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73-Archaeobotanical Analysis of Screened and Flotation Residues from Sites 24N2-227 And 2482-231, Burning Star Mine #5, Jackson County, Illinois

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ARCHAEOBOTANICAL ANALYSIS OF SCREENED AND FLOTATION RESIDUES FROM SITES 24N2-227 AND 24B2-231, BURNING STAR MINE # 5, JACKSON COUNTY, ILLINOIS

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The Westfield of Consolidation Coal Company's Burning Star Mine # 5 is located in northeastern Jackson County, Illinois. It lies within but near the southern terminus of the Mt. Vernon Hill Country of the Southern Till Plains Division and is characterized by mature topography and low relief; elevations ranges from about 108 m ASL along the banks of the Little Muddy River, the principal stream draining the study area, to 120 m ASL on adjacent uplands. The northern limits of the Greater Shawnee Hills Section of the Shawnee Hills Division lie about 20 km to the south, where the gently rolling hills and broad alluvial floodplain of the Big Muddy River, to which the Little Muddy is tributary, abruptly give way to the more strikingly elevated and heavily dissected Shawnee Hills (Schwegman 1975).

Floristically, the research area is included in the Oak-Hickory Forest Region of the Western Mesophytic Forest (Braun 1950). Recent vegetation studies summarized by Lopinot (1980: 2-3) suggest that uplands in the Westfield formerly supported thinly timbered post oak flats, dominated by the post oak and blackjack oak, and prairie, while slope woodlands flanking stream bottoms were characterized by white oak and black oak, but with red oak and pignut hickory being important constitutents of this community. Bottomland forests were of mixed composition and included water tolerant species of oak and hickory, together with black willow, cottonwood, sycamore, elm, gum, and maple, to name just a few.

Uplands in the immediate vicinity of the sites in question at the time of the Government Land Office surveys in 1807 were thinly

timbered and characterized by a brushy understory of shrub oak, hickory, hazel, grapevines, and briers. The only specific references to native grassland, dominated by big bluestem and with a variety of herbaceous species being present as well, indicate that prairies occurred at a distance of several km to the NE and NW of the sites (Lopinot 1980: 3).

Sites 24B2-227 and 24B2-231 are situated on the lower Little Muddy River at a distance of 3.9 km and 5.1 km NNE of this stream's confluence with the Big Muddy River near the corner of Sections 14, 15, 22, and 23 in DeSoto Township (T8S R1W), Jackson County, Illinois. That the Little Muddy is a strongly meandering river along its lower course is indicated by the fact that the aforementioned distances become 9.9 km and 19.1 km, respectively, if one follows the course of the river from its mouth to the locations of these sites.

Site 24B2-227 (also known locally as "Hangin Rock" shelter) is a small east-facing rockshelter located in the river floodplain. It lies about 1.5 m above the riverbank at a point where the stream strikes the base of a prominent sandstone outcrop. Today, only a slight protective overhang is in evidence, with most of the 300 m^2 of occupation area comprising the talus slope. This site was investigated by personnel from American Resources Group, Ltd. of Carbondale, Illinois in Fall 1985, revealing cultural deposits extending to a depth of more than a meter below the modern surface. Material remains from the limited test excavations suggest the presence of Early Archaic, Early Woodland, Middle Woodland, Late Woodland, and Mississippian components at this site.

Sixteen 10 l flotation samples were collected from various 10 cm

levels in the three excavation units where excavators observed cultural midden to be present. Each general level flotation sample consists of soil extracted from the center and the four corners of the test square. In addition, five samples from one excavation unit represent botanical residues observed and collected during sifting of soil through either 6 mm or 12.5 mm mesh screen. No features were distinguished in the midden deposits, but ceramic association suggests that carbonized plant remains submitted to this analyst are primarily affiliated with the Late Woodland and Mississippian occupations of this rockshelter (Ronald Pulcher, American Resources Group, Ltd., personal communication).

Site 24B2-231 is an open-air site encompassing approximately 20,000 m^2 of a ridge top located 30 m E of the river. Also excavated by ARG, Ltd. in Fall 1985, this site has revealed a 15-20 cm thick cultural deposit underlying the modern plowzone that contains mixed Middle Woodland and Late Woodland materials.

