

The 1974–1975 Archaeological Excavations at Owl Cave (15Ed43), Mammoth Cave National Park, Kentucky

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ABSTRACT

Archaeological excavations in the vestibule of Owl Cave (15Ed43) during winter 1974–1975 revealed the presence of Early, Middle, and Late Archaic/Early Woodland occupations. Analysis of the archaeological record from Owl Cave indicates that Early Archaic environmental exploitation was focused toward deer hunting and was without evidence of horticulture. Middle Archaic cultures using the Owl Cave vestibule exploited a wider range of resources, following a more diffuse economic subsistence pattern. The incipient horticultural evidence from the “large caves” in the Mammoth Cave area (e.g., Mammoth, Salts, and Lee), and from evidence within the archaeological record at Middle and Late Archaic shell mounds in the Big Bend region of Green River, probably arose from a diffuse economic subsistence pattern as evidenced by the number of environmental zones exploited by Middle Archaic Owl Cave residents and as exemplified by the Horizon II archaeological record at Owl Cave. Late Archaic/Early Woodland levels at Owl Cave contain meager evidence of plant domestication (a single *Cucurbita* seed hull).

INTRODUCTION

Archaeological excavations at Owl Cave in Mammoth Cave National Park (MCNP), Kentucky, began outside the cave entrance in fall 1974 but, due to excessively bad weather, were moved into the gridded south portion (four, 1 × 1 m test units: C, D, E, and F) of Owl Cave vestibule. Excavations continued from December through January 1975. Additional excavations were carried out by Dr. Darlene Applegate from Western Kentucky University in 1999 prior to installation of a cave gate at Owl Cave (Applegate 1999). The content of this paper, however, addresses only the materials recovered during the 1974–1975 Owl Cave excavations supervised by Carstens.

The Owl Cave excavations were a part of a larger project directed by Dr. Patty Jo Watson of Washington University, St. Louis, Missouri, that addressed the origins of plant domestication in the Eastern Woodlands (Crothers 2001; Crothers et al. 2002; Marquardt and Watson n.d.; Watson 1969, 1974; Watson and Kennedy 1991).

The general excavating format used at Owl Cave included removing deposits by 10 cm arbitrary levels and taking four flotation samples when possible per level. (Flotation samples are 10 liter bags of soil removed from each excavation level, then separated for microscopic and macroscopic evidence of seeds, artifacts [ceramic, lithic, bone, ground stone],

and animal bones.) Excavation was accomplished by troweling and occasionally by shovel-skimming. Whenever prehistoric artifacts were found in situ, they were plotted using a cartesian coordinate system for spatial (horizontal) and temporal (vertical) control. Excavations were halted when limestone bedrock was encountered.

CAVE STRATIGRAPHY

Variations in depositional processes at Owl Cave may be related to both cultural and natural processes. Cultural occupation in the grid-south area of Owl Cave vestibule began ca. 8000 years ago and occurred before the deposition of loamy sands. Numerous artifacts were found lying on limestone bedrock within the cave excavations. Occupation was not intensive at any one time but occurred sporadically as revealed by the excavation of four 1 × 1 meter excavation units. Several lenses of ash, and/or ash and charcoal, indicate that fire building occurred inside the vestibule area, but no hearths were encountered within any of the excavations. Although charcoal flecks were present, not enough were collected for a radiocarbon date. It appears that prehistoric use of the cave ceased by 2000 years ago.

Limestone breakdown (ceiling collapse) was deposited concurrently with the deposition of cultural deposits; however, this natural deposition was probably not a major consideration for transitory vestibule inhabitants. Soil and

Table 1. Stratigraphical sequence and date ranges at Owl Cave, Mammoth Cave National Park, Kentucky.

| Excavation unit and level | | | | | Date range |
|---------------------------|-----|---|-----|---------|---------------------|
| C | D | E | F | Horizon | |
| 1 | 1-2 | 1 | 1 | H III | 4000-2500 years ago |
| 2-3 | 3-5 | 2 | 2-3 | H II | 5000-2400 years ago |
| 4 | 6-8 | 3 | 4-7 | H I | 8000-4000 years ago |

pollen samples were collected from the combined deposits, but the analysis of these samples by specialists was never completed. These samples are now curated in the cultural resources lab at Washington University, St. Louis, Missouri, and at Mammoth Cave National Park, Edmondson County, Kentucky.

