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DEPARTMENT OF ANTHROPOLOGY
WESTERN MICHIGAN UNIVERSITY

REPORT OF INVESTIGATIONS NO. 72

1986

PREHISTORIC PLANT RESIDUES FROM THE BONNIE CREEK
SITE (21C4-46), A MISSISSIPPIAN FARMSTEAD IN THE
NORTHFIELD, BURNING STAR MINE # 4, PERRY CO., IL

William M. Cremin

The site under investigation, Bonnie Creek (21C4-46), is located in the Northfield of Consolidation Coal Company's Burning Star Mine # 4, Perry County, Illinois. Lying within the southern portion of the Till Plains Division, known as the Mt. Vernon Hill Country, the Northfield exhibits a mature landscape of gently rolling hills and broad alluvial valleys through which flow Galum Creek and its major tributaries, Rock Fork and Bonnie creeks. Galum Creek, in turn, is tributary to the Big Muddy River of southern Illinois.

Floristically, the Northfield research area is included in the Oak-Hickory Forest Region of the Western Mesophytic Forest (Braun 1950). However, the local pattern of vegetation is such that it can best be described as comprising a mosaic of plant communities in which the forest-prairie ecotone formerly dominated. The Bonnie Creek site is situated so as to have afforded its residents relative ease of access to a wide range of resources in the forested creek bottoms, wooded uplands, and grassland areas occurring in close proximity to the site.

This site is located some 80 m north of that point where Bonnie Creek bends sharply to the south before continuing toward its confluence with Galum Creek about 300 m downstream. It occupies about 8,000 m² of a small nearly level ridge top at an elevation of 135 m (450 ft) ASL. Although its location places the site within the slope woodland zone, the most productive biogeographical zone in terms of plant resource potential in the study area, the bottomland forest paralleling the course of Bonnie Creek is immediately adjacent to the site at an elevation of 129 m (430 ft), and post oak flats (upland forest) and a large area of

of prairie grassland formerly approached to within 900 m and 1500 m, respectively, of the site from the north.

When investigation of 21C4-46 was initiated by personnel of American Resources Group, Ltd. of Carbondale, Illinois during the summer of 1983, the site lay in corn stubble. Observations derived from the excavations and from the analyses of data recovered revealed that Bonnie Creek represents a "pure" Mississippian component--a small farmstead dating to ca. A.D. 1200-1350 and consisting of several wall-trench structures and associated in-ground facilities used by the site's inhabitants in various subsistence-related and/or domestic activities.

This analyst received from ARG a total of 53 bags and vials of carbonized plant remains, together with analytic sample sheets, from 30 flotation samples extracted from 28 proveniences. For those soil samples for which the volume had been recorded, volumes ranged from 4-80 l. These were collected during the trowelling of structure floors (N= 4 samples), recovered from within and around a broken ceramic vessel (N= 2), and extracted as soil column samples during cross-sectioning of the following types of pit features: smudge pits or corn holes (N= 14); shallow basin-shaped (N= 6), deep basin-shaped (N= 2), and flat-bottomed (N= 1) refuse pits; and a pit of indeterminate function (N= 1). The soil samples thus collected were processed in the field by means of the tub agitation method, after which the light and heavy fractions were air dried and bagged separately for shipment to the ARG laboratory.

All flotation residues were initially sorted by ARG personnel, with the botanical material being separated into the categories of

corn residues, nutshell, seeds, wood charcoal, and unidentified plant parts prior to submission of all material but the recognized wood charcoal to this analyst for study. With respect to wood charcoal, it should be mentioned that aside from some small pieces (including a few specimens that were at least minimally identifiable) that were found among the nutshell in a number of samples, all references to wood charcoal counts and weights have been derived from the analytic samples sheets accompanying each of the 30 flotation samples.

In the laboratory, all sorting, counting, and detailed identifications of the botanical material were accomplished using 10X-20X magnification and reference to standard manuals for wood and seed identification (Core, Cote, and Day 1979; Martin and Barkley 1961; Montgomery 1977; and USDA 1974) and works by specialists in the archaeobotanical study of cultivated plants (Carter and Anderson 1945; Cutler and Blake 1973; Ford 1973; and Nickerson 1953). In addition, many specimens, both wild and domestic, were compared with fresh and carbonized material collected and prepared by the analyst and maintained as a synoptic set in the Archaeology Laboratory at Western Michigan University.

