The Joan Carrie Site: A Short-Term Patrick and Dohack Phase Occupation on the American Bottom Bluff Edge

Duane Esarey and Sissel Johannessen

Joan Carrie (11MO663) is a small bluff-top site overlooking the American Bottom region of the Mississippi River valley. The 25 features at the site contained significant assemblages of ceramics, lithics, and botanical remains dating to the Late Woodland Dohack and Patrick phases. Material remains suggest that site served as warm-weather seasonal settlement whose occupants engaged in primarily agricultural tasks.

The Joan Carrie site (11MO663) occupied the Mississippi River bluff overlooking the American Bottom at an elevation of 155.0–156.5 masl about 25 m above the adjacent floodplain (Figures 1 and 2). The site was located within the planned Luhr Brothers Borrow Pit 4 to be used in the construction of FAI-270 (Esarey and Moffat 1980). This location is just west of Columbia, Illinois, in the SE½, SE¼, SE¼ of Section 8 and the NW¼, NE¼, NE¼ of Section 7, Township 15, Range 10W, Monroe County, Illinois, bounded by the Universal Transverse Mercator coordinates E 742150–742375, N 4259825–4260050.

Environment

A detailed reconstruction of prehistoric vegetation patterns will not be attempted in this report. In general terms, the East St. Louis area falls into Shelford's (1963:10) Oak-Hickory Forest Region. Forests dominated by red and white oak and hickory formerly were present on the bluffs and well-drained parts of the American Bottom. In more poorly drained or frequently flooded parts of the bottom, floodplain plant communities were dominated by willows and cottonwoods (Shelford 1963:89). Most of this area has now been cleared of its natural vegetation in connection with modern agricultural activities and urban development.

A number of meander scars are located proximal to the bluffs in the vicinity of the site. The Hill Lake Meander is less than 2 km to the northwest. The Fish Lake Meander is about 3.8 km to the west. Carr Creek, which is slightly less than 1.5 km to the south, and Palmer Creek, an intermittent stream (in modern times) 0.7 km to the north, may have been of importance to the occupants of the Joan Carrie site. More detailed discussions of

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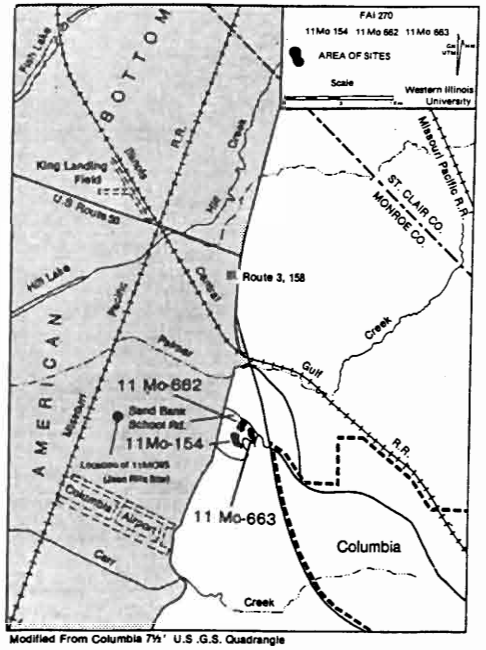


Figure 1. Location of the Joan Carrie site.

the environment of the American Bottom are presented by Gregg (1975), Chmurny (1973), Welch (1975), and White et al. (1984).

History of Investigations

The Joan Carrie site was located in the fall of 1977 by Bruce White during an inspection of the planned Luhr Brothers Borrow Pit 4. The surface area of the site, as defined by the plow-zone scatter of artifacts, covered 10,306 m^2. In April of 1978, Western Illinois University carried out investigations at Joan Carrie and two nearby sites (Tep [11MO154] and Bank Road [11MO662]). The field party consisted of nine individuals headed by Jeanette Stephens. Charles Bentz served as site supervisor, and Lawrence Conrad was principal investigator. Financial support for the project was provided by Luhr Brothers Construction Company and Western Illinois University (Esarey and Moffat 1980).

A controlled surface collection of the Joan Carrie site was conducted prior to excavation. A total of 122 items were found scattered over the site area (Figure 3). This number included very little pottery and no other diagnostics. One grit-tempered sherd, 6 mm thick, was found downslope of the main material cluster. Three limestone-tempered

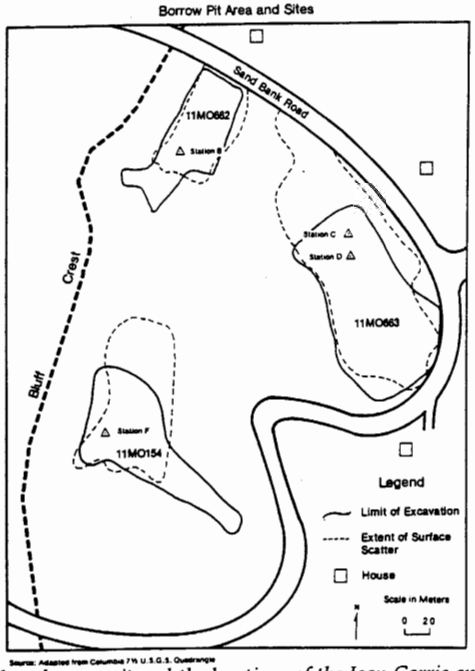


Figure 2. Luhr Brothers borrow pit and the locations of the Joan Carrie and other sites.

sherds were found in the vicinity of the main cluster, which turned out to coincide with the primary feature cluster at the site. The sparsity of artifacts on the surface made the presence of subsurface features seem unlikely, despite a heavy concentration of materials at the southeast end of the site.

Following the controlled surface collection, elevations were recorded to produce a contour map. Subsurface soil samples were taken at points on a 10-m grid using standard open-face soil probes 2 cm in diameter. These were employed to document plow-zone depth and to locate features. The plow zone was then removed from approximately 7,720 m^2 of the site; a light material scatter at the site's northern end was not further investigated. Plow-zone removal was accomplished using two bottom-loading paddle-wheels (the larger of the two worked best and impacted the exposed subsurface the least).

Discolorations in the subsoil were marked immediately. A concentration of 29 features was defined at the southern end of the bladed area. Two isolated features were located at the northern end (Figure 4). An arbitrary instrument station, tied into a bench mark along nearby Illinois Route 3, was used to map the exposed features and limits of excavation.

Features, which contrasted well with the loessal subsoil, were defined and mapped

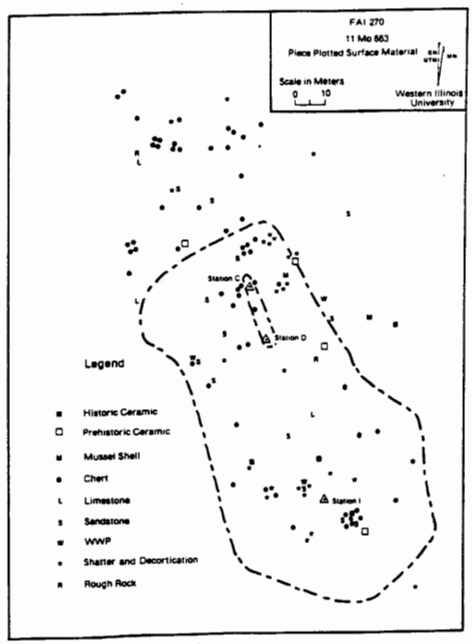


Figure 3. Piece-plotted surface material.

in plan view. Half of each feature was then excavated using 10-cm arbitrary levels and cultural zones. The resultant profile was mapped, and then the second half of the feature was excavated. At least one 10-liter flotation sample was collected from each cultural zone during the excavation of the second half.

Features

Six of 31 features defined during the overburden removal were determined to be noncultural subsurface disturbances (e.g., tree roots). The remainder of the subsurface features were prehistoric pits. Contents and fill descriptions of all 25 features are presented in Esarey and Johannessen (1992). An analysis of pit morphology and pit contents follows.

Approximately half of the features excavated at the Joan Carrie site contained internal stratigraphy probably related to function, refuse disposal, and postoccupational filling. This stratigraphy is related somewhat to feature type. The Joan Carrie pits may be divided into five morphological categories (Table 1; Figure 5).

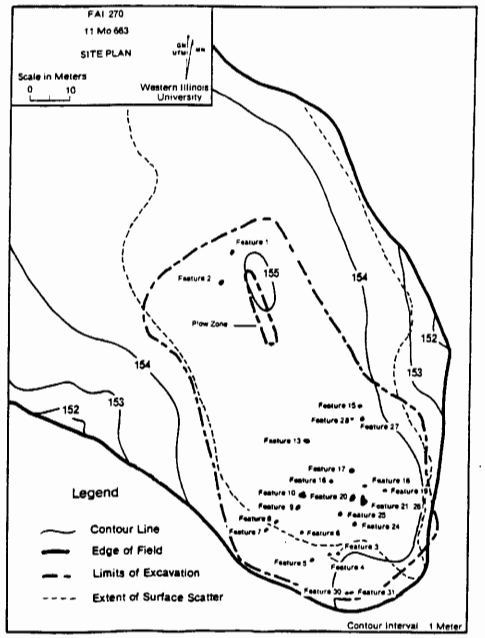


Figure 4. Feature distribution.

Large, Circular, Shallow Basins

Four large and roughly circular basins, Features 13, 17, 20, and 21, were identified . Three of these features possess very shallow sides; before being truncated by plowing, they may have been more horizontally extensive than the remainder of their bottoms indicates. The entire bottom of the fourth, Feature 17, is clearly intact.