Thirteen 5 l flotation samples have been submitted for analysis, including eight that were extracted from various 10 cm levels occurring within the limits of the midden in five excavation units and five samples that were collected from three defined feature contexts. General level flotation samples were recovered in the manner described above for 24B2-227, and each sample from the features represents a column of unscreened fill collected from the 10 cm level specified.

Data Presentation

In aggregate, this analyst received 34 samples of botanical residues totaling 50.88 g by weight and 2457 specimens by count. In the laboratory, all sorting, quantifying, and detailed identification

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; and Montgomery 1977). In addition, many specimens, both wild and domestic, were compared with both fresh and carbonized plant specimens collected and prepared by Mr. David De Fant, who studied the wood charcoal, and this analyst and maintained as a synoptic set in the Archaeology Laboratory at Western Michigan University.

24B2-227

The botanical assemblage from this rockshelter is summarized in Table 1. A total of 160 l of soil from excavation units yielded 28.95 g/ 1227 specimens of carbonized botanical remains, with an additional 5.22 g/ 24 pieces of charred plant material being retrieved from sifting screens.

Residues of carbonized wood are a common constitutent in the assemblage, occurring in all screened samples and 15 of 16 flotation samples. Of the 17.37 g/ 480 pieces recovered, 56% by weight and 19% by count have been identified to genus and/or species. None is out of place given the environmental context in which this site occurs, and these data exhibit unanticipated diversity. In declining order of frequency of occurrence in the wood charcoal spectrum, these are: oak - 9; ash - 7; hickory - 4; hackberry - 2; American beech - 2; hop hornbeam - 2; elm - 1; wild black cherry - 1; American chestnut - 1; and Kentucky coffeetree - 1.

Of the 15 proveniences containing wood charcoal for which the volume of soil processed is known, all yielded only trace quantities. Weight by sample ranged from less than 0.01 g - 0.24 g per liter of

Table 1: Plant Residues from Flotation and Screened Samples, 24B2-227, Jackson County, Illinois

Lot no.	ARG no.	Provenience	Sample Volume	Contents wt(g)/ ct		Comments
24B2-227						
						- Nutshell
1	1	3-4N/0-2E (L-2)	10	.06	4	Carya spp. (hickory)
						- Wood Charcoal
				.07	1	Quercus sp. (red oak group)
				.11	1	Prunus serotina (wild black cherry)
				.06	1	Celtis occidentalis (hackberry)
				.10	2	Fraxinus spp. (ash)
				.24	3	unid. ring-porous
				.57	42	unid. charcoal
						- Seed
				.02	1	unid. seed fragment
						- Other
				.22	7	Cucurbita pepo (squash) rind
2	2	3-4N/0-2E (L-3)	10			- Nutshell
				.11	12	Carya spp.
						- Wood Charcoal
				.08	1	Quercus sp. (red oak group)
				.10	1	Ostrya virginiana (hop hornbeam)
				.07	1	Fraxinus sp. (ash)
				.08	18	unid. charcoal
3	3	3-4N/0-2E (L-4)	10			- Nutshell
				.03	1	C. ovata (shagbark hickory)

Table 1, cont.

Lot no.	ARG no.	Provenience	Sample Volume	Contents wt(g)/ ct		Comments
				.36	15	Carya spp. (thick-shelled hickory)
				.39	25	Carya spp.
						- Wood Charcoal
				.24	2	Fraxinus spp. (ash)
				.07	1	unid. diffuse-porous
				.02	18	unid. charcoal
4	4	3-4N/0-2E (L-5)	10			- Nutshell
				.56	21	Carya spp. (hickory)
						- Wood Charcoal
				.72	3	Fraxinus spp. (ash)
				.33	5	unid. ring-porous
				.22	3	unid. diffuse-porous
				.32	15	unid. charcoal
						- Other
				.33	11	C. pepo (squash) rind)
5	5	3-4N/0-2E (L-6)	10			- Nutshell
				.24	3	Carya spp. (thick-shelled hickory)
				.24	14	Carya spp.
						- Wood Charcoal
				.65	16	unid. charcoal
6	6	3-4N/0-2E (L-7)	10			- Nutshell
				.02	2	Carya spp.
						- Wood Charcoal
				.09	1	Quercus sp. (white oak group)
				.03	1	Fagus grandifolia (American beech)

Table 1, cont.

