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SCIENCE VERSUS GRAVE DESECRATION: THE SAGA OF LAKE HOLE CAVE

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In the spring of 1990, a prehistoric burial site in a small cave in Cherokee National Forest, Johnson County, Tennessee was almost completely destroyed by artifact collectors. Archaeological investigation of the disturbed deposits, conducted with the consent of the Eastern Band of Cherokee, yielded thousands of human skeletal remains, faunal remains, and artifacts. There may be hundreds of similar sites yet undiscovered within limestone and dolomite rocks of the southern Appalachian region. Efforts should be made by scientists and government agencies to discover prehistoric burial caves and to protect them, as American natives consider them sacred places.

Lake Hole Cave (40JN159) is situated on a south-facing hillside on the north side of Watauga Lake in Cherokee National Forest, northeastern Tennessee. The cave is a small solution cavity in the Shady Dolomite which forms the easternmost carbonate rock in the Valley and Ridge physiographic province. Unfortunately, Lake Hole Cave was discovered by individuals whose primary interest was the acquisition and selling of Native American artifacts and skulls. Sometime prior to March 26, 1990, at least one group of vandals dug in the cave (Jefferson, 1992). On March 26, 1990, a Cherokee National Forest employee saw the cave entrance, with a large pile of loose dirt, rocks, bones, and modern litter extending down slope. The District Ranger was alerted and immediately coordinated communications with the forest archaeologists, special agents, and other forest service law enforcement officers. The cave was visited by this group the same afternoon. Upon entering, they found digging equipment, scattered human skeletal remains, bags of human skulls, and a bag of marijuana. Within one day, Lake Hole Cave was placed under 24 hour surveillance.

On March 29th, three individuals were observed to enter the cave with shovels and were arrested after it was evident that they had commenced digging. All three pled guilty to formal charges of ARPA (Archaeological Resources Protection Act of 1979) violations for unauthorized excavation, removal of items, damage, or attempting to do such to an archaeological resource located on public lands of the United States. After one of the defendants was contacted by a local collector, who wanted to sell Indian artifacts reportedly from the cave, the federal agent asked the individual to wear a hidden recording device and meet the collector. Two subsequently taped conversations implicated the collector and other individuals. The group of defendants in the Lake Hole ARPA case grew to a total of nine, based upon the recorded evidence and subsequent testimony from four of the looters. Among the defendants charged were the Greene County assistant tax assessor and a local felon with a reputation for violence. In addition, the father of one defendant was arrested for felony jury tampering and felony obstruction of justice when it was discovered that he had attempted to persuade a jury member not to find his son guilty (Jefferson, 1992).

Two separate trials ensued in October of 1990 with eight of the nine pleading guilty. The jury trial found one individual guilty of all three felony counts. Five of the nine received ARPA felony convictions; and four received convictions of ARPA misdemeanors. The imposed sentences varied dramatically, from two years probation plus $499 fine, to a 22 month prison sentence (the local felon was given six months imprisonment for the ARPA misdemeanor and 16 months imprisonment for a felony weapons violation when it was discovered that he possessed 18 firearms while on probation for a prior felony).

Because Native American burials were desecrated, the Tennessee State Historic Preservation Office and the Regional Forest Service Committee for the Treatment of Human Remains were consulted. It was decided that the human remains would be delivered to the neighboring Eastern Band of Cherokee for reburial in a traditional manner. The Tribal Council of the Eastern Band of Cherokee sent an official delegation to the sentencing of the defendants. The Tribal Council Chair, Dan McCoy, read into the court record (Jefferson, 1992) a very strongly worded condemnation of the actions of the looters and:

"prayed for the imposition of the maximum penalties allowed by law upon these nine defendants, it being the strong feeling of the Tribal Council that such penalties are proper and deserved because of the actions of these defendants and their past history of Indian depredations and are further justified in order to discourage other persons from continual or similar depredations against the remains and spirit of the Cherokee people."

