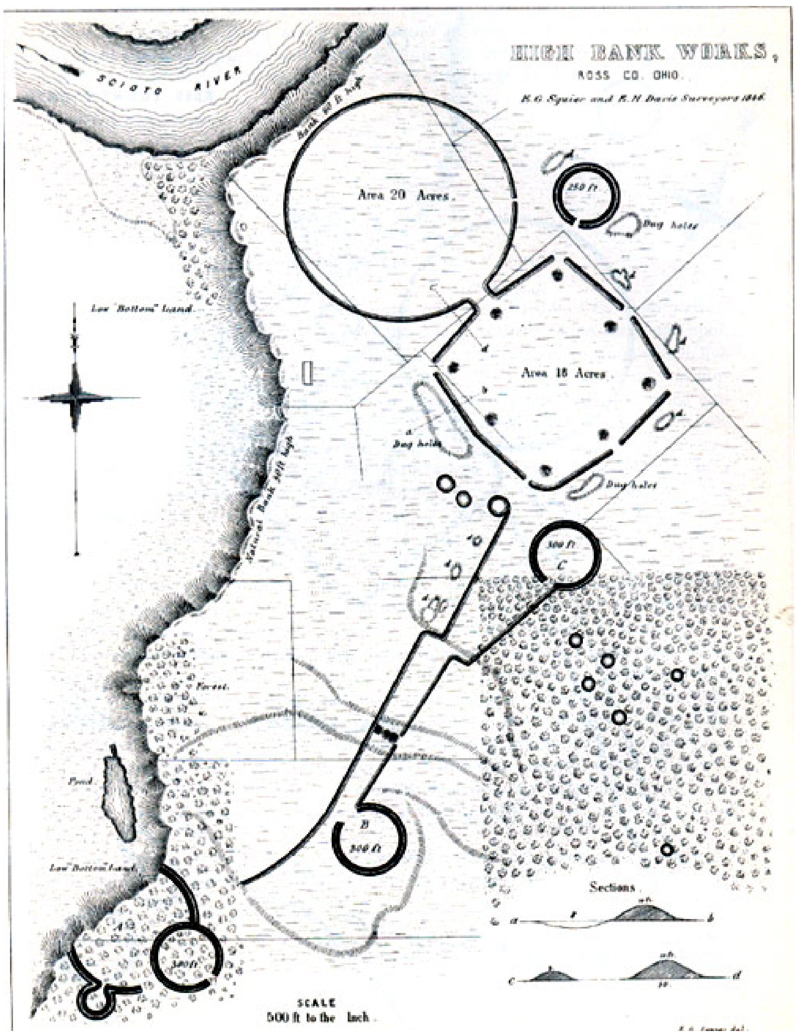

Figure 1. The earthwork as mapped by Squire and Davis. The middle section of linear walls and circles is more eroded than the sets of northern and southern elements.

Fieldwork in 2002 continued studies centered on the Great Circle as part of long term research aimed at placing enclosure sites into the contex t of both other types of structural remains such as buildings and mounds, and the well-known artifacts. Since 1994 a combination of geophysical surveys and limited excavation and coring has produced details of the design and construction of the Great Circle wall. Two major goals were set for this past season and both were met. The first was to determine the source of an anomaly identified by magnetic and resistance surveys in a small section of the wall directly across from the center point of the neck joining the Circle and Octagon. In an idealized ground plan, this point is a natural end for a line that would bisect the circle and the octagon. It also is a significant point in the astronomical design criteria proposed by Ray Hively and Robert Horn that might have been used in constructing the walls (Hively and Horn 1984). The second goal was to recover materials appropriate for radiocarbon assays.