Lot no.	ARG no.	Provenience	Sample Volume	Contents wt(g)/ ct		Comments
				.15	7	unid. charcoal
7	7	3-4N/0-2E (L-8)	10			- Nutshell
				.74	11	Carya tomentosa (mockernut hickory)
				.10	1	C. ovata (shagbark hickory)
				.07	1	C. cordiformis (bitternut hickory)
				3.65	214	Carya spp. (thick-shelled hickory)
						- Wood Charcoal
				.50	3	Castanea dentata (American chestnut)
				.85	25	unid. charcoal
						- Seed
				.03	1	Prunus sp. (partial stone of cherry or plum)
						- Other
				.37	6	C. pepo (squash) rind
						(a piece of burnt bone weighing .38 g)
8	8	3-4N/0-2E (L-9)	10			- Nutshell
				.30	32	Carya spp.
				1.07	17	Carya spp. (thick-shelled hickory)
						- Wood Charcoal
				.27	1	Carya sp.

Table 1, cont.

Lot no.	ARG no.	Provenience	Sample Volume	Contents wt(g)/ ct		Comments
				.13	4	Quercus spp. (white oak group)
				.16	10	unid. charcoal
9	9	3-4N/0-2E (L-10)	10			- Nutshell
				.49	20	Carya spp.
						- Wood Charcoal
				.04	7	unid. charcoal
						- Other
				.06	1	C. pepo (squash) rind
10	10	3-4N/0-2E (L-11)	10			- Nutshell
				.96	50	Carya spp.
						- Wood Charcoal
				.09	2	Quercus spp.
				.06	1	Carya sp.
				.23	17	unid. charcoal
						- Other
				.05	3	C. pepo (squash) rind
11	11	3-4N/0-2E (L-12)	10			- Nutshell
				1.00	18	Carya spp. (thick-shelled hickory)
				2.37	161	Carya spp.
				.01	1	Juglans sp. (black walnut or butternut)
						- Wood Charcoal
				.22	1	Carya sp.
				.17	6	Quercus spp.
				.13	2	unid. diffuse-porous
				.13	11	unid. charcoal

Table 1, cont.

Lot no.	ARG no.	Provenience	Sample Volume	Contents wt(g)/ ct		Comments
						- Seed
				.01	1	unid. seed fragment
12	40	14N-7E (L-2)	10			- Nutshell
				.25	6	Carya spp.
						- Wood Charcoal
				.06	4	unid. charcoal
13	41	14N-7E (L-3)	10			- Nutshell
				.41	19	Carya spp.
						- Seed
				.21	1	Prunus serotina (wild black cherry)
						- Other
				.13	8	C. pepo (squash) rind
14	42	14N-7E (L-4)	10			- Nutshell
				.03	1	C. ovata
				.36	15	Carya spp. (thick-shelled hickory)
				.39	25	Carya spp.
						- Wood Charcoal
				.39	7	unid. charcoal
15	43	1N-9E (L-2)	10			- Nutshell
				.18	16	Carya spp.
						- Wood Charcoal
				.79	10	Fraxinus spp. (ash)
				.36	9	C. occidentalis (hackberry)
				.12	1	O. virginiana (hop hornbeam)

Table 1, cont.

Lot no.	ARG no.	Provenience	Sample Volume	Contents wt(g)/ ct		Comments
				1.11	94	unid. charcoal
						- Other
				.17	11	C. pepo (squash) rind
16	44	1N-9E (L-3)	10			- Nutshell
				.11	3	Carya spp.
						- Wood Charcoal
				1.46	22	Quercus spp. (white oak group)
				.90	76	unid. charcoal
						- Other
				.31	8	C. pepo (squash) rind
17	-	3-4N/0-2E (L-1)	screened			- Wood Charcoal
				.42	2	F. grandifolia (American beech)
				.61	1	Carya sp.
18	-	3-4N/0-2E (L-3)	screened			- Wood Charcoal
				.19	1	Ulmus sp. (elm)
19	-	3-4N/0-2E (L-4)	screened			- Wood Charcoal
				.09	1	Gymocladus dioicus (Kentucky coffeetree)
				.60	4	Fraxinus spp. (ash)
				.84	7	unid. charcoal
						- Seed
				.07	1	Diospyros virginiana (persimmon)
						- Other
				.06	1	C. pepo (squash) rind

Table 1, cont.