LAKE HOLE CAVE ARCHAEOLOGY

In the spring of 1991, Appalachian State University (ASU) was contacted by the U.S. Forest Service and the Eastern Band of Cherokee Indians, and a Challenger Cost Share Agreement

was negotiated to conduct archaeological investigations at Lake Hole Cave (Whyte & Kimball, 1992). The purposes of these investigations were to recover human remains and artifacts from the disturbed contexts for reburial and to assess the informational damage done to the site. In the process, it was hoped that some knowledge of the nature and human use of the cave would be obtained. This project was directed by Dr. Thomas R. Whyte and Dr. Larry R. Kimball, of the Department of Anthropology at ASU, in cooperation with Cherokee National Forest archaeologists Quentin R. Bass and Norman D. Jefferson. The excavations were undertaken by students from ASU and a Cherokee tribal member who, at that time, was an Anthropology major at Western Carolina University. Dr. Ellen Cowan, of the Department of Geology at ASU, was responsible for geological investigations of the cave. Dr. Donna C. Boyd and Dr. C. Clifford Boyd of the Department of Anthropology at Radford University, undertook the identification and analysis of human skeletal remains recovered from the cave. Fieldwork was conducted from May 20 through July 12, 1991. Over 200 volunteers contributed roughly 1500 hours to the recovery and processing of materials from the site.

The cave consists of two small chambers. One extends horizontally more than 11 m to the right of the entrance (Figure 1). The left chamber extends over 6 m to the left and down slope from the cave entrance. Prior to the excavations, a person could stand erect only in the middle of the right chamber. The original entrance was probably no more than a half meter in diameter and may have been deliberately sealed with large dolomite slabs in prehistoric times. A locked iron gate framed in concrete now protects the cave.

After a lighting system powered by a generator was installed, the cave's interior was subdivided into horizontal excavation units, normally one meter long by the width of the cave (less than 3 m). Eighteen such units were excavated in the areas observed to have been disturbed (Figure 1). Undisturbed deposits were documented in the far reaches of the left chamber and the rear third of the right chamber. Each unit was excavated by natural strata, if observable, or arbitrary levels. These "strata" however, turned out to be loads of variably colored sediment moved from one place to another during the episodes of looting. Vertical control was maintained by reference to datum points fixed along the cave walls. Sediment was troweled into provenience-labeled polypropylene feed bags for transport to the screening site. All excavated sediments (over 20,000 kg) from approximately 24 m^3 of disturbed contexts were wet-screened through nested 0.64 and 0.32 cm mesh.

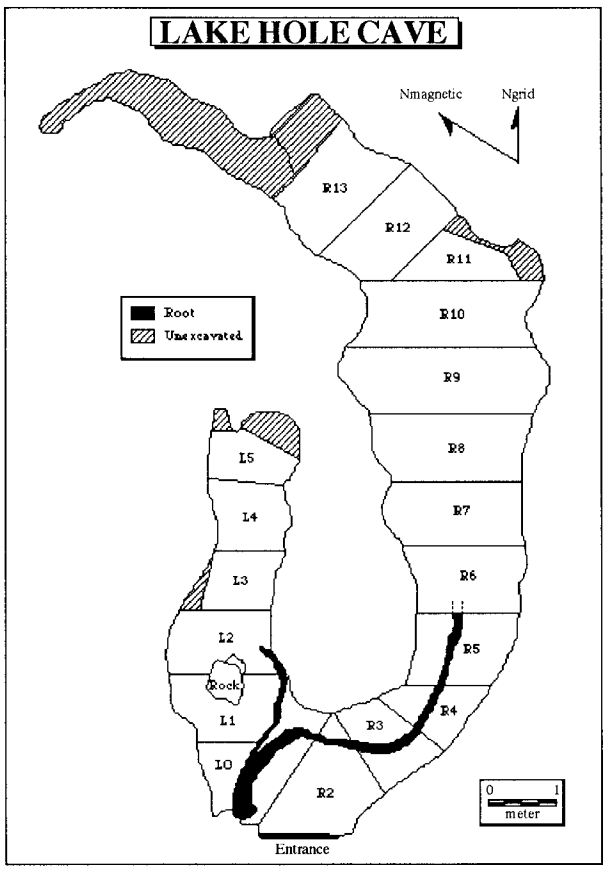

Figure 1. Plan view of the ground surface and excavation units within Lake Hole Cave, Johnson County, Tennessee.