The nineteenth-century farm lane that cut across the Circle and Octagon has been expanded for use by modern trucks and other vehicles **(Figure 2)**. This has severely impacted portions of these enclosures and the westerly side of the neck joining the two major enclosures. In 1846 the Great Circle wall, that had already been affected by farming, was still 1.4 m (4½ ft) high (Squire and Davis 1848:50). Today at ground level it is difficult to impossible to visually trace the entire wall. It is easier using remote sensing techniques. Almost the total length and portions of the interior have been surveyed using a variety of geophysical instruments. The geophysical maps have identified erosional wash and the inner and outer edges of the wall itself that appears to originally been about 8 m across. The geophysical anomaly investigated this season was first identified in 2000 using a fluxgate FM36 gradiometer. Surveys with the same instrument in 2001 and 2002, and resistivity pseudo-sections taken using the Geohm C earth resistance meter in 2001, corroborated the location and pattern of the anomaly. This pattern contrasts with the patterning of the general wall construction design (Greber 1999; Royce and Greber 2001).

Figure 2. Aerial view of the Circle and Octagon in 1938. Note the farm road that cuts through the enclosures and the neck that joins them. The apparent widths of the walls are increased by erosional wash in addition to the walls themselves.

A 2-m by 18-m trench was placed perpendicular to the wall in the central area of the anomaly that is generally circular in outline and approximately 14 m across. The northwesterly corner of the trench was at N 253.88, E -71.42 in the general site grid. Nine 2-m by 2-m excavation units, numbered north to south, were established. Excavations and backfilling took place from 17 June through 17 July.

Excavation Findings

An unexpected finding is that more than 200 of the recorded features are apparently re-filled post holes of varying diameters **(Figure 3)**. There is no obvious pattern in their locations. It is likely that other post holes exist outside the excavated area. The excavations also revealed the remnant of the wall itself and a different sequence of construction from that found in either of the two test trenches placed near the neck south of the farm lane (Greber 1999:Figs. 4,5). Consistent with the initial construction seen in both Trenches I and II, the aboriginal site users apparently cleared the ground surface to about 20 cm above the underlying natural glacial sandy gravels.