Lot no.	ARG no.	Provenience	Sample Volume	Contents wt(g)/ ct		Comments
20	-	3-4N/0-2E (L-6)	screened			- Nutshell
				.26	2	*Carya* spp. (thick-shelled hickory)
						- Wood Charcoal
				.85	3	*Quercus* spp. (oak)
				.55	1	*Fraxinus* sp. (ash)
				.11	1	unid. charcoal
21	-	3-4N/0-2E (L-9)	screened			- Wood Charcoal
				.57	2	*Quercus* spp. (red oak group)

soil floated, with the mean density for all samples being 12.54 g/ 150 l = 0.08. That this mean or average density is almost 7.5 times smaller than the mean density calculated by Lopinot (1980: 8) for Middle Woodland Crab Orchard features at the nearby Consol site (24B2-26), may reflect factors of differential preservation when comparing wood charcoal recovered from former occupation floors in this rockshelter with the greater protection afforded such fragile residues in pit features at the Consol site. Unfortunately, Lopinot does not provide information permitting comparison of the relative diversity within the wood charcoal assemblages from the two sites.

Nut residues, aggregating 14.76 g/ 710 specimens, do not compare favorably with wood charcoal in terms of total weight, but nutshell numbers exceed the count recorded for wood charcoal remains by a ratio of almost 1.5: 1. However, if only the 16 flotation samples are considered, nutshell, with a frequency of occurrence of 100%, exceeds wood charcoal both by weight and by count. Thus, it would appear that quantification by weight is skewed or biased by the greater recovery of relatively large fragments of charred wood in screened samples.

All nutshell residues have been identified at least to the level of genus. Hickory nuts are represented in all 17 of 21 samples yielding nutshell, with the only other occurrence of a nut being the trace quantity of Juglans sp. (0.01 g/ 1 specimen) found in a single flotation sample. In 10 cases, it has only proven possible to assign hickory nut residues to the genus Carya. However, for the remaining seven samples the size and condition of the specimens have

permitted recognition of the following species (together with their frequency of occurrence in the samples): shagbark hickory - 3: mockernut hickory - 1; and bitternut hickory - 1. In addition, thick-shelled specimens, probably representing either shagbark hickory, mockernut hickory, pignut hickory, or shellbark hickory, rather than the thin-shelled bitternut hickory or pecan, occur in six flotation samples.

As was the case with the wood charcoal residues, nothing in the nutshell spectrum appears out of place, arguing strongly for the local harvesting of the autumn nut crop in both the slope woodland and bottomland forest zones occurring in very close proximity to the rockshelter.

By way of comparison with the nutshell assemblage from the nearby Consol site, it is perhaps noteworthy that hickory nuts dominate in all 16 of 17 flotation samples from features . In fact, hickory nutshell constitutes more than 98% of the total weight of all botanical residues, including wood charcoal, found at this site (Lopinot 1980: 5). The single nutshell fragment that has been identified to the species level is shagbark hickory. In contrast to the 24B2-227 nutshell remains, both acorn and walnut residues are presence in 41% and 18% of the Consol site samples, respectively; albeit they occur only in trace quantities (Lopinot 1980: 5-6).

Volumetrically, the nutshell densities recorded for 24B2-227 flotation samples range from less than 0.01 g - 0.46 g per liter of soil processed, with the mean density of all samples being 14.50 g/ 160 l = 0.09. The average density recorded for the Consol site is

2.4 times greater (Lopinot 1980: 8). However, when considering the relative dominance of nutshell to wood in the charcoal (i.e. all potential fuel residues), the mean density of nutshell at Consol is 1/3 of that recorded for wood charcoal; whereas at 24B2-227 the average nutshell density of 0.09 is slightly greater than the mean of 0.08 recorded for wood charcoal in flotation samples. And this observation is only further strengthened if the nutshell/wood charcoal ratio of .68 calculated by Lopinot (1980: 8) for the Consol site is compared with the ratio of 1.2: 1 recorded for 24B2-227. Perhaps this apparent difference in the total composition of all charcoal or fuel residues at the two sites in question reflects differential access to suitable fuel for fires during the season(s) when each of these sites was occupied. If, for example, the rockshelter was occupied during the winter months, a time of year during which access to dry deadwood in the immediate site environs may not have been as great as during the less inclement months of the year when open-air sites like Consol were most probably occupied, the occupants of 24B2-227 may have relied to a relatively greater extent on nutshell as a source of fuel for their warming and cooking fires.