Data Presentation

Table 1 summarizes the plant residues recovered from 30 samples representing 28 proveniences from the Bonnie Creek site. Note that:

1. the total counts and weights recorded for Zea mays or corn in the flotation sample from Feature 2 and the sample from Feature 35 represent subsamples of 50% and 25%, respectively. If one estimates the total quantities of corn in the light fractions from these samples, the aggregate would be 45 g and 3894 specimens of corn for Feature 2 and 157.62 g and 10,444

Table 1: Plant Remains from Site 21C4-46, a small Mississippian Farmstead in Perry County, Illinois.

<u>Lot no.</u>	<u>ARG no.</u>	<u>Provenience</u>	<u>Sample Volume</u>	<u>Contents wt(g)/ ct</u>		<u>Comments</u>
1	6	Feature 2	10 l	22.50	1947	<u>Zea mays</u> , corn cob and cupule fragments from 8, 10, 12, and 14 row ears, with cupule width for measured specimens ranging between 4-8 mm
				0.20	4	unidentified wood charcoal
2	44	Unit 160 N, 190 E (Level 3, floor trowelings)	-	0.32	11	<u>Carya</u> spp. nutshell
				0.20	15	unid. wood charcoal
3	113	Unit 258.5 N, 186 E (Level 3B)	10 l	0.60	20	unid. wood charcoal
						(14 uncarbonized seeds of <u>Chenopodium album</u> and <u>Polygonum</u> spp.)
4	164	Feature 34 (N 1/2)	4 l	0.01	2	<u>Z. mays</u> cupule fragments
				0.38	6	<u>Carya ovata</u> , shagbark hickory
				0.18	3	<u>C. laciniosa</u> , shellbark hickory
				0.64	47	<u>Carya</u> spp. nutshell
				0.20	4	<u>Juglans</u> spp.
				0.60	20+	unid. wood charcoal
5	165	Feature 35	All(?)	37.29	2482	<u>Z. mays</u> kernels and cob and cupule fragments
				(25 % sample)		

Table 1, cont.

<u>Lot no.</u>	<u>ARG no.</u>	<u>Provenience</u>	<u>Sample Volume</u>	<u>Contents wt(g)/ ct</u>		<u>Comments</u>
				8.46	516	from 8 and 10 row ears, with cupule width for measured specimens being 7-8 mm and kernel thickness 3-5 mm / from the <u>light fraction</u>
						<u>Z. mays</u> residues from the heavy fraction, including cob and cupule fragments and kernels from 8 and 10 row ears, with cupule widths from 4-6 mm and kernels being 4-7 mm thick
6	166	Feature 36 (N 1/2)	20 1	1.90	-	unid. wood charcoal (11 uncarbonized seeds of <u>C. album</u> , lamb's quarter)
7	167	Feature 33	10 1	4.38	138	<u>Z. mays</u> cob and cupule fragments from 10, 12, and 14 row ears, with measured cupule width of from 5-8 mm
				0.28	8	fragments of squash rind (probably <u>Cucurbita pepo</u> or summer squash)
				0.08	1	unid. seed or nutlet
				8.56	151	unid. wood charcoal

Table 1, cont.

<u>Lot no.</u>	<u>ARG no.</u>	<u>Provenience</u>	<u>Sample Volume</u>	<u>Contents wt(g)/ ct</u>		<u>Comments</u>
8	171	Feature 37	10 1	2.03	67	<u>Z. mays</u> kernels and cob and cupule fragments from 8, 12, and 14 row ears, with cupule width ranging between 7-10 mm and kernel thickness of 2-5 mm
				0.12	2	<u>Juglans nigra</u> , black walnut
				0.18	8	<u>Carya</u> spp. nutshell
				20.51 [±]	350 [±]	unid. wood charcoal
9	172	Feature 39	10 1	9.84	180	<u>Z. mays</u> kernel and cob and cupule fragments of 8 and 12 row ears, with measurable kernel thickness ranging between 3-5 mm
				0.33	23	<u>Carya</u> spp. nutshell
				0.12	4	<u>Juglans</u> spp.
				0.13	11	ring porous wood charcoal
				0.94	50+	unid. wood charcoal
10	173	Feature 38	5 1	7.61	50	<u>C. laciniosa</u>
				0.82	6	<u>C. ovata</u>
				15.07	694	<u>Carya</u> spp. nutshell

Table 1, cont.