RESULTS OF THE INVESTIGATION

The cave's deposits had undergone considerable damage as a result of vandalism and bioturbation. No completely intact burials were observed, although a few may remain preserved in undisturbed contexts. In addition to thousands of scattered and broken human elements, over 6,000 marine shell beads, 25 triangular arrowpoints, five stone tools, 67 pieces of stone debitage, eight bone and antler tools, 17 bone beads, 136 pottery sherds, and many thousands of animal and plant remains were recovered. It is likely that items of copper (copper staining occurred on a few human elements), pipes, pots, shell beads, arrowpoints, and human remains (especially skulls) were removed by the vandals. No evidence of prehistoric human use of the cave, for any other purpose than burial, was found. Although the deposits investigated had been severely vandalized, all of the prehistoric artifacts recovered appear to have been associated with human interments.

The human remains and artifacts recovered from Lake Hole Cave are much older than had originally been assumed. The recovery of smoothed-over rectilinear complicated stamped and net-impressed pottery with Woodland period rim treatments, the base of a Uwharrie vessel, and Hamilton incurvate-type triangular arrowpoints suggest a Late Woodland to Early Mississippian period (ca. A.D. 800-1200) association. Unfortunately, no torches of prehistoric origin were recovered for ^{14}C dating. A wood charcoal sample from a thin, amorphous area of burned soil discovered at a depth of over one meter below present ground surface, at the contact between the disturbed and undisturbed deposits, was submitted for radiocarbon dating. This burning appeared to have resulted from a

natural fire within the cave sometime prior to the use of the cave as a burial site. The sample (Beta-51201) assayed to A.D. 249 ±80 (uncorrected). This date verifies what was already known based upon typological analyses, that the human use of the cave occurred sometime in the last 1,700 years. Subsequently, permission was obtained from the Eastern Band of Cherokee to submit a bone tool (an assumed burial association) for radiocarbon dating. The adjusted date assay for this sample (Beta-57966) is A.D. 1160 ±60 and the dendro-calibrated age (see Stuiver & Reimer, 1993) is A.D. 1260, which fits with the kinds of artifacts recovered from the cave.

GEOLOGY AND SEDIMENTOLOGY

Over many thousands of years, fine sediment has filtered in through sinks and crevasses in the jointed dolomite (Cowan, 1992). The extent of the cave system is unknown, because only the disturbed fill was excavated, but the presence of dripstone on the cave roof and walls indicates that the open area of the right chamber was up to two meters in height. Dripstone could not have formed beneath the sediment levels along the walls. The color mottling and particle size distributions in the three intact sediment profiles are the result of a long period of groundwater movement through these fine grained sediments.

The mean particle size is slightly coarser in the left chamber than the right in both the undisturbed and disturbed samples. This relationship suggests that the sediment and the artifacts buried within it were not transferred between chambers during digging by the vandals.

HUMAN REMAINS

Human skeletal remains were recovered from both chambers and from the exterior of the cave where vandals had deposited their backdirt (Boyd & Boyd, 1992). In certain instances, miscellaneous human bones had been placed in piles within the cave by these excavations. Most, however, were discovered as isolated fragments. The 12,841 human bones and teeth recovered represent a minimum of 99 individuals, including 50 subadults and 49 adults. Males and females and individuals of all ages, from fetal to older adults, were represented (Boyd & Boyd, 1997). Adult crania, however, were under-represented, probably due to their evident removal from the cave by the vandals.

The most common pathologies observed were degenerative arthritis, non-specific infection (periostitis, osteoporosis, and osteomyelitis), and dental disease. Minor evidence of periodic nutritional stress among subadults also was noted. Ten frontal bone fragments showed clear evidence of cribra orbitalia, suggesting a condition of iron deficiency. Other signs of nutritional stress noted were enamel hypoplasia (on 17 teeth) and considerable bowing of three tibias and a femur (possibly indicating rickets). Very few of the bones showed signs of traumatic injury (Boyd & Boyd, 1997).