The basins range in depth from 6.35 cm to 24.0 cm (mean=12.6). They exhibit no zonation except for a lens at the bottom of Feature 17, where clusters of burned pottery were also found. These shallow basins contained only limestone-tempered pottery. Three of the basins also contained considerable amounts of burned limestone. The fourth, Feature 13, held very little material of any kind. In Feature 21, a bed of burned limestone interspersed with large amounts of burned pottery was spread across the pit . This feature contained more pottery and burned limestone by weight than any other feature at the site. It also contained several elements of at least one deer, including a scapula, several small metatarsal fragments, a small section of a thoracic vertebra, and a medial fragment of the right mandible.

It is difficult to determine if these features represent pits or structure basins. The quantity of burned artifacts in them may represent the intact, task-related deposits of pits

Table 1. Feature Attributes.

Feature	Length (cm)	Width (cm)	Depth (cm)	Plan
Circular Plan, Large Basins (Possible Structures)				
13	120	132	11	Circular
17	178	169	24	Circular
20	194	145	6.4	Circular
21	216	200	9	Circular
Mean	177.0	161.5	12.6	
s.d.	41.1	29.9	7.8	
Circular Plan, Sloping Walls, Small Basins				
1	102	96	20	Circular
2	110	81	18.5	Oval
8	113	105	15	Circular
18	131	120	50	Circular
19	89	88	6.4	Irregular Oval
25	122	118	45	Circular
26	71	69	8.5	Circular
Mean	105.4	96.7	23.3	
s.d.	20.3	19.0	17.3	
Irregular Plan, Small Basin				
28	38	24	12	Irregular
Rectangular Plan, Sloping Walls, Flat Bottom				
3	85	76	7	Square
4	58	29	6.5	Rectangular
5	81	85	12	Square
6	93	70	25	Rectangular
15	80	80	10	Square
Mean	79.4	68.0	12.1	
s.d.	13.0	22.5	7.6	
Rectangular Plan, Expanding Walls (Belled), Flat Bottom				
24	90	61	60	Rectangular
27	135	110	65	Rectangular
Mean	112.5	85.5	62.5	
s.d.	31.8	34.6	3.5	

Table 1. Concluded.

Feature	Length (cm)	Width (cm)	Depth (cm)	Plan
Circular Plan, Expanding Walls (Belled)				
7	123	117	36	Irregular
9	150	135	78	Circular surface
10	171	170	80	Circular
16	95	93	28	Circular
30	96	73	52	Oval
31	81	78	25	Circular
Mean	119.3	111.0	49.8	
s.d.	35.3	37.3	24.5	

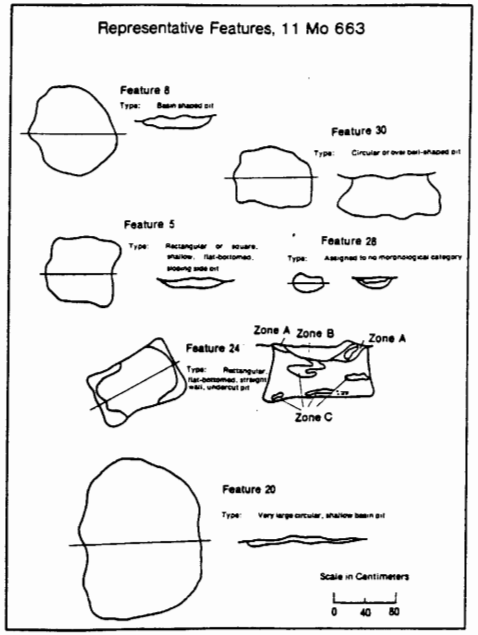


Figure 5. Selected feature plans and profiles.

rather than postoccupational deposits on structure floors. Due to the sparse amounts of material present on the site surface, multiple and/or extended occupation(s) seem unlikely. A plausible explanation for these features is that they are remnants of shallow ovens, roasting beds, or some other kind of processing facility.

On the other hand, it is possible that these features, particularly Features 17, 20, and 21, were structure basins. Since the excavation of the Joan Carrie site in 1978, several other sites have been excavated by the FAI-270 Archaeological Mitigation Project that have yielded structural features similar in morphology to and contemporaneous with the Joan Carrie features (Kelly 1990:Table 11; Kelly et al. 1984a:134, Kelly et al. 1990:Table 2.7; Stahl 1985:Table 43). These other structures exhibit single-post construction. It is conceivable that postmolds on the floors of the large, shallow basins at Joan Carrie could have been missed (Charles Bentz, personal communication 1980).

Basin-Shaped Pits

Seven pits, Features 1, 2, 8, 18, 19, 25, and 26, are basin-shaped in profile and circular or oval in plan. They range in depth from 6.35 cm to 45.0 cm (mean=23). They are characterized by a paucity of material and little to no internal stratigraphy. Three of the pits contained only grog-tempered pottery, two had only limestone-tempered pottery, and two had no pottery.

Of the basin-shaped pits, only Feature 26 contained appreciable amounts of burned limestone. It superimposed Feature 21, a large, shallow basin. The two features show a definite homogeneity of materials, and the excavator noted that nearly all of the material collected from Feature 26 was found along the side adjoining Feature 21.

Shallow, Sloping-Sided, Flat-Bottomed Pits

A third morphological grouping of pits consists of five shallow rectangular features with sloping sides and flat bottoms. The depths of these pits, Features 3–6 and 15, range from 6.5 cm to 25.0 cm (mean=12.1). Their lengths and widths ranged from 76.0 cm to 85.0 cm, except for two that have dimensions of 70 cm by 93 cm and 29 cm by 58 cm.

Only two of the five pits in this category contained ceramics. Feature 5 contained only limestone-tempered sherds while Feature 15 contained both grog- and limestone-tempered sherds. None of the flat-bottomed, sloping-sided features contained appreciable amounts of burned limestone. Two very small fragments of maize were found in Features 5 and 15. Feature 15 was the only one of the rectangular pits with multiple fill zones. Most of this feature was filled with homogeneous ashy silt containing little artifactual material. A very compact, highly organic deposit, containing much burned pottery, baked clay pieces, and small chert flakes, covered part of the bottom.

Flat-Bottomed Pits with Straight, Undercut Walls

Two rectangular pits, Features 24 and 27, have straight, undercut walls. That is, the walls expand toward the bottom not unlike a belled pit. The depths of Feature 24 and 27 are virtually the same, 60 and 65 cm, respectively, but Feature 27 is much larger horizontally.

The axes of the two pits are oriented nearly perpendicular to each other. Both

features exhibit complex zonation indicative of gradual filling. Both features had indications of burning with many large pieces of charcoal and partial charred logs present on or near their bottoms. Burned sterile soil was noted on the walls of Feature 24, and a possible charred mat was found on its bottom. The mat appeared to consist mostly of flattened weed stems or large grasses. The corners of the mat were fitted directly on the bottom of the feature. Feature 24 contained an organically rich fill interspersed with numerous ash lenses. Large amounts of burned limestone as well as occasional pieces of fragmented, charred maize kernels were found in Feature 24. Feature 27 contained a moderate amount of pottery with the rim sherds in each zone being from different vessels. With the exception of some fragments of an untempered (or tempered with fine sand) miniature vessel from Feature 24, the pottery from both Features 24 and 27 is limestone tempered.

Hard-baked mud dauber nests were found throughout the fill of Feature 24. More than 200 mud dauber nests (most of which contained one or more closed cells) were found scattered singly or in small clusters throughout this feature. All of the mud dauber nests had deep thatch impressions, and there were no signs of forceful removal from the thatch. Likewise, the nests themselves were seldom broken, and roughly 60% of the cells (365 of 605) had opened naturally.

Relatively large quantities of small, frothy-looking vitrified particles containing many small gas bubbles within a slag-like medium were found in Feature 24. The fused particles are present in flotation samples of three other pits at the site, Features 9, 10, and 27, albeit in lesser quantities. These particles range in size from the head of a pin up to about 1.4 cm in diameter. They make up about 5% of Feature 24's fill. Each flotation sample taken from this pit yielded 0.7–1.0 liter of nonsoil fill, of which 50% to 75% is vitrified particles (see Plant Remains, below). An x-ray diffraction analysis revealed that these vitrified particles are cryptocrystalline quartz silica (John Klasner, personal communication 1980). The gas bubbles probably indicate the presence of moisture at the time of heating, and the cryptocrystalline structure indicated relatively quick cooling.

Cinders fitting the description of these particles are reported from other archaeological contexts (Bell and Bastain 1967; Monger 1966), especially the burned layers overlying the floors of burned structures. Similar material may also be found after a haystack or barn full of bailed hay has burned. Different grasses, in fact, produce different cinder characteristics (Bell and Bastain 1967:69, 71, 113).

The mud dauber nests in Feature 24 certainly had been attached to thatching of some kind, suggesting the presence of roofed structures. The vitrified particles also support the presence of a thatched-roof structure since they almost certainly were the by-product of burning grass (i.e., thatch) and were associated with the mud dauber nests in Feature 24. It appears that both the vitrified particles and the mud dauber nests either were dumped into Feature 24 following a fire or were washed into the feature following the burning and abandonment of a nearby structure. Unless Features 17, 20, or 21 are structure basins, we must infer that the building sat on the surface or in a shallow basin.

Bell-Shaped Pits

The fifth morphological category is composed of six circular or oval bell-shaped pits, Features 7, 9, 10, 16, 30, and 31. Feature depth ranges from 25 cm to 80 cm (mean=50). Varying amounts of burned limestone is present in these pits, ranging from none in

Features 16 and 31 to 1,694.0 g in Feature 10. Five of the six features contained pottery. Two of the features contained only grog-tempered pottery. Two others contained only limestone-tempered pottery. Feature 9 contained both temper types.

Within Feature 16 was a thick ashy deposit across the floor of the pit that measured 10 cm by 13 cm in diameter. Above this, extending incompletely across the pit, was an organic burned layer containing charcoal, charred maize cobs and kernels, and small pieces of burned limestone and bone. This zone was, in turn, covered with a progressively lightening silty clay with low debris density. This upper zone appears to be postoccupational in origin.