<u>Lot no.</u>	<u>ARG no.</u>	<u>Provenience</u>	<u>Sample Volume</u>	<u>Contents wt(g)/ ct</u>		<u>Comments</u>
				0.31	3	<u>Juglans</u> spp. nutshell
				0.11	1+	unid. seed(s) represented by 15 fragments
				20.31	47+	unid. wood charcoal
11	178	Feature 41 (S 1/2)	10 1	4.44	161	<u>Z. mays</u> kernels and cob and cupule fragments from 8 and 12 row ears, with cupule width ranging from 4-8 mm and kernel thickness between 2-3 mm
				0.09	1	<u>Quercus rubra</u> , red oak charcoal
				60.00	-	unid. wood charcoal
12	181	Feature 46	20 1	0.08	1	<u>C. ovata</u>
				0.08	1	<u>J. nigra</u>
				0.09	3	<u>Carya</u> spp. nutshell
				0.02	1	unid. tree bud (charred)
				17.30	-	unid. wood charcoal
13	182	Feature 48	4 1	0.16	1	<u>J. nigra</u>
				0.07	1	<u>Carya</u> sp. nutshell
				6.10	200+	unid. wood charcoal

Table 1, cont.

<u>Lot no.</u>	<u>ARG no.</u>	<u>Provenience</u>	<u>Sample Volume</u>	<u>Contents wt(g)/ ct</u>		<u>Comments</u>
14	184	Feature 47 (N 1/2)	10 1	0.72	34	<u>Z. mays</u> cob and cupule fragments from 12 and 14 row ears, with cupule width ranging from 4-6 mm
				0.70	14	<u>Carya tomentosa</u> , mockernut hickory
				0.09	1	<u>Juglans</u> sp. nutshell
				0.01	2	seeds of <u>Rhus copallina</u> , dwarf sumac
				0.08	2	diffuse porous charcoal
				16.80	-	unid. wood charcoal
15	185	Feature 50	10 1	0.19	8	<u>Carya</u> spp. nutshell
16	186	Feature 49	40 1	0.10	2	<u>Carya</u> spp. nutshell
				4.60	-	unid. wood charcoal
17	187	Feature 51	10 1	3.59	72	<u>Z. mays</u> kernels and cob and cupule fragments from 8 and 12 row ears, with cupule widths of 6-10 mm and kernel thickness ranging between 2-4 mm
				0.95	3	<u>C. tomentosa</u>
				3.60	-	unid. wood charcoal

Table 1, cont.

<u>Lot no.</u>	<u>ARG no.</u>	<u>Provenience</u>	<u>Sample Volume</u>	<u>Contents wt(g)/ ct</u>		<u>Comments</u>
18	189	Feature 52	10 1	2.80	10	<u>Carya</u> spp. nutshell
19	190	Feature 42 (S 1/2)	30 1	0.05	2	<u>Z. mays</u> cupule fragments
				0.23	8	<u>Carya</u> spp. nutshell
				1.10	25±	unid. wood charcoal
20	191	Feature 42A (N 1/2)	10 1	0.01	1	8 row cupule fragment of <u>Z. mays</u>
				0.15	10	<u>C. ovata</u>
				0.41	3	<u>J. nigra</u>
				0.40	10	unid. wood charcoal
				0.01	1	<u>Z. mays</u> kernel fragment
21	193	Feature 42B (N 1/2)	12 1	1.00	80	<u>Carya</u> spp. nutshell
				0.10	15±	unid. wood charcoal
				2.46	98	<u>Z. mays</u> kernels and cob and cupule fragments of 8, 12, and 14 row ears, with cupule widths of 4-9 mm and the thickness of kernels being 3 mm
22	196	Feature 43 (N 1/2)	4 1	2.00	62	<u>Carya</u> spp. nutshell
				0.91	13	<u>Juglans</u> spp. nutshell
				7.40	300+	unid. wood charcoal

Table 1, cont.