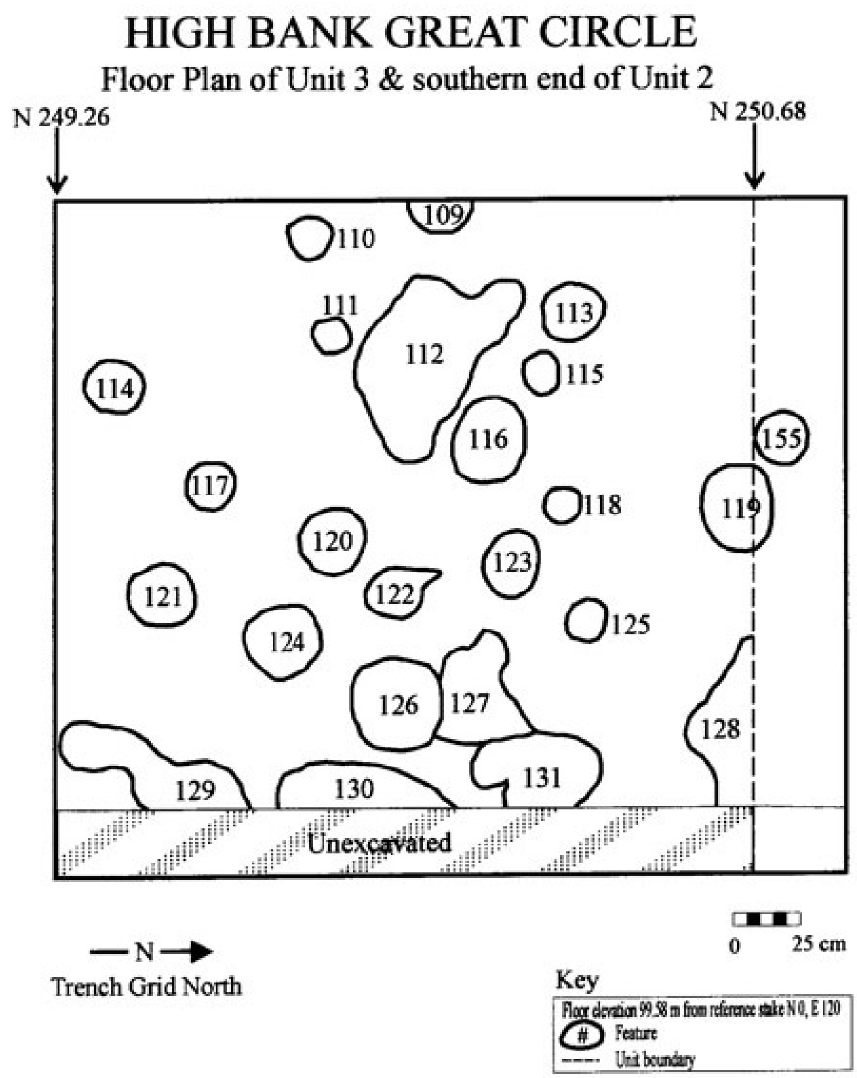

Figure 3. Floor plan of Unit 3 and the southern end of Unit 2 at site elevation 42 cm below N 0, E 120.

Figure 4. Flagging floor features in Unit 3.

The clayey nature of the cleared B-horizon makes a usable activity floor that is a common Ohio Hopewell feature as seen, for example, at Seip in the structures excavated by the Ohio Historical Society and in the nearby plaza area (Greber, Otto, and Lee 2002, Greber 1981, 1984). The specific activities associated with such prepared floors vary. At the High Bank Great Circle, numerous posts were placed on the floor found in Trench III. Shortly thereafter they were apparently removed and the holes filled with soils of the same type as those that formed the floor itself. Thus, it was extremely difficult to identify the post holes when the floor stratum was first exposed.

Figure 5. Northwest section of Unit 1 floor at site elevation 41 cm below N O, E 120. Re-filled post holes can be seen against the underlying natural sandy gravels.

Such re-filling is also a relatively common Hopewell feature, but the post holes are more easily recognized when fine gravels, colored clays, or other more contrasting materials are used as seen, again as examples, in the Edwin Harness Big House, on the floor under Mound 2 at the Hopewell Site, or in post holes found under Capitolium Mound, Marietta (Greber et al. 1983; Greber and Ruhl 2000:55; and Greber 1991, respectively). In our work this past season, the post holes were very easily identified as soon as the natural gravels were reached **(Figures 3–5)**. The origins of the posts can be seen in wall profiles **(Figure 6)**.

Figure 6. Close-up view, grid west wall Unit 1 at northern end of excavation. Here a post hole (Feature 20) is seen on the wall and adjoining floor.

The original construction in this wall section included a slide trench smaller in scale than that found in Trench II **(Greber 1999:Fig. 5**). A line of small decayed posts crossed the northerly end of the excavation near the outer edge of the Great Circle wall **(Figure 7)**. The posts ended in the underlying natural gravels. The separate covering over this feature was truncated by the plow zone.

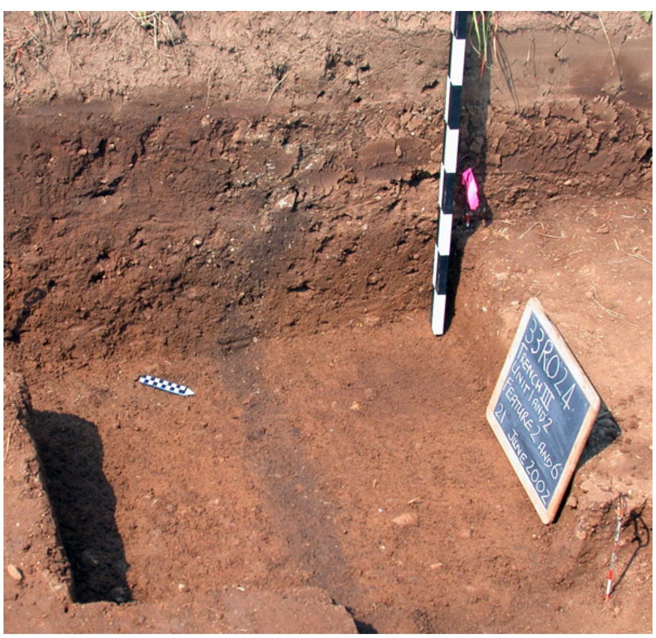

Figure 7. Window trench centered on grid west half of Feature 2. The line of small stakes extends across the upper surface of the activity floor (the cleared B-horizon).