Based on the cultural and natural deposits at this site, three cultural periods were distinguished in the Owl Cave excavations: a basal Horizon I, which probably dates between 8000 and 4000 years ago; a middle Horizon II, which probably dates between 5000 and 2400 years ago; and a Horizon III, which overlaps with Horizon II and dates between 4000 and 2500 years ago (Table 1). This dating sequence is based on the presence of temporally diagnostic bifacial projectile point styles (e.g., arrowheads) that have been dated by conventional radiocarbon dating methods.

ARTIFACT DESCRIPTIONS

The artifacts recovered from Owl Cave vestibule may be grouped into the following categories: utilized and non-utilized chipped stone, vertebrate faunal remains, non-vertebrate faunal remains (not discussed in this paper), and botanical remains. The following is a brief description of these categories presented by cultural horizon.

A total of 462 pieces of chipped stone was recovered from the four test units. Two different methods of analysis were used for the chipped stone materials recovered in situ and from the screening box: (1) hand tabulations for units C, E, and F; and (2) computer tabulations of morphological traits for unit D. The former analysis concentrated on the fluctuation of blade, non-blade, and waste flake production through time. It also emphasized the specific area of the core from which the flake was detached. All chert was examined for possible special methods of treatment, such as

heat-treating. The computer-tabulated study was accomplished to provide a single stratigraphic control sample that might demonstrate developments in lithic technology through time. Similar controls and studies have been used at other archaeological sites in MCNP.

Only 8% of the excavated chipped stone sample evinces utilization. This very small percentage supports the idea that the site was used sporadically and that cultural activities at the site were not intensive. The utilized materials can be subdivided into bifacial (projectile and non-projectile) and unifacial categories. A biface is a chipped stone tool that is worked on two opposing faces. A unifacial tool has workmanship (chipping) along only one edge. The bifacial category represents about 5% of the total chipped stone category and 64% of the total utilized stone inventory.

Horizon I, representing the lowest stratigraphic levels of the site, contained three projectile points/knives; Horizon II had four, and Horizon III contained one projectile fragment (Figure 1). The three projectiles from Horizon I varied in shape, yet the three styles are common Early to Middle Archaic forms, ca. 8000-5000 years ago. One point is a small, triangular, untyped side-notched version. It resembles a Lamoka projectile (ca. 3000-5000 years ago) but occurs in a context with other points that pre-date Lamoka style projectiles (Ritchie 1932). This projectile point form is not common in the central Kentucky karst area, but another similar side-notched point was found on the surface at Owl Cave. This Lamoka-like point is very similar in size and appearance to Tremble and Merom side-notched points of the Wabash Valley's Riverton culture that dates between 4000 and 3000 years ago (Winters 1969:151-154).

A second point was found in test unit C, level 4. This projectile point, similar to the MacCorkle style, is characterized by a large, corner-notched, triangular blade with a bifurcated base. This point was used ca. 8000 years ago.

The third projectile form is similar to the Cypress Creek I point type (Lewis and Lewis 1961:13). Cypress Creek I projectiles were found in the Stratum IV horizon at the Eva site and have been dated to 7200 B.P. \pm 1500 (M-357). On the basis of projectile point ty-



Figure 1. Excavated and surface collected projectile points from Owl Cave, Mammoth Cave National Park, Kentucky. **A.** Adena projectile form, Horizon II. **B-D.** Surface collected early and middle projectile point forms. **E-F.** Buck Creek projectile forms, Horizon II. **G.** MacCorkle projectile form, Horizon II. **H.** Turkey-tail projectile form, Horizon III. **I-K.** Horizon I projectile forms (I, MacCorkle; J, Cypress Creek; and K, Lamoka-like).

pology, Owl Cave Horizon I should date between 8000 and 5000 years ago.