<u>Lot no.</u>	<u>ARG no.</u>	<u>Provenience</u>	<u>Sample Volume</u>	<u>Contents wt(g)/ ct</u>		<u>Comments</u>
23	230	Feature 44 (Area B)	80 1	0.04	3	cupules of <u>Z. mays</u>
				0.68	14	<u>J. nigra</u>
				2.40	126	<u>Carya</u> spp. nutshell
				0.01	1	<u>Polygonum erectum</u> achene
				2.20	-	unid. wood charcoal
24	235	Feature 75 (S2 -18)	?	0.14	3	<u>Carya</u> spp. nutshell
				0.18	1+	7 fragments of a bean-like structure. The size projected for a complete specimen would rule out wild beans (possibly <u>Phaseolus vulgaris</u> , common bean) (an uncarbonized stone of <u>Prunus serotina</u>)
25	236	Feature 75 (S2 -18)	20 1	0.20	1	unid. nutshell(?)
				3.60	-	unid. wood charcoal
26	253	S2 -18 (Level 3, 20-30 cm)	10 1	0.30	20 [±]	unid. charcoal (3 fresh seeds of <u>Polygonum</u> spp.)
27	258	Structure 2 (Level 3, Feature 12)	?	4.61	329	<u>Z. mays</u> cob and cupule fragments from 8 and 12

Table 1, cont.

<u>Lot no.</u>	<u>ARG no.</u>	<u>Provenience</u>	<u>Sample Volume</u>	<u>Contents wt(g)/ ct</u>		<u>Comments</u>
						ears, with measured cupule width ranging from 4-7 mm
				0.03	3	<u>Carya</u> spp. nutshell
				0.10	1	<u>Juglans</u> sp. nutshell
28	260	S2 -18 (Feature 57, N 1/2)	5 l	3.77	10+	<u>Diospyros virginiana</u> (persimmon) seeds, some with charred particles of flesh attached
				0.10	4	unid. wood charcoal
29	263	S2 -18 (Feature 57, N 1/2)	10 l	0.10	3	<u>Carya</u> spp. nutshell
				0.06	1	achene of <u>Asclepias syriaca</u> , common milkweed
				0.70	-	unid. wood charcoal
30	328	Feature 91	10 l	2.03	173	<u>Z. mays</u> cob and cupule fragments from 8 and 12 row ears, with cupule width for measured specimens ranging from 5-7 mm
				0.26	3	<u>C. pepo</u> rind fragments
				0.09	4	<u>C. ovata</u>
				0.33	3	<u>C. tomentosa</u>
				0.95	76	<u>Carya</u> spp. nutshell

Table 1, cont.

<u>Lot no.</u>	<u>ARG no.</u>	<u>Provenience</u>	<u>Sample Volume</u>	<u>Contents wt(g)/ ct</u>	<u>Comments</u>
				2.50 200+	unid. wood charcoal (100+ uncarbonized seeds of <u>C. album</u> , lamb's quarter)

- pieces for Feature 35, rather than the quantities that are recorded in Table 1; and
2. the great majority of wood charcoal from these samples was extracted and quantified by ARG personnel, with both precise and some approximate counts and the total weights for each being reported on the analytic sample sheets.

It is estimated that 384+ l of soil comprising the 30 flotation samples contained approximately 18,300+ carbonized plant specimens, aggregating 402.91 g by weight, of which 7564 specimens weighing 148.84 g were available for this analyst to study.

Wood Charcoal

Residues of charred wood are a common constituent in the assemblage, reportedly occurring in flotation samples from 24 of 28 proveniences and aggregating 120.00 g by weight. Only 0.30 g (N= 14) of wood charcoal was examined, this material being extracted from the nutshell residues occurring in two smudge pits and a single shallow basin-shaped feature. Of this material, eleven specimens are ring porous, two are diffuse porous, and one has been identified as red oak (Quercus rubra) by my associate, Mr. David De Fant. The size of these very small scraps of wood precluded more precise identification.

Of the 23 proveniences containing wood charcoal for which the volume of soil floated has been recorded, most yielded only trace quantities. Weight by sample ranged from less than 0.01 g - 4.06 g per liter of soil floated, with the mean density for all proveniences being $119.72 \text{ g} / 364 \text{ l of soil} = 0.33$. The density recorded for the smudge pits is $84.92 \text{ g} / 109 \text{ l} = 0.78$; for pit features it is $30.38 \text{ g} / 215 \text{ l} = 0.14$; and for samples from structures the density is $0.90 \text{ g} /$

$20 \text{ l} = 0.05$. That the mean wood charcoal density is highest for smudge pits (5.6 times greater than the density calculated for pit features and more than 15 times that recorded for samples from the two wall-trench structures), indicates that burning in a more reducing atmosphere took place in such facilities.