A mantle composed of a layer of heavy gravels in a clayey matrix had been placed on the original activity floor. Infrequently, small areas of reddened soils and/or burnt pebbles were found in the loadings that formed this stratum, but no evidence for *in situ* burning was found. One large post intruded into the top of this stratum and possibly a line of shallow post holes near the inner edge of the Great Circle wall. The first stratum of the wall itself, found immediately below the plow zone, was a reddish sandy clay placed over a portion of the gravelly layer. The southerly end of this stratum indicates the inner edge of the Great Circle wall and appears to correspond to a change within the pattern of the geophysical anomalies. Studies are continuing to work towards identifying the correspondence between the ground truth data and specific elements of the pattern of the anomaly for possible use in interpreting future geophysical surveys. Due to the lack of contrast between the materials of the floor and the re-filled post holes there is not, to my knowledge, a currently available geophysical survey instrument that would detect such features. A contrasting fill, particularly one that contained burned materials or fired ceramics, would provide a better target. The mantle materials, even those that are redeposited unaltered sub-soils and gravels, can provide more contrast with the ground areas immediately surrounding the walls. These are the types of signals we hope to clarify.

Radiocarbon Dates

Three AMS radiocarbon assays have been completed (Table 1). Two dates, Beta 170562 and Beta 170564, come from bits of charred oak recovered from the slide trench (Feature 2) and are consistent with the dates obtained from the larger charred oak posts that composed the dismantled fence found in Trench II (Greber 1999: Table 1). The average at two sigma for the dates based on the small line of posts in Trench III is 1860 ± 80 years BP. Averaging the date based on charcoal from an above-ground section of the dismantled fence and the three dates from the i*n situ* below-ground posts found in Trench II gives the same date. The third date, Beta 170563, is apparently not associated with the Hopewell wall construction. It is based on charred oak bits found at the edge of a post hole directly north of the slide trench (Feature 6). Beta Analytic conducted a second independent run based on materials selected from the remaining pretreated portion of the sample. The resulting date is the same as for the first run, many millennia before the Hopewell era (Table 1).

Feature 6, a post hole that originated on the activity floor, contained a humic soil (7.5 YR 3/4, dark brown). It tapered downward some 40 cm deep into the underlying natural gravels. Tiny flecks of charcoal occurred in parts of the fill. The charred wood found on the activity floor at the edge of the post hole appears to have been the remains of some earlier use of the site. The only portable artifact recovered this season is a small, burnt, worked flint flake that was probably an accidental inclusion in the soils used for wall construction. It is possible that a second accidental inclusion of charcoal bits occurred during Hopewell earth moving. Unfortunately, Beta 170563 is not useful for dating the original building time of the Great Circle wall.

Table 1. Radiocarbon dating information, Great Circle Wall excavations, High Bank Works.

Museum Number	Material	Laboratory Number	Measured C-14 Age, One Sigma	$^{13}C/^{12}C$ Ratio	Conventional C-14 Age, One Sigma	Context
TrenIIICC#01	charred oak	Beta 170562	1930 ± 40 BP	-28.5	1870 ± 40 BP	Feature 2, slide trench
TrenIIICC#11	charred oak	Beta 170564	1890 ± 40 BP	-27.3	1850 ± 40 BP	Feature 2, slide trench
TrenIIICC#03	charred oak	Beta 170563	5150 ± 40 BP	-26.4	5130 ± 40 BP	Feature 6, post
TrenIIICC#03	charred oak	Beta 170563*	5150 ± 50 BP	-26.4	5130 ± 50 BP	Feature 6, post

*second run

Comments

It must be kept in mind that the following comments are based on a very small excavation sample of the wall. The six usable radiocarbon dates from essentially opposite sides of the circle suggest a relatively short time, in terms of human generations, for initial construction of the wall. This is consistent with the condition of the lower strata found in Trenches I and II where about thirty percent (40 cm) of the wall height recorded in 1846 is still intact. Here the top surfaces of the inner “red” and outer “yellow” base strata showed no signs of exposure. The total construction time that left a significantly higher wall is still not known.

Edges of the upper layers and two erosional episodes, apparently before and after AD 1800, were seen in Trenches I and II. The materials used to form the “red” stratum near the neck and also to re-fill post holes on the opposite side of the circle, likely came from a horizontal stripping of the pre-Hopewell natural ground surface.