Seeds are very poorly represented in the residues from 24B2-227. A total of five specimens, aggregating 0.34 g by weight, or 1% of all botanical material, occur in five samples. Two partial seeds are not identifiable. Fleshy fruits are represented by the occurrences of two stones of Prunus, one of which can be identified as wild black cherry, and a single seed of persimmon. Given the frequency with which seeds occur in the samples, it is not possible

to rule out accidental inclusion during the prehistoric occupation(s) of the site. Alternatively, these fruits could have been harvested in the autumn of the year together with the local nut crop. The sample is just too small to permit a firm conclusion regarding their possible importance to the site's inhabitants.

Finally, 9 occurrences of small fragments of squash rind (C. pepo), numbering 56 (4.4%) specimens and weighing 1.70 g (9.8%), comprise the remaining food plant residues in this assemblage, indicating that at least some of the people utilizing the rockshelter over time were engaged in horticulture; at least on a limited basis. Asch and Asch (1981: 288) note that while squash rind fragments usually occur ubiquitously at many Middle and Late Woodland sites in the Lower Illinois River Valley, they are usually recovered in very small amounts. A similar observation has been made by this analyst (Cremin 1986: 18) at a small Mississippian farmstead in nearby Perry County, Illinois. Given the occurrence of a component attributable to Mississippian people in this rockshelter, the recovery of this (and/or other) tropical cultigen might well have been anticipated--albeit unlikely that this plant was cultivated during the time of year that the site was most likely occupied by that group engaged in this activity.

24B2-231

Thirteen 5 l flotation samples, comprising 40 l of soil from the shallow midden and 25 l of feature fill, provide the context for 16.71 g/ 1206 specimens of carbonized plant material from this open-air site located 9.2 km upstream, but only 1.2 km overland, from 24B2-227. This botanical assemblage is presented in Table 2.

Table 2: Plant Residues from Flotation Samples, 24B2-231, Jackson County, Illinois

Lot no.	ARG no.	Provenience	Sample Volume	Contents wt(g)/ ct		Comments
24B2-231						
1	1	40-41N/76-78E (Unit 4, L-2)	5			
				.54	28	- Nutshell *Carya* spp. (thick-shelled hickory)
				.08	5	- Wood Charcoal unid. charcoal
2	2	40-41N/106-108E (Unit 5, L-2)	5			
				.20	3	- Nutshell probably *Carya laciniosa* (shellbark hickory)
				.10	1	*C. ovata* (shagbark hickory)
				.52	89	*Carya* spp.
				.06	11	- Wood Charcoal unid. charcoal
						(numerous fresh seeds of *Amaranthus* spp.)
3	3	40-41N/106-108E (Unit 5, L-3, F-1)	5			
				.01	3	- Nutshell probably *C. ovata* (shagbark hickory)
				.18	17	*Carya* spp. (thick-shelled hickory)
				.05	1	*Juglans* sp. (black walnut or butternut)
				.14	11	- Wood Charcoal unid. charcoal
				.04	1	- Other *C. pepo* (squash) rind

Table 2, cont.

Lot no.	ARG no.	Provenience	Sample Volume	Contents wt(g)/ ct		Comments
4	4	40-41N/76-78E (Unit 4, L-3, F-2)	5			- Nutshell
				.23	5	Carya cordiformis (bitternut hickory)
				.48	28	Carya spp. (thick-shelled hickory)
						- Wood Charcoal
				.76	13	Carya spp. (hickory)
				1.27	104	unid. charcoal
						- Seed
				.01	2	Polygonum spp. (knot-weed)
				.01	2	Iva annua (marsh-elder)
				.01	1	Rhus glabra (smooth sumac)
				.01	1	unid. seed fragment
						- Other
				.16	7	C. pepo (squash) rind
5	5	40-41N/76-78E (Unit 4, L-3)	5			- Nutshell
				.42	72	Carya spp. (thick-shelled hickory)
						- Wood Charcoal
				.07	1	Fraxinus sp. (ash)
				.12	12	unid. charcoal
6	6	40-41N/106-108E (Unit 5, L-4)	5			- Nutshell
				.24	20	Carya spp. (thick-shelled hickory)
						- Wood Charcoal
				.10	11	unid. charcoal

Table 2, cont.

