ABSTRACTS of the 9th Annual Meeting of the Midwest Bioarcheology & Forensic Anthropology Association University of Indianapolis, Indianapolis, Indiana October 19 & 20, 2002

Abstracts are given in alphabetical order by senior author; all papers are podium presentations unless noted otherwise.

(1) APPLEGATE, Darlene, Kimberly COCKREL, & Adrienne ASBELL-PETITJEAN. "Taphonomic Processes in Limestone Caves: Crystal Onyx Cave and Roger's Discovery, Barren County, Kentucky."

Caves in the karst region of west-central Kentucky were used as ossuaries in prehistory, especially during the Late Archaic and Early Woodland periods. Human remains interred in cave contexts are affected by a number of taphonomic processes, the effects of which must be assessed prior to evaluating trauma, pathology, and mortuary treatment. Commingled skeletal assemblages from Crystal Onyx Cave and Roger's Discovery, two limestone caves in barren County, have been impacted by water action, tensile stress, carnivore gnawing and digestion, rodent gnawing, mineral deposition, and algal growth. The nature and implications of taphonomic alterations in the two skeletal assemblages are discussed.

(2) COOK, Della Collins, & Cheryl Ann MUNSON. "Scanning Electron Microscopy of Modified Human Bone from Mississippian Caborn-Welborn Phase and Angel Phase Sites in West-Central Kentucky and Southwestern Indiana."

Artifacts made from human bone have been recovered from several Late Mississippian habitation sites along the Ohio River. In order to reconstruct the manufacture sequence, SEM is applied to a drilled mandible from the Slack Farm site (15Un28), Union County, Kentucky, a defleshed mandible from the Murphy site (12Po1) in Posey County, Indiana, an articulated parietal and frontal segment with two perforations from the Angel site, Vanderburg County, Indiana, and a vessel fragment made from a human cranium, also from the Angel site. Defleshing of relatively fresh bone using a variety of tools is indicated. The objects differ in the complexity and refinement of their manufacture.

(3) DOUGHERTY, Sean, Lorena HAVILL, & Cheryl Ann MUNSON. "Patterns of Cranial Trauma from a Protohistoric Skeletal Sample."

Human burials from the Mississippian Caborn-Welborn phase (ca. A.D. 1400 - 1700) were recovered during mitigative investigations at the Murphy site, located in the Ohio Valley of southwestern Indiana. Twenty-nine individuals were recovered from both residential and cemetery burial contexts. Of these, 21 individuals (9 male, 6 female, 6 infant/juvenile) were complete enough for observations of traumatic lesions. Cranial trauma was found exclusively on males, and was often found to be associated with other traumata. One individual exhibited lesions similar to those found on survivors of scalping. Overall, the frequency of cranial trauma at the Murphy site differs significantly from other contemporaneous sites, and is suggestive of a high incidence of interpersonal violence.

(4) GRAUER, Anne. "Taking the 'Trauma' Out of Trauma, Or, How to Successfully Remodel Skeletal Data on Traumatic Lesions."

Understanding the presence of traumatic injury in prehistoric and historic populations is an important step towards elucidating past human behavior. As a result, the presence of traumatic lesions in skeletal populations is commonly included in skeletal reports, is frequently reported in published papers, and is punctuated by dramatic photographs. In spite of the prevalence of reported cases of trauma, the utility of these accounts is surprisingly limited. The goal of this paper is to assess the shortcomings of reported cases of trauma and to propose ways to alleviate the "trauma" of understanding trauma in human history.

(5) GREENE, Tammy, & Christopher SCHMIDT. "Analysis of Cremated Human Remains from an Early Archaic Mortuary Site in Southern Indiana." (poster presentation; for this abstract see the American Journal of Physical Anthropology, Supplement 30:166, 2000).

(6) HILL, Molly, & Christopher SCHMIDT. "Dental Macrowear Analysis of the Late Prehistoric Ray Site, Warrick County, Indiana." (poster presentation; for this abstract see the American Journal of Physical Anthropology, Supplement 34:85, 2002).