The four projectile points recovered from Horizon II include three recognizable projectile forms: two Buck Creek, a MacCorkle, and an Adena. The Early Archaic MacCorkle form was found above the Buck Creek type in Test Unit E, out of temporal context. It likely represents either artifact mixing in the shallow Horizon II deposit of Test Unit E or the continued use, reuse, or curation of an earlier projectile variety found on site by Native Americans. The Buck Creek projectile style was described by Seeman (1975:106–108). It is a small (ca. 2–4 cm) triangular point that has straight to incurvate lateral margins and usually a straight to slightly expanding stem. The stem cuts deeply into the blade, producing a barbed projectile. Seeman places this

projectile type in the Late Archaic to Early Woodland periods for southern Ohio (ca. 4000 to 2400 years ago). This projectile type has been found in Late Archaic deposits (ca. 5000 to 3500 years ago) (Hay 1957:9–15) in Montgomery County, Tennessee. The Adena point may be found in contexts ranging from Early Woodland to Late Woodland but usually dates between 2800 and 2400 years ago. Thus, projectile point typology indicates Owl Cave Horizon II probably dates to the Late Archaic/Early Woodland transitional period, ca. 5000–2400 years ago.

A fragment of one projectile point resembling the Turkey-tail was recovered from Horizon III. According to Bell (1960), this form is transitional Late Archaic–Early Woodland and has been found in contexts dating between 4000 and 2500 years ago. This time

range overlaps with Horizon I. Numerous turkey-tail points have been found in Mammoth Cave National Park, especially on the surface at Salts Sink (Watson 1974:14).

The metrical descriptions of the non-projectile, bifacial and unifacial, utilized chipped stone materials, described by horizon, illustrate that the total number of utilized non-projectile materials is small, and that the data reveal insight about chipped stone tool production at Owl Cave.

The frequency of utilized non-projectile artifacts increases slightly from Horizon I to Horizon II. This increase is followed by a decrease in Horizon III. The mean length/width and mean thickness/weight ratios also exhibit some variability and similarity between bifacial non-projectile forms and unifacial tools. There is a tendency for bifacial tools to be larger and heavier than unifacial tools at Owl Cave through time. A possible explanation for this is that bifacial tools may perform more "heavy-duty" tasks than do unifacial tools, such as butchering, as opposed to skinning or scraping. Unifacial tool length also appears to decrease through time, yet the average width per tool increases. Such a size change may represent a functional difference of tool use through time. Unifacial tools at Owl Cave demonstrate a change from multi-purpose cutting-scraping tools (e.g., jackknife-like function) to a more specific (specialized) function (e.g., end scrapers). There also appears to be a cultural selectivity for either flake size or flake task, as length-width and thickness-weight categories do not overlap as would be expected if there were no cultural selection for flake size.

Flake type characteristics of the non-utilized chipped stone materials indicate that there is an infrequency of decortication flakes (chipped flakes with an exterior cortex) in the entire chipped stone industry at Owl Cave. Fifteen percent of the hand-tabulated material was comprised of decortication flakes, but only 5% had primary coverage (i.e., more than 90% of the surface covered with cortex). This may indicate that chert and semi-finished chipped stone tools were "roughed-out" elsewhere and brought back to Owl Cave for completion and use. This pattern remains somewhat constant throughout the cultural horizons with percentages of 6.6 for HI, 5.3 for HII, and 4.0

for HIII, respectively. Additional evidence is found in the extremely high and diachronically consistent percentages of non-identifiable waste flakes, which consistently constitute about 50% of the non-utilized chipped stone materials (Horizon I, 53%; HII, 49%; HIII, 45%). The total weight of waste flake averages less than 0.9 g per flake. I would suggest that similar chipped stone tool manufacturing activities (tool manufacture and completion, and tool maintenance) occurred throughout the sporadic occupations at Owl Cave.

FAUNAL REMAINS

A total of 272 non-human vertebrate faunal remains was recovered from the four test excavations in Owl Cave vestibule. Seventy-five percent of these vertebrate remains ($N = 204$) were identified to genus. Of this total, the remains of white-tailed deer were the most abundant, constituting 81% of the identifiable remains.