Dan LeMaster, Regional Soils Specialist, USDA Natural Resources Conservation Service, has found evidence for this stripping in his observations of the present ground surface within the circle (personal communications 1997, 2001, and 2002). Such stripping was also clearly documented beyond the inner edge of the original circle wall at the southerly end of Trench III.

Prior to wall construction, appropriate Hopewell architects and engineers determined a ground plan, wall design, and construction techniques. Prior to raising the wall, activities took place at the site that emphasize the importance of the initiation of the building process, and perhaps of the planning phase. At least some of these activities could have been seen by those carrying the required special soils and gravels that they deposited, each in their proper arrangement. The remains of the ritual activities found at the base of the wall differ near the neck and across the circle from the neck. None of the portable objects used in any associated activities have been found. The plethora of posts adds new, and as yet unexplained, elements to possible interpretations of the range of pre-construction activities.

Acknowledgments

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2. Hopewell Mound 11: Yet Another Look at an Old Collection
By Frank L. Cowan and N'omi B. Greber

The single largest deposit of obsid- ian known anywhere in prehistoric eastern North America is the huge quantity of flakes and other debitage excavated by Henry C. Shetrone (1926) from a "characteristic floor" at the base of the small Mound 11 of the Hopewell type site in Ross County, Ohio (Shetrone 1922:August 2). Approximately 136 kg of obsidian debitage had been carefully placed on the floor **(Figure 1)**. Shetrone interpreted the obsidian debitage as having resulted from the production of the 150+ very large bifaces, including Ross points, found in ritual deposits within Mound 25 and elsewhere at the Hopewell site. He further inter-preted a nearby cremation burial as that of the "Master Artisan" who knapped those large, magnificently crafted bifaces (1922, 1930).

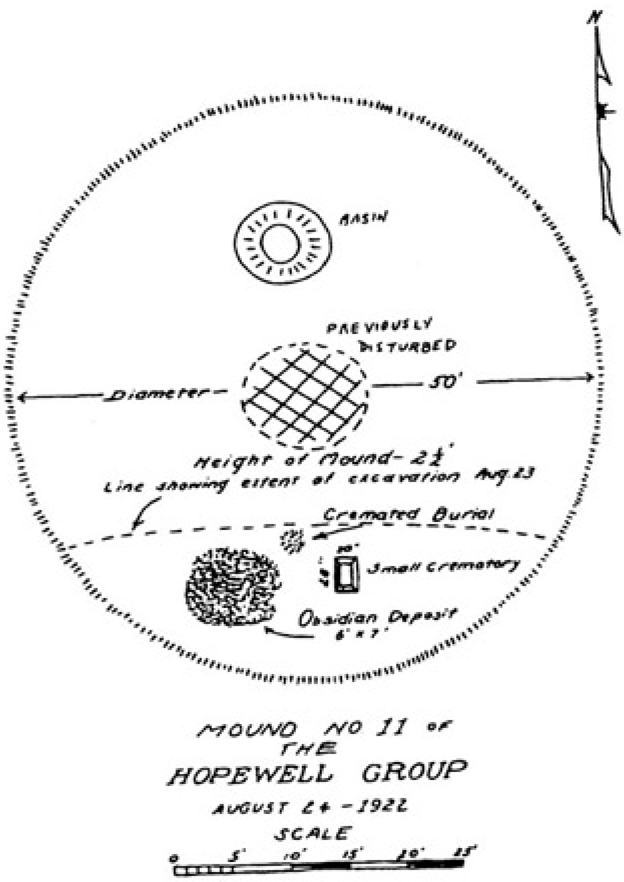

Figure 1. Reconstructed floor plan of Mound 11, Hopewell site.
Adapted from Greber 1996:Figure 9.6.