(7) HARGRAVE, Eve, & Kristin HEDMAN. "Modified Human Bone from Cahokia and Beyond." (poster presentation)

Modified human remains have been found at a number of late prehistoric American Bottom sites around Cahokia. Cultural practices associated with such modifications include mortuary practices, the possible use of human remains as tools, as well as objects of personal adornment. Evidence of post-depositional taphonomic processes will also be addressed.

(8) HEDMAN, Kristin, & James LEFAGER. "Incised Human Bone from the Hoxie Farm Site, Cook County, Illinois." (poster presentation)

A human parietal fragment decorated with an incised "serpent" design was recovered from the Hoxie Farm site (11Ck4), a Huber phase (late prehistoric/early protohistoric) site located in Cook County, Illinois. Similar designs have been found on bone, ceramic, and stone objects from several late prehistoric sites in the Midwest region. The implications for refining the temporal and cultural affiliation of the Hoxie Farm site will be addressed.

(9) HOCHREIN, Michael. "Introducing Geotaphonomy to the Archaeologist and Crime Scene Reconstructionist."

The concept of geotaphonomy is presented for anthropologists, law enforcement, medico-legal, and other crime scene investigators as a means of recognizing contextual environmental clues within and around buried evidence scenes. Geotaphonomy is defined as the study of the geophysical characteristics of, and changes in, surface to subterranean features associated with the interment of buried evidence. It represents a tool for investigators who seek to reconstruct how, when, and by whom clandestine burials were created. Borrowing from taphonomy, geotaphonomy examines the pit (the "body") for evidence of ante-depositional (antemortem), peri-depositional (perimortem), and postdepositional (postmortem) modifications. Six aspects of burial environments comprise the theory of geotaphonomy. Each are mentioned with their particular collection of geological, pedological,

criminalistic, and biological categories of evidence. It has been the author's observation that these are areas which are typically overlooked or ignored during sometimes overzealous efforts to reveal and extract the primary piece of buried evidence. This paper briefly introduces the potential quantity and quality of geotaphonomic evidence associated with clandestinely buried items.

(10) JACOBI, Keith, & M.C. HILL. "Bone Handling and Reuse of Human Skeletal Remains among Prehistoric Southeastern Native Americans."

The archaeological record from the Southeast shows that Native Americans were not averse to handling human remains. Indeed, some of these instances may have been related to ritual activity involving certain individuals with a specific function within the prehistoric society. However, other instances of bone handling involved individuals from the remainder of the community. The acts of trophy taking, the use of human bone as tools, the movement of skeletons, the exhumation of remains with selective extraction of human parts point to some habitual use of human bone by certain members of prehistoric Southeastern Native American groups.

This paper reviews artifacts from several southeastern states that clearly show modification of human skeletal elements into items of cultural significance within the disparate social contexts. At what point do the deceased cease to be viewed as human and become transposed into a spiritual icon and/or an item of utilitarian function? Given the present situation of NAGPRA, items such as these shed a different light on the perception of the sacred condition of the human skeleton by prehistoric Native Americans.

(11) LASSETER, Alanna, & Keith JACOBI. "Cadaver Dog and Handler Team Capabilities in the Recovery of Buried Human Remains in the Southeastern United States."

Five field trials tested the ability of four cadaver dog and handler teams to detect buried human remains. Human and animal remains were buried in various forested areas during the summer months near Tuscaloosa, Alabama. The remains ranged in decomposition from fresh to skeletonized. Cadaver dogs detected with varying success: buried human remains at different stages of decomposition, buried human remains at different depths, and buried decomposed human and animal remains. The results from these trials showed that some cadaver dogs were able to located skeletonized remains buried at a significant depth. Fresh and skeletonized remains were found equally by the cadaver dogs with some caveats. Dog handlers affected the reliability of the cadaver dog results.

(12) LATHAM, Krista, & Mary RITKE. "Skeletal DNA Preservation."