The predominance of deer bone to non-deer bone demonstrates that a focal hunting pattern was emphasized at Owl Cave. Emphasis on deer hunting occurs diachronically and is very similar in frequency to the focal hunting evidenced at other Early Archaic through Late Archaic sites (e.g., the Eva site, the Carlston Annis site, and the Riverton site) (Crothers n.d.; Glore n.d.; Lewis 1996; Lewis and Lewis 1961; Phillips and Brown 1983; Marquardt and Watson n.d.; Webb 1950; Winters 1969). A gradual decrease in the hunting of smaller animals (e.g., squirrels, rabbits, and raccoons) also occurs through time. A complete absence of turkey in Horizon III may be significant and may further substantiate the subsistence commitment to a hunting pattern focused on deer. Conversely, however, the number of exploited floral ecological zones increases through time. The changes in faunal frequencies, especially between Horizons II and III (Late Archaic to Early Woodland) may be related to changes in the economic subsistence system or social structure of the site's inhabitants. That is, emphasis in subsistence pursuits may have changed from focal hunting-focal niche exploitation to focal hunting and limited multi-niche exploitation. A shift such as this could explain the continued dominance of deer hunting and the decrease in the exploitation of lesser animals *if* diffuse niche

exploitation was shifting toward gathering and processing of plant foods. There is some indication, such as charred hickory nut-shell fragments and several carbonized seeds, that plant fruits were being collected (Wagner 1976, 1978).

The cultural selectivity for a particular anatomical area of the deer is also indicated by the data. Skeletal remains from the excavated sample consistently reflect selection for four areas of the deer: cranial (usually represented by antler fragments), axial (vertebral column), pectoral (forelimbs), and pelvic (hind limbs). A fifth category, general appendicular, includes those bone fragments probably representing long bones (e.g., femur, tibia, metapodial, and humerus); these were too small for exact identification. There appears to be a definite selection for the pelvic and rear anatomical areas, especially that area from the innominate through the tibia that contains the maximum amount of meat and fat on a deer. Axial and cranial fragments are relatively low in frequency. The element most frequently identified for the cranial area was antler, especially in Horizon II. However, many of these antler remains belonged to the same fragmented antler tool that was not reassembled until after the identification process and therefore skewed the frequency tabulations. Nonetheless, the preponderance of antler tools at the site indicates that deer antler was of technoeconomic importance to the prehistoric inhabitants of Owl Cave and that selectivity for certain anatomical areas of the deer was practiced by the occupants of Owl Cave throughout each occupation.

SEASONALITY

Three independent lines of evidence indicate that the vestibule of Owl Cave was used in the late fall to early winter: species of animals present in the archaeological record, age of identified animals, and type of identified botanical materials.

Kentucky winters are usually mild, and animals that might be less available (e.g., box turtle and squirrels) in areas north of the Ohio River are occasionally accessible in the Green River area year round. Secondly, tooth eruption rates of white-tailed deer indicate that the dental remains of deer found within Horizons I through III range between 1.5 and 1.75

years of age. Hence, because deer are usually born in late May to early June, the dental remains represent deer killed between October and January of the following year. The presence of charred hickory nut-shell in association with these deer remains gives additional support to this seasonality of site occupation, unless the nut remains were stored (there is at present no evidence of storage pits or containers from Owl Cave).

BONE TOOLS

Ten bone tools and tool fragments were recovered from the excavations in Owl Cave vestibule. All of these tools were made from deer bone, especially deer antler (60%). Only four bone tools were found in Horizon I. Two of these tools made from deer antler are fragments from the distal antler tine and were probably used as an antler pressure flaker. Another bone tool probably functioned as a side scraper or as some other hide-working implement. The last specimen is a small fragment of a deer long-bone shaft. It is pointed and exhibits some degree of use. It may have functioned as a small bone punch or awl.