Remarkably, there have not been detailed studies of the obsidian de-posit to determine if the character of the Mound 11 flake assemblage truly is consistent with the kinds of flakes that result from the production of large bifaces. Hatch et al. (1990) examined a very small sample of the flakes to study the chemical characteristics of the ob-sidian and the thicknesses of the hydration rinds. Their "cursory ex-amination of 19 artifacts from the cache material suggests ... that it consists entirely of flake blades, core fragments, and small bifacial tools produced by a percussion blade-core technology" (Hatch et al. 1990:463).
Two alternative interpretations of the obsidian deposit are thus posed. In one scenario, outlined by Shetrone (1922, 1930), the flakes are by-products of the pro-duction of Ross points and other very large bifaces found at Hopewell and at some other Hopewellian sites. In that case, the several deposits of obsidian bifaces and the flakes are related and might be more-or-less contemporaneous. In contrast, Hatch

et al. (1990) suggest that the flake deposit and the biface deposits represent “in-dependent reduction sequence(s).” In that case, the bifaces and flakes could have been obtained, although not necessarily, from sepa-rate source localities, and the arti-facts could differ both in the dates of production and dates of deposition (Hatch et al. 1990; see also Hughes 1992; Stevenson et al. 1992).
The character of the flake assemblage, then, has bearing on the intrasite chronological relationships of different ritual deposits and different mounds within the Hopewell site. It also has implications for long-standing questions about the mechanisms of obsidian transport from the Rocky Mountain region to the Midwest (e.g., Griffin 1965; Griffin et al. 1969).

Comments on Context

The well-known photograph of the obsidian deposit (Shetrone 1926: Fig. 10; Shetrone 1930:Fig. 125; Hatch et al. 1990:Fig. 2) does not show the deposit as first found. As recorded in the field notes, excavations began on the south side of the mound, and the edge of the deposit was encountered almost immediately **(Figure 1)**. The entire deposit was removed over two days (Shetrone 1922: 22 and 23 August). The character of the deposit and the two portions of mica cutouts and a cut and polished, though likely unfinished, piece of calcite are described in the notes in some detail. Excavations continued to the east where a small ritual basin was encountered **(Figure 1)**.

As work continued north, the cre-mated burial was found. Some time after this, apparently for photographic purposes, at least some of the obsidian was returned to the floor. Mica pieces and the small polished stone that had originally been found within the deposit were placed in full view. It is possible that one of the pieces of mica in the photograph was found with the cremated remains. In addition to general concerns about interpreting a staged photograph, we have questions about the line of stones in the photograph that partially en-circles the artifacts and the cremated remains forming a “grave.”

After the cremated remains were uncovered, Shetrone (1922: 23 August) writes “it was clearly to be seen that the obsidian deposit belonged to it [the burial], since a row of scattered boulders, from one to five pounds, extended from the south side of the crematory, around the deposit and the burial.”
In the photograph the blade of the trowel points south. This direction is consistent with the relative locations of the deposit, basin, and burial as described in the notes and map **(Figure 1)**. The mantle over these features is described as “unproductive gravelly loam composing the body of the mound” (Shetrone 1922: 29 August). Many possible “boulders” are clearly visible in the fill seen in the photograph. No stones were mentioned at the edge of the obsidian deposit as work began and proceeded from the south.

The cobbles in the photograph were apparently placed for the photograph after the deposit was removed and then re-placed. Such a line is not a com-mon Ohio Hopewell grave marker. While there is much individuality in grave construction, we do not con-sider the evidence in this case suf-ficiently clear to positively place the obsidian deposit within any grave. The individual buried near the deposit, and perhaps the indi-vidual(s) represented by the charred human bones found in the backfill over the round ritual basin on the north side of the mound, may all have been “master artisans.” This connection is a reasonable interpretation that is hard to prove.

Examination of the Collection

On May 7, 2002, we conducted a preliminary survey of the Mound 11 flake collection at the Ohio Historical Society curation facility. The examination convinces us that there is much to be learned from this unique deposit and its context, and additional study is planned. Martha Otto, Cheryl Johnston, and William Pickard facilitated our study and deserve our great ap-preciation.

The obsidian pieces are cataloged under accession number 283 and stored in eight cardboard boxes (ca. 0.84 ft^2 each). Within the boxes, the flakes are packed into heavy paper bags, a variety of plastic boxes, and a few plastic zipper-seal bags. The flakes are size-sorted to some extent as some boxes and bags contain ob-sidian pieces of approximately the same size. Dirt still adheres to some of the obsidian flakes within the paper bags.