Feature 9 contained an organic lens to one side of the pit bottom that contained limestone and oxidized soil. Charcoal and maize were not present in this zone but were present in the zone above it. Squash rind, maize cobs and kernels, wood charcoal, burned limestone, and oxidized soil were found in this zone. The upper 20 to 25 cm of the fill was composed of light-colored silty clay with low material density.

Feature 10 contained 15 fill zones in four major horizons. A 10-cm-thick, black, greasy fill containing charred logs, seeds, maize cobs and kernels, and burned limestone was overlain by 20 cm of dark yellowish brown silty clay with sparse artifactual content. This in turn was overlain by about 15 cm of dark, charcoal-laden soil with ashy pockets, charred floral remains, and larger quantities of cultural material. A dark yellowish brown silty clay with little debris distributed evenly throughout comprised the last major zone. The feature was apparently twice utilized for the same or similar function, between which a layer of fairly clean soil was allowed to accumulate. The last zone was terminated 55 to 60 cm below ground surface, assuming a 20–25-cm-deep plow zone.

Feature 31 contained a 10 cm-thick lower zone composed of brown silt. Signs of oxidation were evident across the bottom of the pit. A small section of a burned log and a baked mud dauber nest were found in the lower zone. The upper zone was a yellowish brown silty clay that was difficult to distinguish from the sterile subsoil. Little material was associated with Feature 31.

Feature 7 contained only two silty clay fill zones that are similar except for artifact density and soil color. The upper zone was slightly darker and contained charcoal flecks and baked clay, but debris content was much higher in the lower level. Two sizable sections of a large, grog-tempered, incurved-rim jar were found at the sides of the bottom of the feature. Burning was present on most of the materials recovered from the pit, but no burning was noted in the pit itself.

Feature 30 contained a homogeneous fill. The feature was evidently devoid of accumulated deposits until the time of its abandonment. A whole, grog-tempered, cord-marked bowl was found shattered across its bottom. Other debris was found at or near the bottom of the feature. The fill of the feature contained few artifacts.

Shallow Basin with Irregular, Oval Plan

Feature 28 was placed in a category by itself. It is a shallow basin with an irregular oval plan. A lower, almost sterile fill zone occupied about half of the depth of this pit, while the upper fill zone was composed almost entirely of tightly packed burned limestone. Small amounts of floral material were found in the feature.

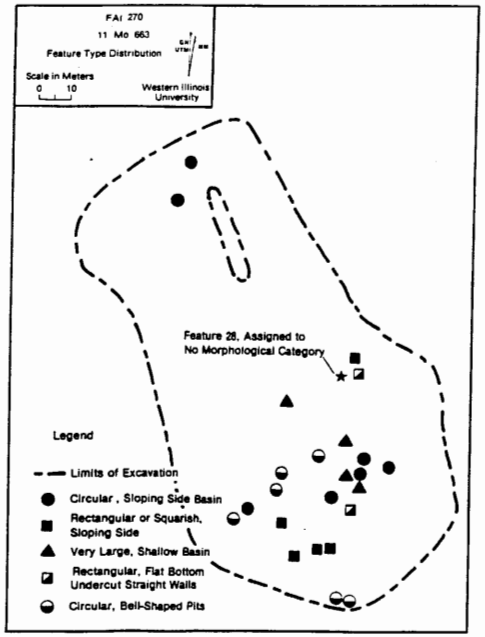


Figure 6. Feature type distribution.

Discussion

The distribution of feature types in conjunction with the characteristics of their fill and contents can provide insights into site patterning (Binford et al. 1970:63). At Joan Carrie there is a notable lack of variability in form and frequencies of pits. This may be representative of repeated seasonal occupations involving similar activities. Clusters of the various feature types are discernible (Figure 6). There are three clusters of pits outside of the large cluster of pits in the southern end of the excavated area. Two circular bell-shaped pits are isolated at the extreme southern end of the excavation. Two circular basin-shaped pits containing almost no artifacts are isolated at the far northern end of the excavation. It is possible that the occupation extends a little further along the ridge, outside of the area of impact.

A small feature cluster—consisting of a rectangular, flat-bottomed pit with undercut or expanding walls (Feature 27); a shallow, square, sloping-sided pit with a flat bottom (Feature 15); and the small, shallow, oval feature full of burned limestone (Feature 28)—is found to the northeast of the main cluster of pits. Feature 13, a large shallow basin, lies between this northeastern cluster and the main cluster to the south. Within the main cluster of pits, the shallow, flat-bottomed, sloping-sided pits form a very tight arc to the south.

The circular, bell-shaped pits form a linear pattern along the west side of the feature cluster, and the large shallow basins are clustered to the north. Basin-shaped pits are scattered through the center.

The clear relationship between feature types and their spatial patterning strengthens the probability that the morphological categories have functional significance. The large, shallow basins may be roasting beds; the circular, bell-shaped pits are most likely earth ovens or processing pits. The shallow, rectangular, sloping-sided pits with flat bottoms give little clue to their function. Perhaps they were storage facilities. Flotation of their fills yielded only small amounts of floral material. This may be the result of pits left empty at the end of the site occupation.

Since spatially patterned sets of pit types comprise the main feature cluster of the Joan Carrie site, it seems a reasonable inference that a single group, performing the same or similar sets of activities reoccupied the site during a specific season over a period of years. The small cluster to the northeast, with its nearly full complement of pit types, may indicate a single and functionally similar spatially separated occupation.

Ceramics

All ceramics from the Joan Carrie site are either limestone or grog tempered. Both limestone- and grog-tempered vessels exhibit similar attributes. These appear to derive from both Patrick phase and Dohack phase occupations (Kelly et al. 1984a, 1984b).

Paste

The most common vessel paste ranges in color from a very dark gray to brown or orangish brown. It is likely that these colors are the result of firing, as some individual sherds exhibit abrupt changes in color. The paste characteristics of most of the pottery may be a result of the use of the dark-colored mud noted for Late Woodland pottery in the American Bottom (Kelly et al. 1979:29; Stahl 1985:172). A reddish paste variety with a crumbly texture is also present. The cordmarking on this exclusively grog-tempered pottery is more heavily smoothed over than the rest of the pottery. A complete bowl of this reddish paste was found in Feature 30 (Figure 7). The only other pastes noted are those making up two of three miniature vessels. One is orange and gritty with a chalky surface. It is untempered or is tempered with a very fine sand. The other is brown and platey with sparse limestone temper. Its surface is fabric marked but substantially smoothed over.

Grog-Tempered Vessels

Four grog-tempered rims were recovered, all of which are cordmarked on the exterior surfaces (two have S-twist cords; two have Z-twist cords [see Hurley 1975:85]). One heavy and dense grog-tempered bowl rim has slightly smoothed, diagonal cordmarking covering the entire sherd exterior up to the lip. Heavily smoothed diagonal cordmarking also is found on the 0.6-cm-wide rounded lip. The estimated vessel diameter is 15–20 cm (Figure 7a).

The complete bowl recovered from Feature 30 is 7.5 cm deep and 17.5 cm in diameter with somewhat smoothed-over cordmarking on the entire exterior (Figure 7d). The cord-

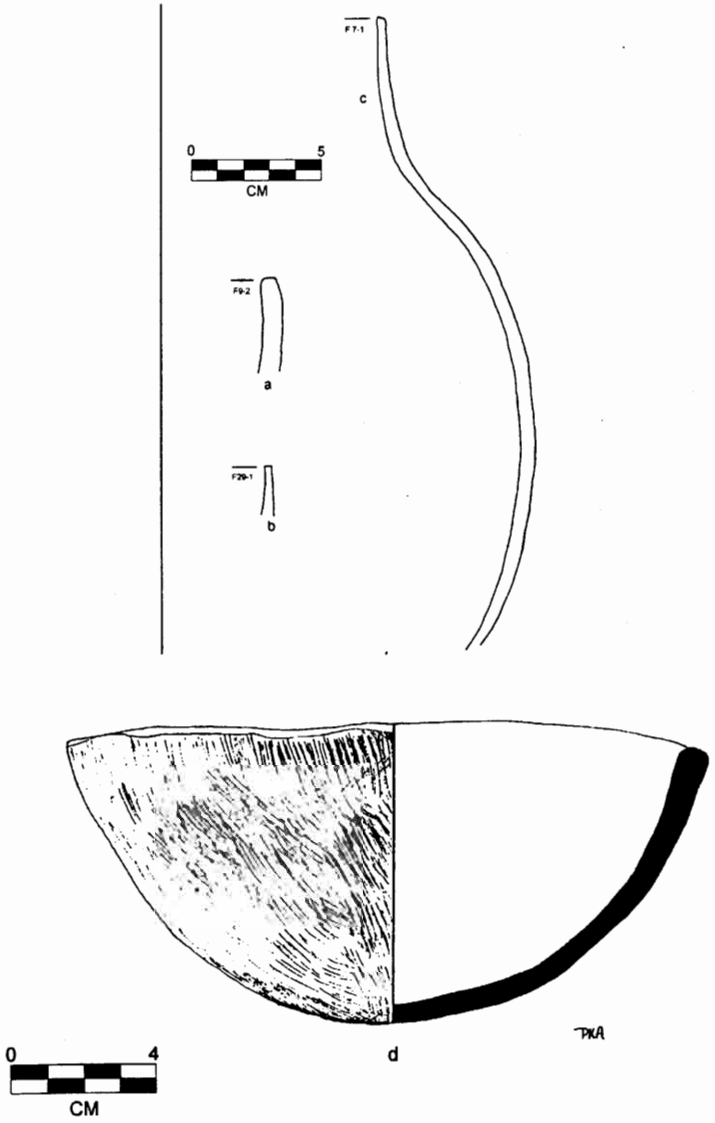


Figure 7. Grog-tempered vessel profiles.

marking along a 2.5 cm-wide band below the lip is oriented vertically but the remainder of the cordmarking ranges from vertical to horizontal in orientation. Cordmarking was cross-applied on the vessel bottom but is almost totally obliterated by subsequent smoothing. The lip is rounded and uneven. The poorly fired, uneven interior surface is unmodified except for an 8-cm-wide black smudge patch in the bottom.