Genetic Analysis is becoming an essential tool in forensic sciences. The development of the polymerase chain reaction (PCR) made identification by DNA profiling possible from the small amounts of DNA found at crime scenes. The discovery that DNA can also be extracted and analyzed from skeletal remains thrust genetic analysis into the fields of forensic anthropology and archeology. However, skeletal DNA, especially that from historic specimens, may be complicated to extract and analyze because of chemical changes from degradation, contamination with contemporary DNA, or PCR inhibition from diffusible and nondiffusible inhibitors. This paper will briefly describe the challenges of skeletal DNA extraction and analysis, and review several areas of research from the University of Indianapolis concerning the detection and removal of PCR inhibitors in historic skeletal DNA.

(13) MEGYESI, Mary. "The Effects of Temperature on the Decomposition Rate of Human Remains." (poster presentation)

This research tests a new method of determining the postmortem interval from decomposing human remains. Decomposition is quantified into a numerical system and used to predict accumulated degree-days from 69 known human remains cases. (NOTE: this poster was originally presented at the 54th Meeting of the American Academy of Forensic Sciences, Atlanta, Georgia, February 2002; for a complete abstract, see Proceedings of the American Academy of Forensic Sciences 8:216-217).

(14) NAWROCKI, Stephen, Steven SYMES, & Christopher SCHMIDT. "A Workshop on Taphonomy & Trauma."

This purpose of this hands-on workshop is to acquaint participants with the major categories of alterations that occur to bone and to help them learn to distinguish between pre-, peri-, and postmortem processes. Categories of modifications to be addressed include: premortem healed cranial trauma, premortem healed postcranial trauma, perimortem gunshot wounds, perimortem cranial blunt force trauma, perimortem butterfly/spiral fractures of long bones, perimortem sharp force trauma, perimortem sawing trauma, carnivore modifications, rodent modifications, burning & cremation, postmortem erosion, sunbleaching & weathering, postmortem fracturing, postmortem deformation, plowing & shovel damage, fluvial transport, coffin wear, color changes, biotic changes (plants, algae), human modification for tool use, curation artifacts, and mummification. Numerous specimens from the University of Indianapolis and the Memphis Regional Forensic Science Center will be made available for examination by participants.

(15) NAWROCKI, Stephen, Matthew WILLIAMSON, Christopher SCHMIDT, Heather THEW, & Greg REINHARDT. "Excavation and Analysis of Four Homicide Victims from Shallow Graves in Bartholomew County, Indiana." (poster presentation)

This poster presents the procedures used to excavate four recent human burials at a forensic scene. Careful techniques permitted the recovery of cloth impressions made by the assailant's clothing, toolmarks, and "false-starts" created before digging the graveshafts. (NOTE: this poster was originally presented at the 54th Meeting of the American Academy of Forensic Sciences, Atlanta, Georgia, February 2002; for a complete abstract, see Proceedings of the American Academy of Forensic Sciences 8:219).

(16) NORTON, Dale. "Melanin in Human Teeth?" (poster presentation).

Based on a speculation made by a pathologist, this project seeks to determine whether melanin might be present in human teeth. Not only does melanin exists in other oral tissues, but both melanin and tooth enamel are derived from the neural crest developmental pathway. The presence of melanin will be determined through tissue specific staining of teeth from known individuals representing a variety of skin colors. If observable, then it could potentially aid in the determination of biological ancestry as well as enhance bioarchaeological demographic analyses. Further, it could assist in the validation of sex and age determination, as the abundance of melanin tends to be higher in males and younger individuals.

(17) PARISH, Joseph. "Evidence of a Possible Hanging in the Stirrup Court Cemetery Collection."

In 1982 the remains of 29 individuals were unearthed at the site of the Stirrup Court Cemetery in London, Ontario. These individuals resided in what has been suggested to be a 19th century peri-urban community adjacent to the historic township of London (Parish 2000). The skeleton from Burial 20 presents fractures of the skull that are consistent with those produced by hanging from a subaural knot. This pattern is documented by Wood-Jones (1913) on a series of Nubian skeletons. Additionally, there are no vertebral fractures but a curious bending of the vomer and a dislodging of it from its articulation with the sphenoid. There is no historic record of the hanging that can be found to date. These multiple lines of evidence point to a slow hanging whereby the individual was strangled to death as the most likely cause of death. This presentation will suggest that the hanging may have been a suicide/homicide that was not carried out by professionals who would have preferred the suboccipital or even the submental knots which cause practically instantaneous death.