The fact that all portions of the skeleton, including several hyoids and numerous small infant bones, were represented by the fragments recovered, indicates that at least some individuals were placed to rest in Lake Hole Cave as primary (articulated) burials. This also is indicated by the frequent incidences of carnivore chewing of the ends of long bones and phalanges. It is possible, however, that some individuals were brought to the cave as secondary (bundle) burials.

MARINE SHELL BEADS

The 6,029 marine shell beads recovered from Lake Hole Cave include ones manufactured from the shells of olivella (genus *Olivella*) snails (71%), olives (genus *Oliva*) (<1%), marginellas (genus *Prunum*) (3.5%), and whelks (genus *Busycon*) (Keller & Evans 1992). The latter include disk (25%), and columella (<1%) beads. A comparison of this sample with published counts from other sites in the region shows that Lake Hole and the Hamilton (Late Woodland-Early Mississippian) mortuary contexts have considerably fewer disk beads (25% at Lake Hole and <1% at Hamilton) than the later prehistoric and historic contexts (93 - 95%). For these same two groups (Lake Hole and Hamilton versus late prehistoric/historic), olivella beads are more abundant than marginella in earlier versus later contexts (Keller & Evans 1992). Thus, while artifact collectors may have removed more of the larger (more visible) disk beads than the smaller olivella and marginella beads, the Lake Hole sample is still quite similar to that of the Hamilton mortuary pattern.

BONE AND ANTLER ARTIFACTS

Artifacts of bone or antler recovered from Lake Hole Cave include 17 bone beads, one bone beamer, one scraped box turtle carapace fragment, two antler pressure flakers, and six fragmentary pointed bone tools (Kimball & Whyte, 1992). The beads all appear to have been grooved and snapped from the diaphyses of medium to large bird limb bones. Aside from these bone artifacts and the shell beads, no animal remains showed evidence of human modification or use, such as butchery marks. Furthermore a considerable percentage of the thousands of animal bones recovered exhibit evidence of chewing and breakage by carnivores, suggesting that humans were not responsible for their deposition in the cave.

PREHISTORIC CERAMICS

The 136 prehistoric pottery sherds recovered have been described by Kimball (1992a). Rim sherds were conspicuously under-represented, possibly indicating that the vandals collected rim sherds and perhaps whole vessels. The sherds are representative of a minimum of four vessels and exhibit smoothed-over rectilinear complicated stamped, smoothed-over simple stamped, smoothed plain, or indeterminate surface treatments. None of these designs is distinct enough to describe in great detail, but they do not appear to be smoothed-

over versions of complicated stampings from Woodland, Pisgah, or Qualla assemblages for the region. The sherds from Lake Hole Cave exhibit tempering with coarsely crushed chalcedony or quartz, both of which are immediately available. The use of this tempering is a relatively local phenomenon in the southern Appalachians–possibly restricted to areas of the Shady Dolomite formation in northeastern Tennessee and southwestern Virginia.

Each of the rim sherds recovered is straight to slightly incurved. The lips are decorated with simple diagonal incisions. These ceramic types are more typical of a Woodland, rather than Mississippian period assemblage for the region, but the ceramic technologies from this portion of the western boundary of the southern Appalachians are very poorly known.

One vessel base from a probable Uwharrie series vessel was unexpectedly recovered. The Uwharrie series dates to approximately A.D. 1000 and is most abundant in the upper Piedmont and eastern edge of the Blue Ridge escarpment, minimally 50 miles to the east of Lake Hole Cave.

ARROWPOINTS

Twenty-five arrowpoints recovered from the cave deposits were compared with a sample of 175 small triangular arrowpoints, from Late Woodland through Historic Cherokee contexts from eastern Tennessee, using cluster analysis for five metric characteristics (length, width, thickness, lateral edge curvature, and basal curvature) (Kimball, 1992b). All the 25 clustered with points from Emergent Mississippian Martin Farm and Early Mississippian Hiwassee Island contexts, but never with points from later Dallas, Pisgah, or Historic Cherokee contexts.

The Lake Hole sample is made from the locally available Shady Dolomite chalcedony, near-local Knox Group black chert, and nonlocal jaspers and cherts (possibly from as far away as West Virginia and southeastern Kentucky). Many of the arrowpoints recovered are broken.