A large section of a straight-rim jar was recovered from Feature 7 (Figure 7c). The cordmarked vessel exterior is slightly smoothed. The cordmarking on the upper rim was cross-applied, and all cordmarking 9–10 cm below the lip is vertically oriented and continuous. The neck is 7 cm high, and the orifice diameter is 27 to 30 cm; the lip has been scraped flat and has no decoration.

A small grog-tempered rim sherd was recovered from Feature 29 (a natural subsurface disturbance). It is cordmarked on the exterior surface up to the lip, which had been scraped flat. Vessel form is indeterminate (Figure 7b).

Limestone-Tempered Vessels

A total of 35 limestone-tempered rim sherds were recovered representing a maximum of 29 vessels. These were invariably cordmarked on the exterior surfaces. Cords used were generally Z-twist (Hurley 1975:85). Two limestone-tempered containers from Features 21 and 27 exhibited S-twist cords. Several limestone-tempered sherds exhibit finely crushed temper. The particle size of these specimens is about 0.2 mm in diameter as opposed to the 0.75-mm average for other sherds. Two limestone-tempered jar rims are light gray and very hard. Both rims have a tapered lip in profile and exhibit more smoothing than the rest of the vessels (Figure 8b, j).

Vessel forms represented by rim sherds include 26 straight-rim jars, two bowls, and one miniature vessel (represented by three rims). Six rim sherds were not identified as to vessel form due to their small size. Within vessel-form categories, the most apparent grouping is by lip treatment. The range and frequency of lip treatments for identified limestone-tempered vessels within each form category is presented in Table 2 (unidentified rim sherds also are tabulated). Three large rim sherds show that lip stamping was not always applied around the entire orifice. Clusters of stamped impressions are in several cases separated by several centimeters of undecorated lip. One large section has 7.5 cm of undecorated rim adjacent to 5 cm of interior lip decoration (Figure 8c). This variability may cause difficulty in summarizing the vessel assemblage and may reduce the estimate of vessel numbers present in an assemblage.

Jar height, orifice diameter, and maximum external diameter are likewise difficult to approximate due to the small size of most rim sherds. Jar orifice diameters range from 12 cm to 25 cm. One limestone-tempered jar fragment, smaller than most in the assemblage, has an orifice diameter of 12 or 13 cm and a vessel height of about 12 cm (Figure 8d). Two varieties of jars are present: incurved- and inslanted-rim varieties. Twelve rims are from straight-rim jars with incurved walls (Figure 8i-t), and eight represent straight-rim jars with inslanted walls (Figure 8a-h).

The limestone-tempered bowls exhibit flat, scraped lips (Figure 8bb-cc). Bowl orifice diameters measure 20 cm and 25 cm. Their heights probably did not exceed 10 cm. Both bowls show definite bands of vertical cordmarking below the lip and little indication that

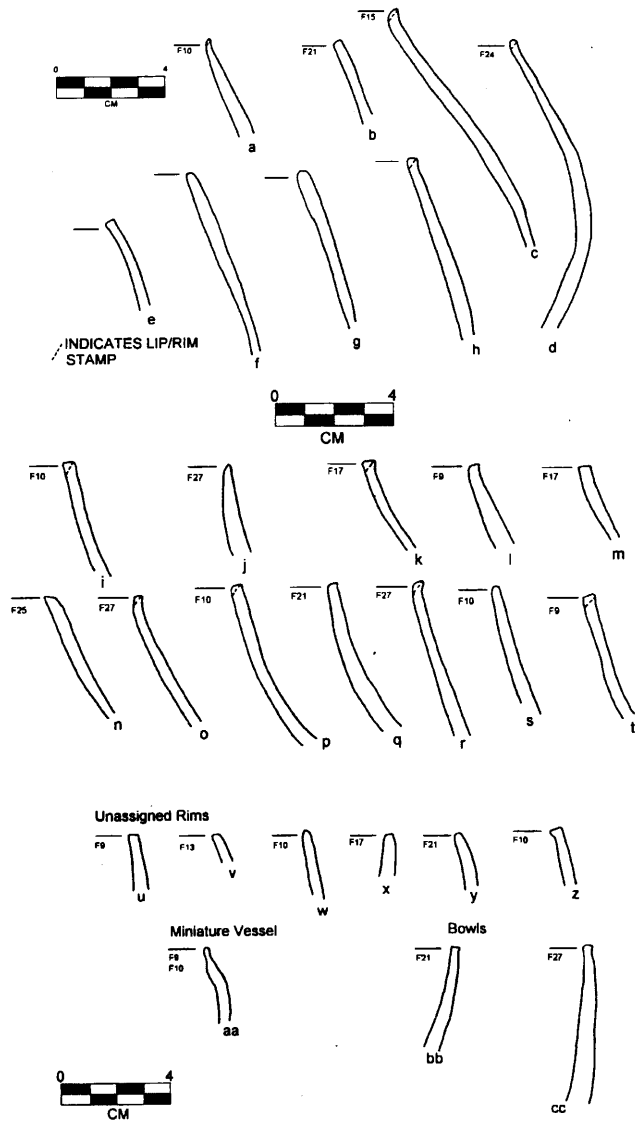


Figure 8. Limestone-tempered vessel profiles.

Table 2. Lip Treatment by Limestone-Tempered Vessel Form.

Lip Treatment	Jar 1	Jar 2	Bowl	Unidentified	Pinch pot	Total
Rounded		1				
Scraped/flattened		3	4	2	5	
Smooth dowel		2	1			
Cordwrapped dowel	1					1
Slashes (sharp notches)	1	2				3
Finger nail impressions					1	1
Unknown		2			1	
Combination dowel or slash and scraped lip	2	1				3
Total			12	8	2	6

Note: Jar 1 = Insloped rims, curving upwards toward lip; Jar 2 = Inslanted rims, straight-walled and leaning inwards toward lip.

these surfaces were smoothed over. These bands are 1.5 cm wide on both vessels and were applied after the entire vessel had been cordmarked.

The miniature pots have lips decorated with fingernail impressions. The rims of both were pinched or tapered, and each has gray and yellow-brown splotches, remnants of an unidentified surface treatment.

Other Ceramics

Two small sherds were recovered that most probably are not associated with the site's primary component. One is a small, orange, grit-tempered sherd from the surface of the site edge. The other sherd, a completely smoothed limestone-tempered sherd, was found in the fill of Feature 13. It may match the small unidentifiable rim sherd from the same feature. These two sherds probably predate and postdate, respectively, the primary component at the site.

One fragmentary grog-tempered ceramic pipe stem was recovered from a general context. It is more or less cylindrical although one end is tapered. The pipe is manufactured from an orange, chalky paste. The stem measures 35 mm in length and 15 mm in maximum diameter. A longitudinal hole, markedly off-center, was probably formed by wrapping the clay around a twig or cord.

Ceramic Distribution

With the exception of four small, weathered sherds found during the surface collection, pottery was located exclusively in features. Most pottery aboriginally deposited on the surface had probably disintegrated. As noted above, there is a distinct segregation

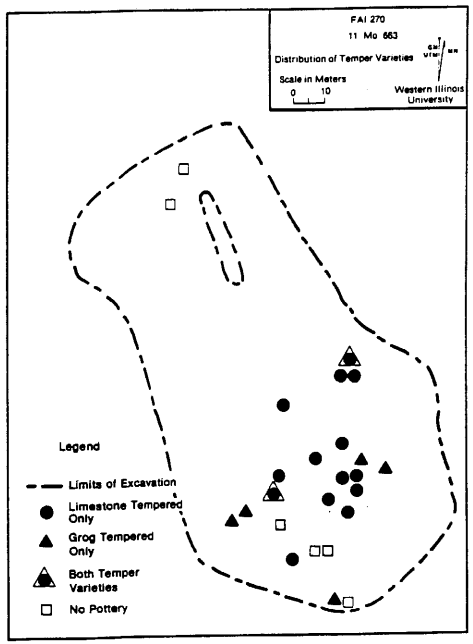


Figure 9. Distribution of ceramic temper in features.

of grog-tempered and limestone-tempered pottery (Figure 9). Of the twenty pits containing pottery, only two (Features 9 and 15) contain both temper varieties. Five features (7, 8, 18, 19, and 30) contain only grog-tempered sherds. Twelve features (5, 10, 13, 16, 17, 20, 21, and 24–28) contain only limestone-tempered pottery. Feature 2 contained one sherd of unknown temper (lost prior to analysis).

The pits containing only grog-tempered sherds are scattered across the site, while pits containing only limestone-tempered pottery show a more nucleated distribution. It seems unlikely that these two groupings of pits are contemporaneous; some temporal separation, however slight, is indicated by the virtual lack of mixing. However, the similarity of vessel forms and surface treatments and the similarity in features associated with each type may be used to argue that the temporal distance between the two is minimal. In any case, the features bearing grog-tempered sherds are considered to date to the Patrick phase (A.D. 600–750) while those with limestone-tempered pottery date to the subsequent Dohack phase (A.D. 750–850). Some grog-tempered pottery, it should be noted, has been recognized in other Dohack phase ceramic assemblages (Kelly et al. 1984a).