Lot no.	ARG no.	Provenience	Sample Volume	Contents wt(g)/ ct		Comments
						- Seed
				.01	1	I. annua (marshelder)
7	7	40-41N/76-78E (Unit 4, L-4, F-2)	5			- Nutshell
				2.67	34	C. laciniosa (shell-bark hickory)
				.66	45	Carya spp.
						- Wood Charcoal
				.06	1	Castanea dentata (American chestnut)
				.82	16	Carya spp. (hickory)
				.08	1	Fraxinus sp. (ash)
				3.77	360	unid. charcoal
						- Seed
				.04	30	P. erectum (knotweed)
						- Other
				.07	3	C. pepo (squash) rind
8	8	40-41N/76-78E (Unit 4, L-4, F-2)	5			- Nutshell
				.37	31	Carya spp. (thick-shelled hickory)
				.24	4	Quercus spp. acorn kernel fragments
						- Wood Charcoal
				.09	1	Gymocladus dioicus (Kentucky coffeetree)
				.21	4	Quercus spp. (white oak group)
				.06	1	Carya sp. (hickory)
				.23	62	unid. charcoal

Table 2, cont.

Lot no.	ARG no.	Provenience	Sample Volume	Contents wt(g)/ ct		Comments
						- Seed
				.04	26	P. erectum (knotweed)
9	9	50-51N/106-108E (Unit 3, L-3, F-3)	5			- Nutshell
				.18	3	Carya spp. (thick-shelled hickory)
				.14	25	unid. nut charcoal
						- Wood Charcoal
				.10	3	Quercus spp. (white oak group)
				.31	46	unid. charcoal
10	10	50-51N/136-137E (Unit 6, L-2)	5			
						- Nutshell
				.01	3	unid. nut charcoal
						- Wood Charcoal
				.01	1	unid. charcoal
						- Seed
				.01	1	Polygonum erectum (knotweed)
				.01	1	Polygonum sp. (knot-weed)
11	11	40-41N/136-137E (Unit 7, L-2)	5			- Nutshell
				.09	7	unid. nut charcoal
						- Wood Charcoal
				.21	17	unid. charcoal
						(12 fresh seeds of weedy annuals)

Table 2, cont.

Lot no.	ARG no.	Provenience	Sample Volume	Contents wt(g)/ ct		Comments
12	12	40-41N/136-137E (Unit 7, L-3)	5			- Nutshell
				.16	3	C. ovata (shagbark hickory)
				.08	11	unid. nut charcoal
						- Wood Charcoal
				.05	4	unid. charcoal
						- Seed
				.01	1	P. erectum (knotweed)
				.01	1	Rhus glabra (smooth sumac)
13	13	50-51N/76-78E (Unit 2, L-2)	5			- Nutshell
				.09	9	probably Carya spp.
						- Wood Charcoal
				.01	1	unid. charcoal

Wood charcoal is also common in the assemblage from this site, occurring in 100% of the samples and aggregating 48.9% by weight and 59.6% by count of all botanical material. By way of comparison, the residues of wood were observed in 95.2% of the samples and total 50.8% by weight and 38.4% by count in the assemblage from 24B2-227. However, of the 8.17 g/ 719 specimens comprising the wood charcoal, a much smaller percentage from 24B2-231, 28% by weight and 6% by count, is identifiable. As was the case at the rockshelter, all of the wood represented by identified residues could have been collected in the immediate site environs, and each is also present in the 24B2-227 wood charcoal residues. But species diversity is not nearly as great in this assemblage. In declining order of their frequency of occurrence, firewood taxa represented include: hickory - 3; oak- 2; ash - 2; American chestnut - 1; and Kentucky coffeetree - 1.

Here, wood charcoal is again present only in trace quantities, with the weight by sample ranging from less than 0.01 g - 0.95 g per 1 of soil floated. On the average, the wood charcoal density for a sample is 8.17 g/ 65 1 = 0.13, or 1.6 times greater than was recorded for the rockshelter. Comparing midden and feature samples, it is perhaps noteworthy that the mean density for feature samples is about 15.5 times greater than the average recorded for samples collected from the midden.

Carbonized nutshell also occurs in 100% of the flotation samples, totaling 8.10 g/ 409 pieces in this assemblage. When comparing wood charcoal and nutshell residues from this site, one observes the reverse of the situation noted for 24B2-227. Whereas the total weight of the two classes of plant remains is nearly identical at this site, particles of wood charcoal are almost 1.8 times more numerous than

the residues of nutshell.