The collection consists of many tens of thousands of obsidian arti-facts, and our examination thus far has been necessarily cursory. We surveyed the contents of each plastic box, although some boxes and bags received more concentrated attention than others. The contents of some bags were spread out on separate trays to better examine the contents; in other cases we just peered into the bag to get a sense as to whether or not the contents were similar to that of adjacent bags.

Many pieces were individually studied in detail, although most flakes were just visually scanned. We have not yet undertaken for-mal coding or measurements of any of the flakes, and appropriate sampling and quantification procedures for a formal study are yet to be worked out. Nonetheless, we feel we can make a number of solid qualitative observations about the collection and some reasonable inferences about the behaviors that created it. We also separated 29 obsidian flakes that may be an appropriate sample for a planned energy dispersive x-ray fluorescence (EDXRF) analysis to be performed by Richard Hughes.

In addition to obsidian, we encountered some other notable items within the storage boxes. Box 12 contained several non-obsidian artifacts that we sorted out and placed into separate small, plastic zipper-seal bags. These materials include tiny mica pieces, fragments of quartz crystal, very small pottery sherds including a rim sherd, faunal fragments, two tiny copper-stained organic fragments (bark?), one copper fragment, chert flakes, and modern debris probably from excavation or curation storage. The unanticipated discovery of a small sample of wood charcoal in the collection engendered much excitement and provides us the first opportunity to obtain radiometric age estimates for Mound 11 and its deposits. The radiocarbon age estimates are presented and discussed below.

Production Technology and Behaviors

The most striking characteristic of the Mound 11 obsidian flakes is that the entire assemblage results from the production of many very large bifaces. Much of the assemblage consists of relatively large, broad flakes with relatively little longitudinal curvature. The dorsal surfaces bear multiple flake scar facets, many of which show multiple flaking orientations. Most flakes are fragmentary. Striking platform remnants are relatively small, infrequently cortical, and many are multifaceted with platform edge (dorsal surface) trimming and platform edge abrasion. These flake characteristics are common traits of bifacial tool production.

In marked contrast to the technological assessment of Hatch et al. (1990), we see absolutely no evidence that the flakes represent a “percussion blade-core technology” or bladelet production. In fairness to Hatch and his associates, it is worth remembering that they were not conducting a technological analysis and examined only 19 specimens out of the tens of thousands of flakes in the collection.

The bifaces from which many of the flakes derived were very large. Many flake fragments are greater than 6 cm in length along the flaking axis, and we estimate that many of those fragments represent individual flake removals that could easily have been 15 cm or more in length. Such large biface thinning flakes indicate that the bifaces were a least 15 cm in width at some stage in the reduction sequence. The relative “flatness” of the flakes along their longitudinal axes indicates that the bifaces had relatively biplanar (flat) cross sections. The thinness of many of the flakes, especially relative to overall flake size, indicates that the bifaces were carefully “pared” to smoothly contoured surfaces.

These flakes, then, are entirely consistent with the production of Ross "points" and other very large, relatively thin, biplanar bifaces such as those known from Mound 25 and elsewhere at the Hopewell site. Some of the Hopewell site bifaces were as much as 25 to 38 cm in length (Greber and Ruhl 2000:147–154; Moorehead 1922: 132) and tend to be much larger than the obsidian bifaces recovered from Mound City, Fort Ancient, or other Ohio Hopewell sites.

The Mound 11 flake assemblage was produced by virtuoso flintknappers (we have no opinion, at present, as to whether one or more knappers were involved). The knappers were accomplished in the flaking of very large, broad, and thin bifaces, and it appears that they were also quite familiar with working obsidian. There are no broken or otherwise mishandled bifaces in the Mound 11 collection, and we have not yet noticed any knapping errors in the flake assemblage.

It appears likely that the Mound 11 obsidian deposit consisted of flakes only from successful production episodes and that flakes from unsuccessful attempts were deposited elsewhere. Nonetheless, given that neither the making of such large, thin bifaces nor obsidian-working were common practices for the Middle Woodland people of Ohio, it is intriguing to contemplate how and where such practiced expertise would have come into being.