Lithics

The quantity of burned limestone at the Joan Carrie site probably mirrors availability. Limestone was easily accessible to site inhabitants, occurring in small outcrops and major bluff escarpments adjacent to the site. Recovery of limestone at the site was largely restricted to pits (Figure 10). While several pits contained heavy deposits of burned limestone that clearly had been intersected by the plow, only four pieces were found on the site surface. Burned limestone apparently deteriorated rapidly in the plow zone.

The presence of large quantities of burned limestone is not anticipated to correlate with the intensity of maize processing (cf. Porter 1974), since only a small amount of alkaline is needed to process maize (Katz et al. 1974). The majority of North American groups listed by Katz et al. (1974:765–773), in fact, used ashes rather than lime. At the Joan Carrie site, the feature with the most burned limestone, Feature 21, contained no carbonized maize.

Fourteen sandstone pieces were found during the controlled surface collection, but sandstone was not as well represented as limestone in features (Figure 10). The majority of sandstone was recovered from Feature 24, including one chunk weighing 10.2 kg. Igneous and metamorphic glacial cobbles and cracked rock, water-worn pebbles, and unmodified hematite comprise the balance of nonchert lithics recovered. Seven cracked rocks, two cobbles, and two pebbles were retrieved from the plow zone. Pits contained only a few pebbles, cracked rocks, and pieces of hematite (Appendix).

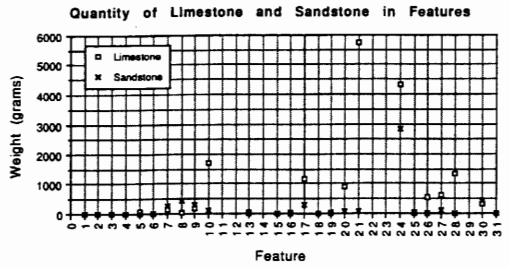
Ground, Pitted, and Polished Tools

Ground, pitted, and polished lithic tools consisted of three igneous hammerstones, one chert hammerstone, one plain mano, two single-pitted manos, one bipitted mano, and a piece of polished hematite (Table 3). No manos, nutting stones, or battered rocks were found in feature context with the exception of a small hammerstone in Feature 24.

Two small igneous-rock hammerstones are spherical, extensively pecked, and battered over most of their surfaces; large one is less symmetrical and exhibits only end and edge battering. The chert hammerstone—probably a utilized glacial cobble—displays many battered edges with many stepped flake scars. It shows no intentional shaping. The plain mano has a concave worn surface with a smooth, flat, unworn band around the periphery of the utilized surface. Its entire back and one end is pecked, and the cortex has been completely removed from most surfaces. The single-pitted manos are igneous cobbles of irregular shape. They have only one flat surface. The bipitted mano differs only in having two flat surfaces, each exhibiting a central depression. The polished hematite tool fragment found in Feature 24 is suspected to be the poll of a celt or adze. Striations, related to its manufacture, are oriented in different directions across its surface.

Chert Artifacts

A simplified breakdown of the major chert-debitage types by percentage within provenience units is presented in Table 4. There appears to be a disparate distribution of chert in favor of the surface. Although Features 10 and 24 exhibit a low percentage of thinning flakes and a high percentage of decortication flakes, the Joan Carrie pits usually contain more thinning flakes than chert fracture. The controlled surface collection recov-



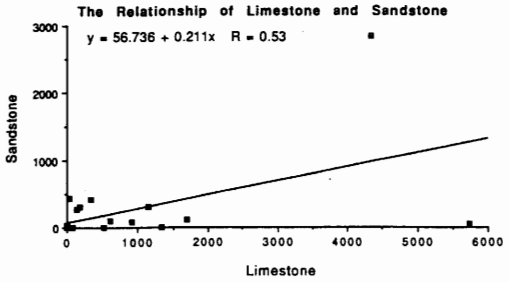


Figure 10. The quantity and relationship of limestone and sandstone in features (one large piece of sandstone from Feature 24 was excluded).

ered a similar percentage of thinning flakes and decortication flakes, while there is generally less of the other debitage types. The increased presence of chert shatter does not specifically replace any other debitage category. This seems to indicate that while similar quantities of debitage resulting from tool manufacture and maintenance are found on the site surface and in features, more debitage from initial chert processing is found on the site surface. Tasks related to pits need have no necessary connection to chert processing. No distinct cluster of initial-chert-processing debris is apparent (Figure 4), but the random scatter of small clusters of such material may point toward isolated incidences of initial processing.

A breakdown of chert by geological types was not undertaken, but a large proportion of the unworked and minimally worked pieces of chert, as well as much of the shatter and decortication debris, is low-grade tabular chert. Thinning debris and worked chert is of a much higher quality. This may indicate that major chert working at the site consisted of producing finished or utilizable items from preformed chert rather than engaging in all stages of manufacture on site.

Table 3. Pecked and Ground-Stone Tools.

Tool	Provenience	Weight (g)
Igneous hammerstone	plow zone	365.5
Igneous hammerstone	plow zone	191.0
Igneous hammerstone	feature 24, zone D	80.0
Chert hammerstone	plow zone	375.5
Single-pitted mano	plow zone	688.0
Single-pitted mano	plow zone	510.5
Bi-pitted mano	plow zone	1,085.0
Mano, concave surface	plow zone	1,209.0
Polished hematite	feature 24, zone D	1,21.0
Total	N=9	4,625.5

Table 4. Chert Debitage.

		Percent of Total Debitages in Provenience Unit					
Provenience	Total (n)	Thinning Flakes	Fracture	Decortication Flakes	Think Blank	Sharpening Flakes	Other
Controlled Surface Collection	86	57.7	18.8	11.8	4.7	2.4	4.6
Feature							
1		15.0	66.0				13.3
2		50.0	82.0			2.0	12.0
7		30.0	66.7	6.7		3.3	6.7
9		100.0	74.0	2.0	4.0	13.0	4.0
10		75.0	33.3	12.0[a]	32.0	12.0	2.7
17		41.0	70.7	4.9	9.8	7.3	
21		63.0	58.7	1.6	22.2	9.5	6.3
24		16.0	43.7	6.0	25.0	18.8	
27		45.0	60.0		13.3	6.7	13.3
30		55.0	58.2	5.5	12.7	10.9	5.5
All features	490	61.3	2.7	11.9	8.35	6.4	8.1

[a]Fire-related fracture; not included in overall average.

Diagnostic chipped-stone artifacts from the Joan Carrie site are limited to three projectile points. Two flake arrow points were found in Feature 7. One is unifacial and similar to the Wanda point as defined by Munson (1971:10) (Figure 11c). The other arrowpoint is unifacially worked on alternate blade edges. It is elongate and may be properly considered side-notched (Figure 11b). The third projectile point was recovered from Feature 27. It is a finely worked, Early Archaic biface of the Kirk cluster (Coe 1964). Its serrated blade edges are unbeveled (Figure 11a). It probably represents an incidental inclusion in Feature 27, perhaps collected and reused by the Dohack phase inhabitants of the site.

Other chert can be considered under two headings: formal tools (a drill, two bifacial knives, six unifacial scrapers, and fragments of bifacially worked items) and informal tools (utilized or retouched chert items used as cutting tools, spokeshaves, or choppers). The criterion used to identify informal tools is a macroscopic sign of use wear on an otherwise unmodified or marginally retouched chert flake or piece of chert fracture.

Twelve slightly retouched and/or utilized flakes, mostly thinning flakes, were recovered, distributed evenly between surface and subsurface. Characteristic wear consists of dulled edges and macroscopically visible edge striations. Some stepped flake scars also are obvious. Blade edge shape is usually straight, although concave and convex edges were noted.

Another informal tool type consists of pieces of chert debitage with steep-sided notches 7 mm to 9 mm wide. Stepped flake scars originating from the base of the notch are often evident on these tools (indicating a uniform direction of tool use). Eight of these tools, probably spokeshaves, were found in plow-zone and feature contexts. Six were manufactured on large decortication flakes. Another is made from a thinning flake, and one was produced on a Burlington-chert hoe-resharpening flake.

Choppers consist of three large pieces of chert that exhibit large stepped flake scars along fairly sharp edges. One is a heavily burned piece of chert, perhaps originally a core; its chopping edge is slightly concave, and its surface consists of 40% cortex. The other two specimens (Figure 11) display a more distinct unifacial shape; flakes had been removed from one side forming a steep chopping edge, apparently used in a uniform direction since stepped flake scars predominate on the worked side. The utilized edges are convex, but one is much more even than the other. They are similar in weight (363 g and 360 g).

Besides these choppers, perhaps manufactured from cores, 11 chert cores were identified in the lithic assemblage. Included in this number is an exhausted specimen made from a high-grade green-colored (Fern Glen) chert. This specimen is ovate in shape and exhibits multidirectional flake removal.

Several biface fragments representing formal tools were found; some exhibit use wear along convex edges (Figure 11e and f). Some biface fragments may be preform fragments or large cutting tools; five are fragments of finished bifaces. A small drill or perforator with a snapped shaft was collected from Feature 10 (Figure 11d). Both bit edges on one side exhibit small stepped flake scars; no such flakes are present on the other side.

Other formal tools include six unifacial scrapers with convex, moderately steep working edges (Figure 11g-l). Three are side scrapers, one is an end scraper, and two are end and side scrapers. One side scraper possesses a graver spur and considerable numbers of stepped flake scars (Figure 11j).