Horizon II also contained four bone tools and/or tool fragments. Three of these tools, made from deer antler, demonstrate distal "edge wear" of the kind expected had they been used to knap chert by means of pressure flaking or indirect percussion flaking. The fourth specimen probably functioned as an awl or bone punch for leather working.

Only two bone tools were found in Horizon III. One specimen may be either a punch or fragment of an antler projectile point. However, the lack of wear (polish) on the distal end and the absence of a socket for hafting on the proximal end indicate that neither suggestion is completely satisfactory. The other specimen is a long bone shaft fragment with a small semi-circular depression along the lateral edge. The depression is highly polished over an area ca. 8 mm in length. This tool may have been used as an abrader or spokeshave for such items as wood or cane.

The bone tool inventory is small in number, but the repetition of similar tool types indicates that the bone tool industry functioned similarly through time at Owl Cave and appears to have been rather limited in its variety.

BOTANICAL

An analysis of charred botanical remains recovered in the 63.5 mm² fine screen mesh sifting screens (Wagner 1976) and by flotation (Wagner 1978) offers insight into the botanical subsistence base at Owl Cave. Wagner's data, when presented by cultural horizon, indicate that both charred wood and hickory nut (*Car-ya*) remains were somewhat equally represented and utilized during Horizon I. The frequency of hickory nuts continue to increase into Horizon II, while the frequency of charred wood diminishes rapidly. Both types of charred botanical remains, especially hickory nut, become infrequent in Horizon III.

A charred walnut (*Juglans*) hull was found in Horizon II. A single squash (*Cucurbita*) seed hull was found in Horizon III, indicating the possible presence of horticultural activity or associated activity occurring at Owl Cave during Horizon III (ca. 4000–2500 years ago). This is the same time interval of incipient horticulture observed at the large caves in MCNP (Mammoth, Salts, and Lee), and within the Late Archaic shellmound deposits west of the Park in the Big Bend Region of Green River in Ohio and Butler counties (Prentice 1994).

INTERPRETATION OF THE OWL CAVE VESTIBULE CULTURAL REMAINS

The cultural deposits in Owl Cave range in age from ca. 8000 to 2500 years ago. This temporal span may be divided into three cultural horizons on the basis of projectile point typologies and stratigraphic similarities. Overall, the material cultural remains are similar throughout the cultural horizons except for fluctuations in frequency. It is the changing frequencies of certain artifacts and ecofacts that enable an interpretation of the cultural record.