The Mound 11 obsidian flake deposit is also biased in that the deposit lacks the small-sized end of the flake spectrum. The smallest flake fragments in the extant collection are approximately finger-nail-sized or about the size that would likely be collected by hand and transported from the original production sites. Although we do not expect that micro-debitage would have been collected in a 1922 excavation, we do suspect that Shetrone would have attempted to recover quite small obsidian flakes from such a context. It is unlikely that the thousands of pieces contained those flakes at the time of deposition.

Cortex-bearing flake surfaces are not rare in the assemblage. The nature of the cortex suggests that the obsidian was obtained directly from *in situ* obsidian flows rather than from secondary deposits such as stream cobbles. The presence of cortex and of internal flaws suggest that the obsidian was only minimally tested and reduced prior to transport from the source region to Ohio. Some bifaces, however, were made from large flakes as evidenced by the presence of so-called "Janus flakes" — flakes whose dorsal surfaces were the ventral surfaces of larger flake blanks.

The obsidian is quite varied in its visual appearance. Some is very deep black, smooth, and glassy; some is opaque even at the thin edges of flakes; some translucent to transparent; some is milky; some has light banding; and some contain numerous phenocrysts. We can not say whether or not this visual variability reflects different obsidian sources.

Finally, we would note that much of the debitage placed within the Mound 11 deposit was sufficiently large that it could have been used to make everyday Hopewellian Middle Woodland retouched tools, which tend to be relatively small. The raw material potential of the obsidian debitage, therefore, was not "economized" any more than were the large bifaces that were placed with other ritual deposits at the Hopewell site. Partly for this reason, we find it rather unlikely that the edge damage so common on the Mound 11 flakes represents use-wear as interpreted by Hatch et al. (1990:463). Instead, the edge-damage probably represents both prehistoric and relatively modern "curation damage" to thin, very fragile flake edges.

Dating the Deposit

The results of two radiocarbon assays on wood charcoal sorted from the deposit are consistent with each other (Table 1). Their average, at one sigma, dates the placement of the obsidian debitage to 1745 ± 40 years BP. This does not necessarily date the chipping of the large bifaces that produced the debitage.

Dates for this chipping, based on the thicknesses of the hydration rinds found on 19 pieces from the deposit, have been published (Hatch et al. 1990). However, several technical problems associated with the method used prevent complete acceptance of these dates (e.g., Hughes 1992).
Technical problems associated with measuring the depth of the rind itself have been overcome. Work continues to find appropriate temperature values that are needed in the theoretical equation translating rind depth to chronological time (e.g., Lepper, Skinner and Stevenson 1998). The success of this work could answer questions concerning the length of time of active use of obsidian by Ohio Hopewell artisans. The dates in Table 1 reflect the end of this major use.

Conclusions

Our very brief survey of the Hopewell Mound 11 obsidian indicates that there is much to be learned by further study of the collection. Of all the exotic raw materials employed by Hopewellian peoples, obsidian was the commodity whose original source was farthest from home. As the only substantial assemblage of Hopewellian obsidian debitage known in Ohio, study of this flake collection remains the best pathway for understanding the mechanisms and motivations by which obsidian made its way from the Rocky Mountains to the Midwest. More formal and detailed studies of small sub-samples of the collection are pending. Even the brief study to date emphasizes the importance of the information that is still to be found in museum collections, in this instance a collection that has been safely curated for eight decades.

Acknowledgements

We thank the Ohio Historical Society for allowing us to examine the Mound 11 assemblage and for giving permission to date a charcoal sample found within the collection. We especially thank Martha Otto, Curator of Archaeology, for facilitating our study.
Funding for the AMS radiocarbon age estimates came from donations made to the Hopewell Research Fund at the Cleveland Museum of Natural History.

Table 1. Mound 11 radiocarbon age estimates

Museum Number	Laboratory Number	Measured C-14 Age	$^{13}C/^{12}C$ Ratio	Conventional C-14 Age
OHS283MD11-A	Beta 170560	1740 ± 40 BP	-26.0	1720 ± 40 BP
OHS283MD11-B	Beta 170561	1800 ± 40 BP	-26.6	1770 ± 40 BP

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