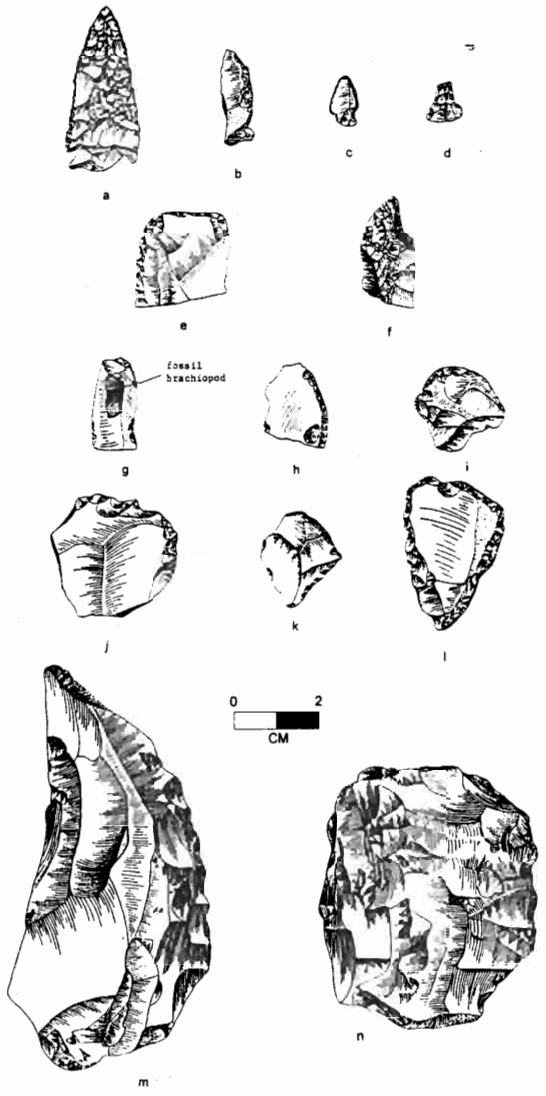


Figure 11. Chert tools.

Plant Remains

Botanical remains recovered from the Joan Carrie site through flotation were analyzed. Flotation samples, usually 10 liters, were taken from each zone of each of the 25 features. After water flotation (Wagner 1976), the samples were sent to the FAI-270 laboratories at the University of Illinois, Urbana, for analysis. Twenty-two samples were selected by the site director from 14 (56%) of the 25 features for analysis. Each feature type is represented in this analyzed sample.

The selected samples were first screened through a 2-mm sieve. The material greater than 2 mm in size was sorted into categories (e.g., wood, nuts, etc.) under low magnification (10X-30X), and the items were counted and weighed. The smaller fraction was scanned carefully, and all seeds and remains of cultivated plants were removed. The weight of these seeds is not included in the total sample weight. Identifications were made with the aid of standard texts (Martin and Barkley 1961; Montgomery 1977; Panshin and de Zeeus 1970) and ultimately by a one-to-one comparison to a modern reference collection.

Results

The botanical contents of 22 samples from 14 features were identified (Table 5). A total of 36.5 g of carbonized plant remains was recovered from the samples. The majority of this total was wood charcoal. Nutshell fragments were relatively infrequent overall, but the remains of other food plants, including small seeds, maize, and squash rind fragments, were abundant in undercut pits and bell-shaped pits.

Nuts are not well represented. The nutshell-fragment to wood-fragment ratio is 0.13. This ratio is much lower than at many earlier sites that lack evidence of cultivated plants. It is characteristic of Archaic assemblages, for example, that the quantity of nutshell equals or exceeds the quantity of wood charcoal (Asch et al. 1979:81). At two Late Archaic sites in the FAI-270 right-of-way, Dyroff and Missouri Pacific #2, the nut-to-wood ratios are 0.9 and 1.4, respectively. In other words, the nutshell frequency at the Joan Carrie site is eight to ten times lower (relative to wood charcoal) than that characterizing two earlier assemblages. This may be a reflection of the decline in nut use that Asch and Asch (1978:331) suggest accompanied the first widespread use of maize.

Samples from four of the analyzed features are devoid of nutshell, and the average frequency of nutshell fragments was only seven per sample. Hickory nutshell (Carya sp.) is the most abundant type present. Small quantities of black walnut shell (Julans *nigra*) were recovered from two features, and hazelnut shell (*Corylus* sp.) was found in one feature. Acorns (*Quercus* sp.) are somewhat better represented with shell and nutmeat fragments occurring in samples from four features.

All of the samples analyzed contain wood charcoal. Although wood charcoal is abundant, the variety of taxa represented is not great. The wood almost exclusively is from the oaks (*Quercus* spp.) and hickories (*Carya* spp.). The only exceptions are a few fragments of honey-locust or Kentucky coffee-tree (Gleditsia/Gymnocladus), elm or hackberry (Ulmaceae), birch (cf. *Betula* sp.), and hop-hornbeam (cf. *Ostyra* sp.). The bluff-slope and upland forests of the American Bottom region are composed of a great variety of tree species (Hus 1908). The predominance of oak and hickory in samples from Joan Carrie suggests that the aboriginal inhabitants were selecting these taxa over other wood types.

Table 5. Plant Remains from the Joan Carrie Site.

Taxon	1	4	5	8	9A	9B	10F	10JN	15A	15B	16B	16C	17	19	21	24A	24C1	24D	25	28A	28B
Nuts (total frags.)	88	1		1	8	8	29	8	1	2	9		8	1	1	1	4	9			1
Carya sp. (hickory)	60			1	4		1	3	1	1	1		3		1	1	3	6			
Corylus sp. (hazelnut)							2								1						
Juglandaceae(walnuts/hickories)	28	1						2		1	8		5		1		1				
Juglans nigra (black walnut)	2													1?	1						
Quercus sp. (acorns)					4	8[a]	26[a]	3							1			3			1
Wood (total frags.)	1	26	26	160	153	52	190	24	7	47	43	180	13	21	166	23	26	56	6	7	1
cf. *Betula* sp. (birch?)					87																
Carya sp. (hickory)		3	10	29	9	13	10	8		28			1	2	50			6			
Gleditsia/*Gymnocladus* (locut/coffee tree)					23																
cf. *Ostrya* sp. (hop-hornbeam?)																	7?				
Quercus sp. (oak)		3		7	29		10		2		4		3		33	2	5	20		1	
Quercus, red group	1	6	2	65	46	31	124	2		2	15	180	3	4	75	6	5	3	3	1	
Quercus, white group				7	5		10				7				8						
Ulmaceae (elm, hackberry)					5																
Ring-porous		8	14	15	9	5	26	4	2	9	6		4	8		7	5	24		3	
Unidentifiable		6		37	9	3	10	10	5	6	7		2	4		8	4	3	3	2	1
Bark					9					2	4			3							
Seeds																					
Amaranthus sp. (amaranth)					17				2?												
Brasenia schreberi (water shield)					1																
Chenopodium sp. (goosefoot)					3	1	46	174			36			1		42		7			
Galium sp. (bedstraw)					1																
Gramineae (grasses)					4		3	68			1						2	2			
Phalaris caroliniana (maygrass)			24		114		880	34			620	68				13	3	20			
Polygonum spp. (knotweeds/smartweeds)					1	1		5									2?	3			
Polygonum erectum (erect knotweed)					6	36	6	800			6					328		132			
Rhus sp. (sumac)					2		1				6										
Vitis sp. (grape)					6						6[b]										
Eroded/fragmented			23		21	21	7	190			6	5		1		50	6	40			

Table 5. Concluded.

Taxon	1	4	5	8	9A	9B	10F	10JN	15A	15B	16B	16C	17	19	21	24A	24C1	24D	25	28A	28B
Zea mays (maize) (g)	<0.1		<0.1		9.7		3.0	0.1		<0.1	4.9	0.1				0.1		0.5			
Cucurbita sp. (squash) N of rind frags.					10		7				1										
Monocotyledonous stem					1	1												3			
Vitrified plant opal					P			P								P		P			
Coal					P																
Total weight (grams)	1.5	0.1	0.3	1.6	11.5	1.0	6.6	0.4	0.1	0.8	5.6	2.5	0.3	0.3	1.8	0.3	0.2	1.3	0.1	0.1	<0.1
Sample volume (liters)	10	5.3	10	10	?	10	10	10	10	3	?	?	10	?	10	10	10	10	10	3	3

Note: P = present in sample.
[a]Both Shell and nut meat present.
[b]Both seeds and pedicels present.

Seeds and the remains of Mesoamerican cultigens are common in the samples analyzed. Concentrations of these food plant remains appear in samples from the bell-shaped pits and the undercut-wall pits. A total of 3,519 seeds were recovered. Almost 97% of these belong to three taxa: goosefoot (*Chenopodium* sp.), maygrass (*Phalaris caroliniana*), and erect knotweed (*Polygonum erectum*). These three taxa make up a complex of starchy seeds that forms the greatest proportion of archaeological seeds recovered in this area from Middle Woodland and later sites (Asch et al. 1979:83). It has been argued that these species were cultivated (Asch and Asch 1978, 1980; Asch et al. 1979; Cowan 1978). The basis for the argument is that none of the three species occurs in nature in sufficient quantities to account for the fact that their seeds are consistently abundant archaeologically, and must therefore have been encouraged (i.e., cultivated). Concentrations of these seeds in features at Joan Carrie indicate that intensive seed harvests were taking place.

Other seeds recovered include grasses (Gramineae), amaranth (*Amaranthus* sp.), bedstraw (*Galium* sp.), sumac (*Rhus* sp.), and grape (*Vitis* sp.). A number of grape stalks (pedicels) were also recovered. One feature yielded a single water-shield seed (*Brasenia schreberi*). Water-shield is a hydrophytic plant in the water lily family (Nymphaceai) that occurs in the still waters of ponds and sloughs (Steyermark 1963:669). The author knows of no ethnographic accounts of the use of water-shield, but Steyermark (1963:669) remarks that it "is of food value to ducks, and the tuberous roots are reported to be eaten by Indians in California."

Maize fragments (*Zea mays*), including cupules, glumes, kernels, and germs, were present in samples from eight (57%) of the 14 features analyzed. The maize remains were concentrated in samples from the three bell-shaped pits. A few small fragments of squash rind (*Cucurbita* sp.) were also recovered from these bell-shaped pits.