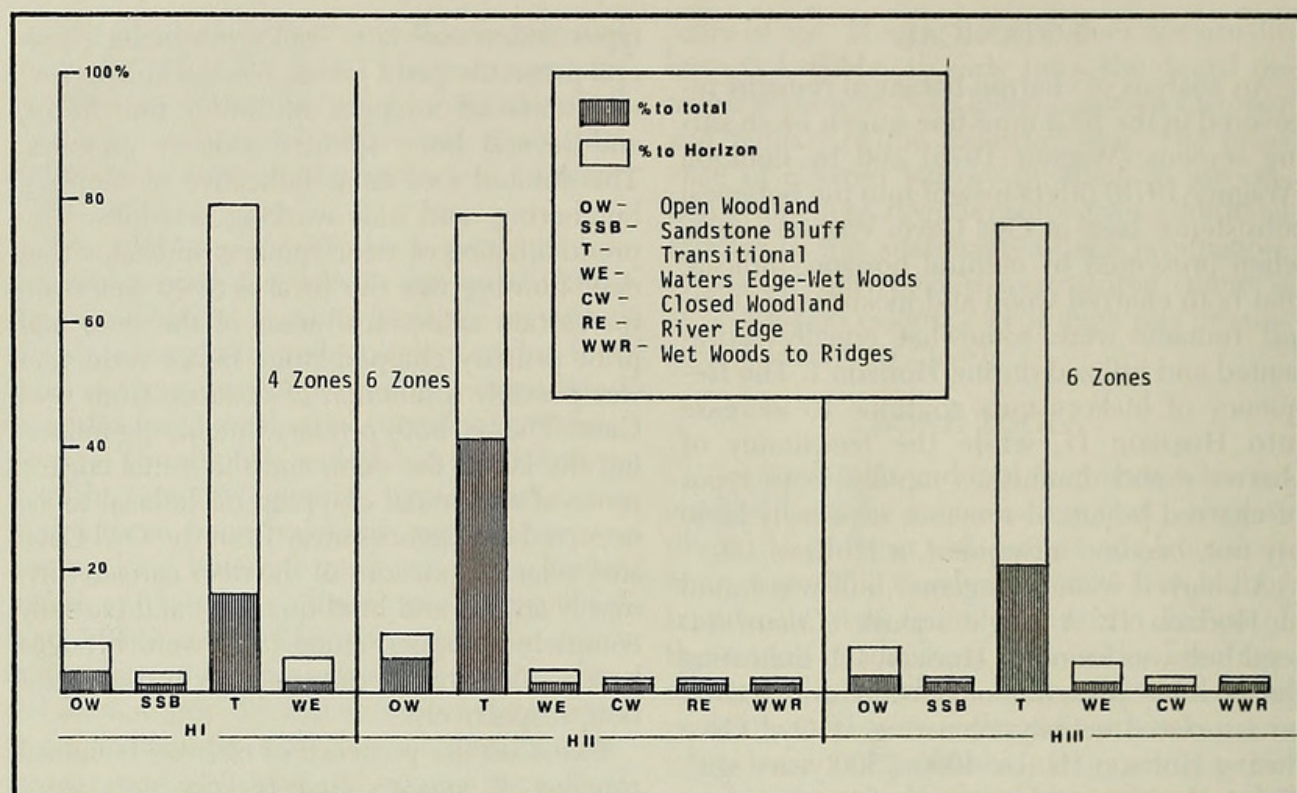
Horizon I is the oldest of the three cultural horizons. Projectile point typology indicates that Horizon I dates between 8000 and 5000 years ago. The artifacts within this horizon demonstrate sporadic activity at a special purpose site. Both the techno-economic and related subsistence pursuits appear to be focused. The techno-economic cultural subsystem is inferred from the material remains, such as tool types and/or tool kits. There is a low degree of variation and frequency of tool

types and/or tool kits. Tool types include several projectile point forms, bifacial knives, several unifacial scrapers, an antler tine flaker, and several bone splinter awls or punches. This limited tool kit is indicative of hunting, butchering, and hide-working activities. The predominance of deer remains indicates that deer hunting was the focal activity. Selection for certain anatomical areas of the deer and prior primary chipped stone biface reduction was possibly a function of distance from Owl Cave. That is, both primary butchering following the kill of the deer, and the initial cortex removal and initial chipping on bifacial tools, occurred at distances away from the Owl Cave site; selected portions of the deer carcass (primarily antlers and hind quarters) and partially completed chipped stone tools were brought back to the site for consumption and completion, respectively.

Based on the presence of charred botanical remains, it appears that hickory nuts were gathered to supplement the protein-rich diet. The frequency of this gathering process in Horizon I is not as great as in Horizon II. As is the case with Horizons II and III, there were no vegetal processing tool kits recovered in Horizon I.

The overall interpretation of Horizon I is that focal techno-economic subsistence strategies were employed sporadically between 8000 and 5000 years ago. These activities focused on the hunting of deer. The hunting and processing of deer may well have been accomplished by a small band of hunters, probably all male. The sporadic human occupancy of Owl Cave vestibule during Horizon I occurred between the late fall and early winter seasons.

Horizon II seemingly dates from about 5000 to 2400 years ago and is therefore equivalent with the Late Archaic to Early Woodland cultural periods. Projectile points changed in style from side-notched and bifurcated-types to stemmed varieties. Chert flakes appear to have been selected by size to make up a slightly more diversified chipped stone tool kit consisting of unifacial (smaller) and bifacial (larger) tools. There is also a greater range in the number of ecological habitats exploited as interpreted by the types of biological remains (ecofacts) preserved at the site (Figure 2). Larger frequencies and greater varieties of this material were interpreted as representing