Nuts

Flotation samples from 21 proveniences contained carbonized nutshell residues. These number 1316 pieces and weigh 41.31 g, or 28.1% of the plant material available for study. If the total estimated weight for all the botanical material (i.e. 402.91 g) in the samples is considered, the nutshell weight reduces to a mere 10.3% of the total. This is the lowest representation of nutshell residues for any site in the Northfield, and perhaps it is also noteworthy that this percentage is significantly lower than the 86.0% observed for the very similar Mississippian farmstead (21D3-67) on White Walnut Creek in Deep Strip # 3 of Burning Star Mine # 2 that was previously analyzed by the author (Cremin 1982: 14).

For the 19 flotation samples yielding nutshell for which soil volumes have been reported, nutshell densities range from 0.002 g - 4.76 g per liter of soil floated. The resulting mean nutshell density is $40.5 \text{ g} / 309 \text{ l} = 0.13$, or approximately one-third of the density for wood charcoal. The nutshell:wood charcoal ratio derived from these densities is 0.39. Interestingly, these densities and the resulting ratio are very comparable to those derived from the much larger botanical assemblage from the Jamestown site (21C4-14), a large Late Woodland village located a short distance to the south and west of 21C4-46 and overlooking the confluence of Rock Fork, Bonnie, and Galum creeks. Here,

the mean nutshell density was .10, and the mean density recorded for wood charcoal was .26. The resulting nutshell:wood charcoal ratio for Jamestown was .38 (Cremin 1985: 23).

Hickory nutshell represents the dominant material in the class of residues, occurring in every sample from the 21 proveniences yielding the remains of nuts. It comprises 91.8% by weight and 96.4% by count of all nut residues. Carya species identified include three thick-shelled hickories. In decreasing order of frequency of occurrence (N= 21), these are: shagbark hickory - 5; mockernut hickory - 3; and shellbark hickory - 2. The remaining nutshell residues have been identified only to the generic level.

That no thin-shelled species (e.g. bitternut hickory, pecan) have been positively identified in the assemblage may be due to this analyst's failure to distinguish such specimens among the very small fragmentary residues. Alternatively, it can be argued that the Mississippian people occupying this site were making more frequent use of thicker hickory nuts. This observation has been noted in the Lower Illinois River Valley, where archaeobotanists have posited that the thin-shelled species become less ubiquitous and abundant in assemblages from Archaic through Mississippian times, reflecting a subsistence trend of some potential significance (see for example, Asch and Asch 1981).

The remains of Juglans occur in flotation samples from 11 proveniences, but in terms of both absolute weight (3.18 g; 7.7%) and count (N= 47; 3.6%) they comprise a minor portion of the nutshell residues. In five of 11 cases, it has been possible to positively identify the nutshell as being J. nigra, black walnut. And given the environmental context in which 21C4-46 occurs, together with the ubiquity and abundance

recorded for these remains relative to hickory nuts, the following would appear warranted: first, that all of the Juglans material is probably black walnut; and, second, that both the hickory nuts and walnuts were probably being harvested by the inhabitants of 21C4-46 in terms of their availability in the immediate environment of the site.

Corn Residues

This class of carbonized plant remains is exceedingly well represented in the Bonnie Creek site samples. Whether one considers the estimated quantity (236.84 g; 15,599 specimens) or the smaller amount of material actually available for study (102.47 g; 6206 specimens), corn residues comprise the bulk (56.9% by weight and 84.3% by count; 68.8% by weight and 82.0% by count, respectively) of the botanical assemblage.

As anticipated, most of the corn occurs in the smudge pit samples. Of 14 features assigned to this type, corn was observed in the flotation samples from 10. The estimated quantity (229.38 g; 15,057 specimens) comprising the smudge pit sample is more than 70 times the amount of corn residues found in five samples from five refuse pits (2.85 g; 213 specimens) and greater than 45 times the quantity of residues recorded for the single sample from a structure floor (4.61 g; 329 specimens) yielding corn.