Overall, the pattern of plant remains from the Joan Carrie site suggests a subsistence emphasis on cultivated plants. Some nuts and wild plants evidently were gathered, but three starchy-seed species were probably cultivated as well as maize and squash. If all plant remains recovered had their origins at or near the site (rather than having been stored and transported), the season of occupation must have been from at least June to September or October. Maygrass ripens in early summer, and the other wild and cultivated taxa in late summer and early fall.

In addition to carbonized botanical material, samples from three of the features (9, 10, and 24) contained a number of small (1–4 mm) globular objects of a siliceous nature. Dr. Robert Jones, Professor of Mineralogy and Ecology with the Department of Agronomy at the University of Illinois, examined the material with the aid of a petrographic microscope. He reports that the morphology and structure of the material is consistent with its being plant opal, vitrified by high temperature and crystallized into silica as it cooled. Plant opal occurs most abundantly in the leaves and stems of the monocotyledons (e.g., grasses, sedges).

Animal Remains

Preservation of bone was poor and much of what had been preserved was unidentifiable. Identification of the few preserved faunal remains was provided by Paula G. Cross. Preserved bone was limited to only four features (10, 17, 21, and 24). Feature 10, zones f

and h, contained burned fragments of unidentified mammal. Feature 21 contained white tailed deer elements (left scapula, medial section of right mandible, a metatarsal fragment, a first premolar, and a partial spinous process of a thoracic vertebra) probably all from one individual. Other burned fragments of unidentifiable mammal bone were also present. Feature 24, zone d, contained the burned vertebra of a bowfin (*Amia calva*).

The only other animal remains collected were mud dauber nests. A total of 174 individual nests were collected from the features through hand excavation. Approximately 50 additional nests were recovered by flotation. About 95% of the approximately 224 nests are from Feature 24. Six nests were found in Feature 27; they contained four closed cells. Feature 10 contained five nests with no closed cells. Features 31 and 5 contained a single nest each with no open cells.

Nest were, of course, primarily recovered from fire-related deposits. Firing is the only means by which they are preserved. A little over 600 cells are present, of which about 220 are still closed, presumably containing developmental specimens. The great majority of the nests have narrow (1.0–1.5 mm) or wide (4.0–6.0 mm) thatch or stem impressions on their dorsal surfaces (impressions 2–4 mm wide are rare). The impressions are seldom "broken" even in cases where the stem was completely enveloped by clay. It is possible that the thatch or stems could break away along with the nests if they were wrenched from their thatch/wall foundation, but the undamaged attachments and the high number of unbroken nests, taken in conjunction with the presence of burned structural elements in Feature 24, enhance the likelihood that the host structure burned (or at least that its roof was burned).

The research potential of prehistoric mud dauber nests with regard to environment and seasonality has been the subject of some debate (Friemuth and LaBerge 1976; Rogers 1979). Rogers (1979) notes that unless the egg or larval phases are present, it is impossible to generate useful seasonal information from archaeological specimens, since multiple life cycles per season are present for both species. He does agree that remains of spiders enclosed as food for developing wasp larvae may possibly supply information concerning the local environment, provided the species of spider is noncosmopolitan in its choice of habitats.

Mud dauber nests are not extremely rare on archaeological sites (e.g., Maxwell 1951:213; Morrell 1965:58; Morse 1969:213; Wedel 1961:116). Of note concerning the nests from the Joan Carrie site is their number, the proportion of closed cells, and the likelihood that the great majority of developmental stages present were terminated at the same time by a single fire. Hopefully, this firing did not destroy the contents of the nests. Only two cells were opened for investigation. One, opened accidentally in the field, contained a pupal stage wasp. The other, opened in the laboratory, contained fragments of an egg and had a red splotch on one wall. If identification of these specimens is correct, then by Rogers' (1979) criterion, development was interrupted between the early summer and late summer. Verification of this tentative hypothesis must await detailed study of the sample. Future analysis of the mud dauber nests from Joan Carrie should be carefully planned, so as not to waste the potential of this large sample.

It seems unlikely that the formative wasps in the nests were being eaten by the inhabitants of Joan Carrie site given both the low incidence of breakage and the nature of the fills in which they were found (containing burned structural elements). This supports

Freimuth and LaBerge's (1976:112) predictions regarding midwestern Woodland and Mississippian sites (see also Wilson's [1979:69] comments on the Allen site in Nebraska [as reported by Wedel 1961]).

Site Summary and Significance

The Joan Carrie site may be dated within the Patrick and Dohack phases (A.D. 600–850) based on ceramics (Kelly et al. 1984a, 1984b; Stahl 1985). Distinguishing the two phases, however, obscures the apparent continuity indicated by the feature types present. Probably the site represents two or more brief occupations during a period of rapid changes in the ceramic tradition. Two wood charcoal samples were radiocarbon dated at 940 ± 70 B.P. (ISGS-984) and 1000 ± 70 B.P. (ISGS-986) (Bareis and Porter 1984:266).

It is proposed that 11MO663 was occupied by a small group of individuals, probably on a seasonal basis. This group would have been engaged primarily in agricultural tasks (i.e., growing and processing maize, squash, starchy seeds), probably complemented by hunting and gathering. The limited amount of hunting and gathering represented by deer, fish, nuts, and procurement and processing tools (projectile points, manos, scrapers, etc.) suggests that upland resources were perhaps of lesser importance to the site inhabitants than agricultural resources.

Both the density and distribution of archaeological remains (i.e., pits, ceramics, lithics, and plant and animal remains) indicate that the site was occupied by a small group(s) of people. Any given occupational episode probably was limited to a fairly brief span of time. The zonation of pits, kinds of plant remains, apparent accumulation of mud dauber nests in thatched structures (possibly annually abandoned), and the limited tool assemblage all may be used to argue that Joan Carrie was a seasonal settlement. The Joan Carrie site was probably occupied during the warm months; the inhabitants may have been living in settlements on the floodplain proper from late fall until spring (e.g., Kelly et al. 1990), perhaps accounting for the possible bottomland muds used in the manufacture of Dohack phase vessels (Stahl 1985:172).

The importance of the Joan Carrie site, then, lies in its relatively uncomplicated set of archaeological remains. This small site plays an integral role in understanding the Patrick and Dohack phase continuum that preceded and led directly to the Mississippian developments which were to occur in the following centuries.

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Appendix. Feature Inventory

Feature 1, zone A
- Fill: Medium to dark gray mottled with yellowish brown and gray. Texture not noted. Some pieces and flecks, locally heavy. Most material in upper fill
- Materials: 127.5 g chert (n=18)
  6.5 g sandstone (n=1)
  13.5 g hematite (n=4)
  2.5 g sedimentary concretion (n=1)

Feature 1, zone B
- Fill: Dark grayish brown with a whitish caste. Texture not noted. Many pieces of charcoal throughout. Most material in zone A.
- Materials: 1 sherd (lost)
  83 g chert (n=33)
  0.5 g sandstone (n=1)
  0.1 g hematite (n=1)
  small pieces of burned bone

Feature 2, zone B
- Fill: Dark yellowish brown. Texture not noted. Many pieces of charcoal throughout.
- Materials: 6.5 g chert (n=12)
  1.0 g water worn pebble (n=1)

Feature 3, zone A
- Fill: Dark yellowish brown to yellowish brown silty clay. Small flecks of charcoal and baked clay. Some charred seeds noted.
- Materials: 2 g chert (n=1)

Feature 4, zone A
- Fill: Yellowish brown clayey silt. A few flecks of charcoal.
- Materials: 2 g baked clay (n=1)

Feature 5, zone A
- Fill: Medium brown silty clay. Small and medium pieces of charcoal. Burned seeds. Burned Clay. Most material in upper level.
- Materials: 59 g pottery (ls temper)
  27.5 g chert (n=6)
  83 g limestone (n=5)
  3.5 g baked clay (n=14)
  2 frags. mud dauber nests

Feature 6, zone A
- Fill: Dark brown silty clay. Rodent disturbance.
- Materials: 2 g chert (n=2)
  1 g sandstone (n=1)
  1 chert scraper

Feature 7, zone A
- Fill: Medium gray brown silty clay. Flecks of charcoal and baked clay particles. One nut shell; materials evenly dispersed throughout fill.
- Materials: 95 g pottery (gg temper)
  56.5 g chert (n=11)
  151 g sandstone (n=4)

3.5 g limestone (n=1)
1 flake arrowpoint

Feature 7, zone B
Fill: Light or medium gray brown silty clay. Flecks of charcoal. Large jar fragment on floor.
Materials: 22 g pottery, plus large jar section (gg temper)
51 g chert (n=4)
10 g sandstone (n=1)
11.5 g limestone (n=2)

Feature 7, zones A and B mixed
Materials: 68.5 g pottery (gg temper)
45.5 g chert (n=7)
96.5 g sandstone (n=1)
73 g limestone (n=4)
44.5 g baked clay (n=2)

Feature 7, disturbed zones
Materials: 59 g pottery (gg temper)
13.5 g chert (n=7)
13.5 g sandstone (n=7)
47.5 g limestone (n=3)
1 flake arrowpoint

Feature 8, zone A
Fill: Yellowish brown. Texture unrecorded. Some root disturbance and charcoal
Materials: Some material lost.
92 g pottery (gg temper)
440 g sandstone (n=3)
34.5 g limestone (n=3)
Some burned bone

Feature 9, zone A
Fill: Gray to medium gray brown silty clay
Materials: 60.5 g pottery (ls temper)
84 g chert (n=19)
96 g sandstone (n=3)
47 g limestone (n=1)
22 g igneous rock (n=10)

Feature 9, zone B
Fill: Gray brown mottled with gray organic fill. Texture unrecorded. Much charcoal and maize kernels and cobs throughout.
Materials: 233.5 g pottery (ls temper)
113.5 g pottery (gg temper)
588.5 g chert (n=77)
208 g sandstone (n=23)
142 g limestone (n=40)
79 g glacial cobble (n=1)
115 g igneous rock (n=11)
26 g burned clay (n=2)

Feature 9, zone C
Fill: Very organic black soil mottled with dark brown and reddish brown. Charcoal, nutshell. Some burning.
Materials: 21 g chert (n=3)
Limestone noted but not recovered

Feature 10, zones A-D
Fill: Dark brown to yellowish brown silty clays. Some charcoal, seeds, acorn. At the base of z.A-D is limestone slab floor.
Materials: 220.5 g pottery (ls temper)
214.5 g chert (n=?)
192.5 g sandstone (n=?)
857 g limestone (n=6)
1.0 g waterworn pebble (n=1)
64 g igneous cracked rock (n=1)
0.5 g vitrified particle
23 g baked clay (n=?)