Nutshell has been identified at least to the level of genus in all but two of the samples. Hickory nuts are present in all 11 samples yielding identified nutshell, with trace quantities of Juglans sp. nutshell (0.05 g/ 1 specimen) and acorn (Quercus spp.) kernels (0.24 g/ 4 fragments) being recorded for single flotation samples. In those instances for which the size and condition of hickory nutshell specimens proved suitable for species identification, the following taxa (together with their frequency of occurrence) have been recognized: shagbark hickory - 3; shellbark hickory - 2; and bitternut hickory - 1. In addition, thick-shelled species are represented by nut residues in six flotation samples. As with the rockshelter, this observation argues for more intensive exploitation of the thick-shelled hickories in adjacent slope woodland and bottomland forest zones on the part of the site's inhabitants.

Nutshell densities recorded for flotation samples from 24B2-231 range from less than 0.01 g - 0.67 g per 1 of soil processed, with the mean density for all samples being 8.10 g/ 65 l = 0.12. This average is almost 1.4 times greater than the mean recorded for 24B2-227, but is only slightly more than 1/2 the average density calculated by Lopinot (1980: 8) for the nearby Consol site. Comparing level and feature samples reveals mean densities of 0.06 g and 0.21 g, respectively. The latter is almost identical to the mean of 0.22 g recorded for Crab Orchard features at Consol.

Comparing relative dominance of nutshell to wood charcoal remains at the three sites on the Little Muddy River results in the following ratios: Consol - .68; 24B2-227 - 1.2; and 24B2-231 - .92. This may be

interpreted as indicating that the total composition of all fuel residues (nutshell and wood charcoal) at 24B2-231 is intermediate between the open-air Consol site and the rockshelter. That is, nutshell contributes to the total fuel needs of this site's occupants to a greater degree than at the Consol site, but was of lesser importance as a source of fuel for fires than at 24B2-227.

The most significant difference in the two botanical assemblages under study pertains to carbonized seed residues. Although not very abundant at 24B2-231, and distributed such that only two flotation samples contain the overwhelming majority of all specimens, the seeds from this site reveal an interesting aspect of subsistence behavior in Woodland times. In aggregate, 67 seeds, weighing a mere 0.17 g, occur in six of 13 samples. They are poorly represented in the midden, with just five specimens being recovered from three flotation samples. However, the three 5 l flotation samples from Feature 2 contain 62 carbonized seeds. And with the exception of a single unidentified specimen, all can be readily assigned to a genus and/or species. In declining order of their occurrence in the flotation samples, these are: knotweed - 5; marshelder - 2; and smooth sumac - 2.

With respect to the fruit of the smooth sumac, this berry was popular among historic Indian groups in eastern North America and either consumed when fresh or dried and stored for winter use. The most frequently reported use, however, was as a beverage, or "false lemonade" (Fernald and Kinsey 1958: 262). Although typically occurring in small quantities in flotation samples from sites throughout the Midwest, at the Late Woodland Jamestown Village in nearby Perry

County this analyst (Cremin 1985: 28) observed smooth sumac to comprise 45.4% by count and evidence the greatest ubiquity recorded for all seed residues in the assemblage. However, that only two seeds have been identified at 24B2-231, one in a midden sample and the second in a sample from Feature 2, does make it difficult to rule out the possibility of accidental inclusion during the prehistoric occupation(s) rather than deliberate utilization being the agency responsible for their presence.

Similarly, the three specimens identified as marshelder represent the occurrence of a single seed in a midden sample and two seeds in a sample from Feature 2. Morphologically, these are the seeds of "wild" marshelder. They do not evidence the large size typical of marshelder achenes from numerous Middle and Late Woodland contexts in west central Illinois, where archaeobotanists have inferred that the observed increase in seed size among archaeological specimens when compared with seeds from modern wild stands of this plant is the result of domestication of this oily seed-bearing weedy annual in the past (Asch and Asch 1981: 286).

In the absence of seed ubiquity and abundance in this botanical assemblage, the presence of marshelder might best be explained as the result of accidential inclusion. Alternatively, some harvesting of wild stands of marshelder for their seeds cannot be entirely dismissed as a possibility; especially in light of the fact that two seeds were recovered from Feature 2, where many seeds of knotweed were also found!