Referring only to those remains from smudge pit and refuse pit samples for which the volumes of soil floated have been recorded (the volume of the single flotation sample from Structure 2 containing corn is not known), the following densities have been calculated:

features	#	total volume (l)	quantities		derived densities	
			wt	/ ct	wt/l	/ ct/l
smudge pits	9	80	71.76	4613	.90	57.7
refuse pits	5	140	2.85	213	.02	1.5

\bar{X} densities recorded for 14 samples					.34	22.0

The corn remains from 16 samples exhibit a preponderance of strongly row-paired cobs, with 8-rowed and 12-rowed residues occurring in 10 samples; 14-rowed in five samples; and 10-rowed in three samples. Measurable cupule widths range from 4-10 mm, and kernel thickness for specimens complete enough to measure ranges from 2-7 mm.

Those kernels for which it has been possible to determine shape are crescent-shaped. However, while most observations of cupule width and crescent-shaped kernels, together with the presence of large and hard 8-rowed and 10-rowed cobs evidencing strong row-pairing, attest to the predominance of Eastern complex maize or corn (Carter and Anderson 1945) in this assemblage, the frequent occurrence of both 12-rowed and 14-rowed specimens (and possibly some smaller noncrescent-shaped kernels that were not as readily identifiable) may indicate that the site's inhabitants had not entirely ceased raising older varieties of flint and/or pop corns.

Carbonized Seeds

Seeds are very poorly represented in the residues from the Bonnie Creek site. The total minimum number is 16, and including the particles of flesh or pulp adhering to 10 seeds of persimmon (Diospyros virginiana) in one of two samples collected from the deep basin-shaped pit labeled Feature 57, the aggregate weight for this class of remains is 4.04 g. In addition to the above mentioned concentration of persimmon seeds,

this same sample yielded a single achene of milkweed (Asclepias syriaca). A large flotation sample from a shallow basin-shaped pit (Feature 44) contained a specimen of erect knotweed (Polygonum erectum), and a second such facility (Feature 47) produced two seeds of dwarf sumac (Rhus copallina).

The most notable specimen in this class of residues is represented by seven fragments of what appears to be a single seed of common bean (Phaseolus vulgaris). This seed food cultigen has been reported for several sites in the Eastern Woodlands dating as early as the eleventh century A.D., becoming increasingly well represented in botanical assemblages thereafter. However, it has seldom if even been recovered from prehistoric sites in appreciable quantities.

Perhaps noteworthy is the fact that this specimen was found in association with a ceramic vessel (Feature 75) during excavation of a wall-trench house (Structure 2). In addition to the bean, the soil sample extracted from within the pot yielded an uncarbonized stone of P. serotina, a minute quantity of hickory nutshell, and several grams of wood charcoal. If, as this analyst suspects, the specimen in question is a common bean, it represents the first documented occurrence of this seed food cultigen in the Northfield research area.

Other Plant Remains

The only residues included in this section represent two occurrences of small quantities of squash (Cucurbita pepo) rind, numbering 11 pieces and aggregating 0.54 g by weight, in a flotation sample from a smudge pit (Feature 33) and another from a shallow basin-shaped facility (Feature 91). Notably, both samples also contained the residues of corn in small quantities.

Concluding Remarks

Although the aforementioned observations and interpretations derived from them may be skewed by the fact that more than 30% of the soil processed by flotation has been extracted from 13 of 14 features identified by excavators as smudge pits or corn holes, it appears reasonable to conclude that the Bonnie Creek site is most notable for the reliance of its resident population on the cultivation of corn. When informed that this site represented a "pure" Mississippian component dating to ca. A.D. 1200-1350, the analyst anticipated that corn residues would be present in the botanical assemblage. However, it was not expected that the ubiquity and abundance of this material would be so great relative to natural food remains such as the nuts, fleshy fruits, and starchy seeds to be found in natural environment of the Upper Galum Creek drainage.

Not only are the residues of corn virtually omnipresent on this site, but here are also found the other elements of the "great American triumvirate"--squash and the common bean (albeit in trace quantities). Based on the data presented to this analyst for study, it is most reasonable to conclude that the Mississippian people inhabiting the Bonnie Creek site derived their subsistence from the tropical cultigens, with only modest supplementation from the natural resources of the immediate site environs. And given the excellent preservation of the plant residues, it would appear quite unlikely that differential preservation can be advanced to explain the presence of only a few "scraps" of wild plant seed residues and the very modest quantities of nutshell remains occurring in 30 flotation samples from 28 proveniences sampled on this site.

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