Feature 10, zones E-K
Fill: Dark grayish brown to dark brown silty clays. Charred logs, much charcoal pieces and ash in pockets. Maize kernels and cobs. Burning in all five zones.
Materials: 220.5 g pottery (ls temper)
372 g chert (n=36)
25.5 g sandstone (n=1)
478 g limestone (n=25)
1 vitrified particle
62.5 g mano fragment
7 g baked clay
small bone fragments
3 mud dauber nests
6 g broken drill

Feature 10, zones I-M
Fill: Dark brown to yellowish brown silty clays. Some ashy pockets. Some charcoal flakes and baked clay. All material in zone I.
Materials: 71.5 g pottery (ls temper)
27.5 g chert (n=4)
50 g sandstone (n=1)
6 g limestone (n=1)
12 g waterworn pebble (n=1)
14 g mud dauber nests (n=2)

Feature 10, zones N-O
Fill: Black to dark grayish brown clayey soils and "greasy" soil with whole charred logs, much ash and seeds. Logs on floor with limestone present.
Materials: 353 g limestone (n=3)
387 g nutting stone (n=1)

Feature 13, zone A
Fill: Yellowish brown silty clay. Charcoal and baked clay, seed and nuts. Most material in pit center.
Material: 181 g pottery (ls temper)
7.5 g chert (n=6)

26 g limestone (n=1)
small burned bone

Feature 15, zone A
Fill: Light grayish brown clay silt mottled with gray. Some pieces of charcoal, some ashy pockets. This zone makes up most of the pit volume.
Materials: 2 g pottery (ls temper)

Feature 15, zone B
Fill: Very dark blackish brown lens of compact greasy silt heavily mottled wit grayish brown clayey silt and some yellow brown clay. Baked clay, little charcoal. Shallow lens covering part of the pit base.
Materials: 149 g pottery (ls temper)
74.5 g pottery (gg temper [with admixture of limestone])
38.5 g chert (n=8)
6 g sandstone (n=1)
0.25 g hematite (n=1)

Feature 16, zones A and D
Fill: A—Dark brownish gray silty clay mottled with brown clay. Flecks of charcoal and burned and baked clay. D—Very dark gray silt. Chunks and pieces of charcoal, baked clay. Mixed zones during excavation.
Materials: 9 g pottery (ls temper)
37.5 g chert (n=2)
22 g baked clay (n=4)

Feature 16, zone B
Fill: Dark gray greasy silt. Chunks and pieces of charcoal, maize kernels and cobs and seeds. Partially mixed with zones A and D.
Materials: 61 g chert (n=2)
19.5 g sandstone (n=1)

Feature 16, zone C
Fill: Light brown gray silt mottled with yellow brown clay. Ash in fill. Some flecks of charcoal.
Materials: None

Feature 17, zone A-E
Fill: Medium brown to light yellowish brown fill. Texture unrecorded. Burned lens with pottery at bottom. Charcoal and baked clay throughout.
Materials: 157.5 g pottery (ls temper)
150 g chert (n=40)
307.5 g sandstone (n=8)
1152.5 g limestone (n=57)
1 g hematite (n=1)
54.5 g baked clay (n=11)

Feature 18, zone A
Fill: Medium grayish brown silty clay. Sparse flecks of charcoal. Artifact size is small.
Materials: 11 g pottery (gg temper)
14 g chert (n=11)
5.5 g sandstone (n=5)

Feature 18, zone B
Fill: Grayish brown clayey silt mottled with gray and yellowish brown. Heavily disturbed.
Materials: None

Feature 18, zone C
Fill: Yellow brown silty clay mottled with light yellow brown clay. Charcoal flecks and pieces. Heavily disturbed.
Materials: None.

Feature 19, zones A-E
Fill: Dark brown to grayish brown. Texture unrecorded. Charcoal and baked clay common especially in darker fill areas. Zonation due to firing/color differences.
Materials: 31.5 g pottery (gg temper)
27.5 g sandstone (n=1)

Feature 20, zone A
Fill: Dark brownish gray silty clay. Charcoal and baked clay pieces.
Materials: 58.5 g pottery (ls temper)
5.5 g chert (n=4)
86 g sandstone (n=1)
920 g limestone (n=31)
930 g battered cobble (n=1)

Feature 21, zone A
Fill: Dark brown clayey silt, lighter towards edges. Much charcoal, no baked clay.
Materials: 1186 g pottery (ls temper)
274 g chert (n=74)
56.5 g sandstone (n=3)
5741.5 g limestone (6 large pieces=928.5g; a seventh=435g)
49.5 g glacial cobble fragments (n=3)
5.5 g baked clay (n=4)

Feature 24, zones A and B
Fill: A—Dark brown silt. Much small, medium and large pieces of charcoal; some baked clay. B—Medium brown silty with yellowish brown mottles. Some medium pieces of charcoal.
Materials: g pottery (ls temper)
20 g chert (n=9)
1.5 g sandstone (n=1)
1016 g limestone (n=29)
vitrified particles
16.5 g baked clay (n=3)
94 g mud dauber nests (n=16)

Feature 24, zones C and D
Fill: C—Light gray silt (ash lenses). Many large and medium pieces charcoal. D--Black silt with light yellowish brown ashy clay mottles. Organic. Much large and small charcoal pieces, maize kernel frags. and seeds.
Materials: 345.5 g pottery (ls temper)
28 g pottery (untempered pinchpot frags.)
55 g chert (n=16)
2833 g sandstone (n=16)
10209 g sandstone (n=1)

1130.5 g limestone (n=45)
2185 g limestone (n=1)
36.5 g glacial cobble fragment (n=1)
121 g hematite celt fragment (n=1)
80 g hammerstone (n=1)
258 g baked clay and daub
ca. 2250 g mud dauber nests (n=195)
vitrified particles (5% of fill)

Feature 25, zone A
Fill: Light yellowish brown clayey silty with medium brown mottles. Charcoal flecks present.
Material: 2 g pottery (ls temper)
30 g sandstone (n=1)

Feature 26, zone A
Fill: Light medium gray silty clay mottled with small amount of orange brown clay. No charcoal or baked clay. Suspected to be mixed fill derive from feature 21 which it superimposed.
Material: 12 g pottery (ls temper)
19 g chert (n=3)
529 g limestone (n=17)
1 g cobble fragment (n=1)

Feature 27, zone A
Fill: Yellowish brown clayey silt; poor records.
Materials: 112 g pottery (ls temper)
154 g chert (n=?)
94.5 g sandstone (n=1)
1 g limestone (n=1)
59.5 g cobble fragment (n=1)
10 g daub and baked clay (n=?)
6 g pottery pipe stem (gg temper)
2 g mud dauber nest (n=1)

Feature 27, zone B
Fill: Dark brown clayey silt.
Materials: 40.5 g pottery (ls temper)
9.5 g chert (n=4)
5.5 g limestone (n=1)
8.0 g daub (n=1)
23 g mud dauber nest (n=1)

Feature 27, zone C
Fill: Brown silty clay.
Materials: 80 g pottery (ls temper)
15 g chert (n=2)
8.5 g early Archaic projectile point

Feature 27, zone D
Fill: Black silty clay (organic). Burned *in situ*.
Materials: 86.5 g pottery (ls temper)
46 g chert (n=1)
610 g limestone (n=4)

49 g daub and baked clay (n=?)
53 g mud dauber nest (n=4)

Feature 27, zone E
Fill: Dark grayish brown silty clay. Burned *in situ*.
Materials: None

Feature 27, zone F
Fill: Black silty clay organic layer. Large chunks of charcoal and logs. Burned *in situ*.
Materials: None

Feature 28, zone A
Fill: Dark grayish brown clayey silt mottled with yellowish brown clay. Many small flecks of charcoal and baked clay.
Materials: 1 g pottery (ls temper)
1359 g limestone (n=?, all small items)
3.5 g baked clay (n=1)

Feature 28, zone B
Fill: Grayish yellow brown silty clay.
Materials: None

Feature 30, zone A
Fill: Medium brown silty mottled with light yellowish brown. Baked clay pieces in concentrations. Charcoal. Most materials on or near the bottom.
Materials: 335 g pottery (n=1 whole gg tempered bowl)
53.5 g pottery (gg temper)
345 g chert (n=?)
302 g sandstone (n=7)
330.5 g limestone (all small items; n=?)

Feature 31, zone A
Fill: Dark yellowish brown clayey silt.
Materials: 6 g chert flake blade (n=1)

Feature 31, zone B
Fill: Brown clayey silt. Burned fill. Baked particle concentration. Small burned log present. Pit floor zone.
Materials: 2 g chert (n=1)
18 g sandstone (n=1)
2.5 g cobble fragment (n=1)
8 g baked clay (n=1)
3 g mud dauber nest (n=1)

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