Given the variety of lithic raw materials and the broken condition of many of these points, it is suspected that some of these arrowpoints may have been in Lake Hole Cave because they had been brought there in the bodies of individuals buried there and not interred as grave offerings. This is not an unreasonable suggestion given the observations of embedded points and the positions of points documented for Late Woodland and Early Mississippian burials in the region, especially by Lewis and Lewis (1946) from Hamilton burial mound contexts.

To investigate this interpretation, we undertook a microwear analysis of these arrowpoints following the approach developed by Lawrence Keeley (1980). Using an incident-light microscope at magnifications of 50, 100, and 200 powers, microwear polishes due to use, hafting, and alteration can be determined by comparison to microwear polishes on experimentally employed tools. These polishes vary according to the material worked and the motion of the tools during work.

Excavation damage was first assessed for the sample. In only two cases is there clear evidence of microwear traces due to impact with metal tools. This means that the breakage of the other arrowpoints is probably due to other causes. Two arrowpoints exhibit "linear traces" which have been observed in projection experiments by several microwear analysts (Fischer, et al., 1984; Geneste & Plisson, 1993; Kimball, 1994). A linear trace is caused by the movement of a microflake across the point surface at the instant of impact. Hafting traces were observed on 12 examples. It is apparent that a somewhat loose hafting method was involved, possibly with vegetal cordage rather than mastic, although experimentation is needed to support this interpretation. Meat polish was observed at seven locations, and bone polish was recorded at the most distal portion on two distally broken points. Major distal fractures, micro-impact fractures, proximal fractures, and proximal burinations were all observed in the sample. These observations suggest that several of the arrowpoints had been used and were possibly embedded in the bodies of individuals buried there.

NON-HUMAN VERTEBRATE REMAINS

Tens of thousands of vertebrate and molluscan remains deposited by natural agencies were recovered by the archaeological excavations at Lake Hole Cave (Whyte, 1992). These faunal remains document a long history of the use of the cave by animals since the Late Pleistocene. Of particular interest was the recovery of remains of fisher (*Martes pennanti*), extinct horse (*Equus* sp.), and giant armadillo (*Dasypus bellus*). The fisher was last seen in the southern Appalachians in the 1830s (Powell, 1991) while the horse was probably extinct by 8,500 B.P. (Woodward, 1991) and the giant armadillo was probably extinct by 10,000 B.P. (Klippel & Parmalee, 1984).

CONCLUSION

Lake Hole Cave is a desecrated Native American cemetery and a vandalized archaeological site. It is one of several known and one of probably hundreds of existing prehistoric burial caves within the Shady Dolomite of the southern Appalachians. Entrances to burial caves, yet undiscovered, may have been artificially sealed with stone slabs and presently remain unknown. In addition to human and archaeological remains, these caves are expected to contain rich Pleistocene and Holocene faunal and botanical assemblages that have obvious scientific value. Most importantly, however, they represent cemeteries that are sacred to contemporary native Americans and must be protected from the destructive endeavors of artifact collectors and the seemingly innocent pursuits of recreational spelunkers and seekers of knowledge.

Out of respect for native peoples and their burial places, prehistoric burial caves, upon their discovery, should be reported to appropriate tribal representatives of Native American groups currently and/or historically resident within the region, so that they may be given the opportunity for a direct role in

their protection, management, and if necessary, their scientific exploration. Many burial caves, such as Lake Hole Cave, are located on public lands and are therefore legally provided some protection. An even greater number of them are doubtless on private properties and are more vulnerable to the pursuits of artifact collectors and private land modification projects. One means of protecting privately owned burial caves would be for scientists, Native Americans, and concerned individuals to urge landowners to prevent the intrusion into such sites and to educate the public about the rights and concerns of native peoples with regard to prehistoric Native American burial places and skeletal remains.

Despite the unfortunate disturbance of human skeletal remains and archaeological and paleontological deposits within Lake Hole Cave, much information about the natural and cultural history of the cave and the region was obtained. While it may be in the interest of archaeology, speleology, paleontology, and other sciences to discover and explore caves in the southern Appalachians, exploration of a burial cave should be conducted only with the consent of native peoples and according to their desires.

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