Animal Habitats Exploited by Owl Cave Inhabitants

Figure 2. Animal habitats exploited by Owl Cave inhabitants, Mammoth Cave National Park, Kentucky.

a more diffuse techno-economic subsistence adaptation. The continued dominance of deer hunting, however, argues against defining the cultural adaptation as diffuse. Yet the greater variance of Horizon II subsistence practices argues for an increase in population size, or an increase in occupation intensity, or both. Although the array of eco-niche exploitation in Horizon II increases slightly, the intensity and importance of multi-niche exploitation is *not* indicated by the Owl Cave data. The data *do* indicate incipient diffuse exploitation practices. The importance of this non-intensive, multi-niche subsistence "dabbling" is that it hints of a greater cultural awareness and use of environmental resources than is evidenced in Horizon I. It is possible that changes were occurring in the overall social structure of the Owl Cave culture as a result of some unknown stress factors during the Horizon II period, e.g., increase in population pressure or environmental change or both (Boserup 1965; Cohen 1977). Or, as Cleland (1976) suggested, social change may have resulted from the observable successfulness of the Horizon I focal hunting pattern (Sauer 1950, 1952; Watson

and Watson 1969). In theory, the result of a successful focal economy is that innovation is "born of luxury, not necessity" (Cleland 1976: 61). It is the implied sedentism and successfulness of the focal economy that provides economic security and experimentation with local environments, out of which cultural change gradually occurs. The evidence indicates that the initial multi-niche contact that is evinced in Horizon II of Owl Cave exhibits characteristics of a new mode of cultural adaptation in the central Kentucky karst. Although there is no definite evidence of horticultural activities in the upper portions of Owl Cave's Horizon II, as there is at Salts Cave between 2800 and 2400 years ago, there is evidence of a slight increase in the number of ecological niches exploited by the Owl Cave inhabitants. It is this expansion of environmental-zone exploitation that is interpreted as a period of early plant experimentation and economic (subsistence) change. However, persistence of more refined and developed horticultural pursuits depends on its own success.

Horizon III overlaps with the terminal range of Horizon II and probably dates be-

tween 4000 and 2500 years ago. The undisturbed portion of Horizon III is a continuation of the more open or "diffuse" economy of Horizon II. The general decrease in the frequency of similar chipped stone and bone tool types in Horizon II, and the continued but minor importance of multi-niche exploitation, are interpreted as a decrease in site use. The example of *Cucurbita* may represent possible horticultural pursuits. As in Horizons I and II, Horizon III probably was occupied during the late-fall (October) to early-winter seasons by a small band of hunters. The charred squash hull may indicate storage of *Cucurbita* as part of the Owl Cave occupant's subsistence base.