That the intensive harvesting, if not actual cultivation, of the seeds of commensal plants was undertaken by the inhabitants of

this site is very strongly suggested by the occurrence of 61 carbonized seeds of knotweed in five flotation samples. Three samples from Feature 2 yielded 58 seeds, with the remaining three specimens coming from two midden samples. The concentration of knotweed seeds in the feature is probably the result of a single episode of burning, and the fact that more than 96% of these seeds have been positively identified as Polygonum erectum (erect knotweed), a well-documented cultigen in the Lower Illinois River Valley during Middle and Late Woodland times (Asch and Asch 1981: 285-287), constitutes a persuasive argument for the importance of starchy seeds to the site's inhabitants.

In his examination of carbonized seeds associated with Crab Orchard features at the Consol site, Lopinot (1980: 12-13) has noted that a total of seven specimens of erect knotweed occurred in four of 17 flotation samples studied. While his observation is not nearly so convincing as that reported for 24B2-231, his review of the regional literature supports his contention of starchy seed utilization and possible cultivation of this plant in Woodland times--a position that is further strengthened by the presence of a few carbonized seeds of goosefoot (Chenopodium bushianum) and maygrass (Phalaris caroliniana) in the flotation samples.

Charred squash rind, aggregating a mere 0.27 g by weight and 11 specimens by count, has been recorded in one flotation sample from Feature 1 and two of three samples collected from Feature 2 at 24B2-231. While squash rind fragments are less ubiquitous and abundant than previously reported for 24B2-227, the presence of this tropical cultigen in both assemblages from the Little Muddy drainage is notable. Although Lopinot did not observe squash rind in the

carbonized residues from the Consol site, he does report the possible association of maize with one Middle Woodland Crab Orchard feature, as well as the very definite occurrence of well-developed Northern or Eastern Flint corn in a Mississippian feature on this same site (1980: 15-16).

Concluding Remarks

Although the botanical assemblages from sites 24B2-227 and 24B2-231 constitute samples that are too small to permit far reaching interpretation regarding prehistoric plant utilization in this drainage, a problem that is further exacerbated by the difficulty of associating flotation samples with specific occupations of these multicomponent sites, these data have proven most interesting in several respects.

First, the admittedly small quantities of wood charcoal at both sites exhibit unanticipated species diversity, especially at 24B2-227, reflecting utilization (and preservation) of a relatively wide range of firewoods in the immediate site environs. However, it is difficult to ascertain whether this diversity signals non-selective collection of this resource. Comparing nutshell and wood charcoal at these sites with similar residues at the nearby Consol site may indicate greater reliance on nutshell for fuel by the prehistoric occupants of the rockshelter than those groups inhabiting the open-air sites. This may in part be a reflection of seasonality (and/or duration?) of occupation.

Secondly, when the quantities of nutshell in the carbonized residues are compared with those that this analyst has examined from sites in nearby Perry County, in terms of both abundance and

species diversity, it would appear that the nutshell spectra from the Little Muddy sites are comparatively impoverished. Does this perhaps indicate a diminished role for this resource in the area under consideration? Or does this observation reflect on the context, size, and number of flotation samples available for this analysis?

Thirdly, while possible "native" cultigens have been observed at both open-air sites in the study area, the evidence for intensive seed harvesting and/or cultivation suggested by the concentration of charred knotweed seeds in Feature 2 at 24B2-231 affords the best single example of this subsistence strategy in the general area of these sites with which the analyst is currently familiar. Two smaller concentrations of 27 and 28 seeds of erect knotweed were previously reported by this analyst for the Late Woodland Jamestown site on Galum Creek, another tributary of the Big Muddy River, in Perry County (Cremin 1985: 27-28). Nevertheless, without a larger sample of carbonized residues to study, the potential significance of the aforementioned observation regarding the role of starchy seeds in the overall subsistence strategies of the prehistoric residents of the Little Muddy and other tributary watersheds in this general area cannot be fully evaluated.

Finally, it has been recognized for some time that the tropical cultigen, C. pepo, together with three other oily seeds, marshelder, sunflower, and bottle gourd, and the starchy seeds of knotweed, goosefoot, and maygrass, has played a role of some importance in the subsistence of Middle and Late Woodland populations in west central Illinois. However, while squash seeds are seldom recovered, reflecting the very fragile nature of the achene and its inability to

withstand even partial combustion, squash rind fragments do occur ubiquitously at many sites; albeit they are recovered in very small quantities. It bodes well for the future of archaeobotanical research, and subsistence studies in general, that similar observations are now being noted for Woodland (and Mississippian) sites in tributary drainages of the Big Muddy River Valley of southern Illinois.

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