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LITERATURE CITED

- Applegate, D. 1999. Archeological assessment of the Owl Cave Gate Installation Project, Mammoth Cave, Kentucky. Department of Anthropology, Western Kentucky University, Bowling Green, KY.
- Bell, R. E. 1960. Guide to the identification of certain American Indian projectile points. Spec. Bull. Oklahoma Anthropol. Soc. 2.
- Boserup, E. 1965. The conditions of agricultural growth: the economics of agrarian change under population pressure. Aldine Publishing Company, Chicago, IL.
- Carstens, K. 1975. Surface archaeology in Mammoth Cave National Park, Kentucky. Paper presented at the 40th annual meeting of the Society for American Archaeology, Dallas, TX.
- Carstens, K. 1980. Archaeological investigations in the central Kentucky karst. Ph.D. Dissertation. Department of Anthropology, Washington University, St. Louis, MO.
- Cleland, C. E. 1976. The focal-diffuse model: an evolutionary perspective on the prehistoric cultural adaptations of the eastern U.S. Midcontinental J. Archaeology. 1(1):59-76.
- Cohen, M. N. 1977. The food crisis in prehistory. Yale Univ. Press, New Haven, CT.
- Crothers, G., n.d. Vertebrate fauna from the Carlston Annis site. In W. Marquardt and P. Watson (eds). Archaeology of the Middle Green River Region, Kentucky. Univ. Alabama Press, Tuscaloosa, AL. In press.
- Crothers, G. 2001. Mineral mining and perishable remains in Mammoth Cave: examining social process in the Early Woodland period. Pages 314-334 in P. Drooker (ed). Fleeting identities: perishable material culture in archaeological research. Center for Archaeol. Invest., Occasional Paper 28. Carbondale, IL.
- Crothers, G., C. Faulkner, J. Simek, P. Watson, and P. Willey 2002. Woodland cave archaeology in eastern North America. Pages 502-524 in D. Anderson and R. Mainfort (eds). The woodland southeast. Univ. Alabama Press, Tuscaloosa, AL.
- Glore, M. n.d. Zooarchaeological analysis of Bt 5, operation C. In W. Marquardt and P. Watson (eds). Archaeology of the middle Green River region, Kentucky. Univ. Alabama Press, Tuscaloosa, AL. In press.
- Hay, T. B., Jr. 1957. The Coleman's cave investigation. Tennessee Archeol. 14(1).
- Lewis, R. B. 1996. Kentucky archaeology. Univ. Press of Kentucky, Lexington, KY.
- Lewis, T. M. N., and M. K. Lewis. 1961. Eva: an archaic site. Univ. Tennessee Press, Knoxville, TN.
- Marquardt, W., and P. Watson (eds). n.d. Archaeology of the middle Green River region, Kentucky. Univ. Alabama Press, Tuscaloosa, AL. In press.
- Phillips, J. L., and J. A. Brown (eds). 1983. Archaic hunters and gatherers in the American Midwest. Academic Press, New York.
- Prentice, G. 1994. A settlement pattern analysis of prehistoric sites in Mammoth Cave National Park, Kentucky. Ph.D. Dissertation. Department of Anthropology, Univ. Florida, Gainesville, FL.
- Ritchie, W. A. 1932. The Lamoka lake site. Res. and Trans. New York State Archaeol. Assoc. 7(4). Rochester, NY.
- Sauer, C. 1950. Cultivated plants of South and Central America. Pages 487-543 in J. H. Steward (ed). Handbook of South American Indians. Bur. Am. Ethnol. Bull. 143.
- Sauer, C. 1952. Agricultural origins and dispersals: the domestication of animals and foodstuffs. Am. Geogr. Soc. Reprinted 1969, Massachusetts Institute of Technology, Cambridge, MA.
- Seeman, M. 1975. The prehistoric chert quarries and workshops of Harrison County, Indiana. Indiana Archaeol. Bull. 1(3). Bloomington, IN.
- Wagner, G. E. 1976. Aboriginal plant use in west-central Kentucky. A preliminary report of surface sites in the Mammoth Cave area. Paper presented at the 17th annual meeting of the Society for Economic Botany. Univ. Illinois, Champaign-Urbana, IL.
- Wagner, G. E. 1978. An archaeobotanical analysis of five sites in the Mammoth Cave area. Master's Thesis. Department of Anthropology, Washington Univ., St. Louis, MO.
- Watson, P. 1969. The prehistory of Salts Cave, Kentucky. Rep. Invest. 16. Illinois State Museum, Springfield, IL.
- Watson, P. (ed). 1974. The archaeology of the Mammoth Cave area. Academic Press, New York. Reprinted 1997, Cave Books, Saint Louis, MO.
- Watson, P., and M. Kennedy. 1991. The development of horticulture in the eastern woodlands of North America.

- ca: women's role. Pages 255-275 in J. Gero and M. Conkey (eds). *Engendering archaeology, women and prehistory*. Basil Blackwell Publisher, Oxford.
- Watson, R. A., and P. J. Watson. 1969. *Man and nature: an anthropological essay in human ecology*. Harcourt, Brace & World, Inc., New York.
- Webb, W. 1950. The Carls[t]on Annis Mound, Site 5, Butler County, Kentucky. *Reports in Anthropology* 7(5). Univ. Kentucky, Lexington, KY.
- Winters, H. 1969. The Riverton culture: a second millennium occupation in the central Wabash valley. *Rep. Invest.* 13. Illinois State Museum, Springfield, IL.



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