(18) RAMANAN, Kharlena. "A Probable Case of Tertiary Syphilis and Insect Casings Found in an Individual Originally Thought to be Associated with Woodland and Mississippian Artifacts." (abstract not available)

(19) SCHIESS, Lori. "Postmortem Cultural Modification: Cutmark Pattern on the Femora of the Poole-Rose Ossuary as Part of the Feast of the Dead Ceremony." (poster presentation)

This study analyzes cutmarks on the femora from the Poole-Rose ossuary as evidence of postmortem cultural modification related to the Feast of the Dead. The ossuary, located in southern Ontario, Canada, dates to A.D. 1550 ±50. The Feast of the Dead is a burial custom associated with the Huron and other groups of the Great Lakes. The MNI using the femur for the adults of the Poole-Rose ossuary is 248, based on the presence of the proximal half of the shaft. Only adult femora were examined in the cutmark analysis. Of the adults, sixteen percent of the Poole-Rose population shows evidence of cutmarks. In total, approximately 30 percent of the femoral specimens recovered show cutmark damage. The cutmarks appear in three general areas or zones. Zone one is defined as the neck of the femur; zone two is the proximal half of the shaft, below the greater and lesser trochanter; and zone three is the distal half of the shaft. The results of this study indicate that the Poole-Rose ossuary is consistent with the ethnographic account of attributes associated with the Huron Feast of the Dead.

(20) SIMMONS, Tal. "'What Ceremony Else?': Ritual Treatment of the Dead in the Pre-Pottery Neolithic B Mortuary Complex of Kfar HaHoresh, Israel."

The Pre-Pottery Neolithic site of Kfar HaHoresh (8750 B.P.) in the lower Galilee of Israel has yielded numerous burials and unique mortuary contexts. Burials of single, articulated individuals are relatively rare at KHH, in contrast to most known PPNB Levantine sites where they are the norm. At most sites, individuals are buried under plaster floors of dwellings. KHH has no apparent house architecture and, although human remains are routinely found under plaster surfaces, these function more as caps to burial installations rather than floor structures per se. Burials at KHH may take many forms including individual burials with or without skull removal, multiple burials of both a primary and secondary nature, bundle burials, skull caches, and two dimensional representations of animals constructed of human bones. Many burials are intimately associated with animal remains. A headless gazelle was buried with a plastered human skull, two foxes were each buried with a piece of human

cranium, and an articulated but headless human male was placed atop a pit containing the remains of at least 9 butchered Bos.

This paper examines the human burial taphonomy (postmortem modification by human, animal or natural actions) at Kfar HaHoresh with regard to several variables. For the purposes of this study, human modification of a skeletal element was defined as indications of perimortem (sensu latu) cutmarks (for dismemberment, defleshing, or disarticulation), burning, saw marks, and/or drill holes. Animal modifications of bones were defined as being caused by carnivores (punctures, scratches/striae, shallow pits, ragged edge chewing, perforations, and crenulated edges) and rodents (gnawing). In addition, percussion damage, fracture type and shape, shaft circumference, and weathering were also considered. Two loci are compared: Locus 1003, which is argued to represent a multiple use secondary burial pit containing a MNI of 12 individuals (based on the mandible), and the complex of Loci 1155, 1352, 1353, and 1373 (MNI of 12 individuals, based on the left femur), which is argued to represent a depiction with a skull cache. There are significant differences in the treatment of the human remains in each area. For example, in Locus 1003 only 0.02% of the 1028 bones and bone fragments examined exhibit postmortem human modification; in the 1155 Locus complex, a full 6.10% of the 722 bones exhibit human modification. Likewise, in Locus 1003 only 0.02% of bones show modification by rodents and/or carnivores; in 1155 over 7% of the bones are modified by animals. These differences are statistically significant and reflect the contrasting use of these burial areas and the actions and intents of the people who created the site. Other factors, including the age distribution of the individuals, the marking of the graves, and (in at least one case) the cause of death, also speak to these distinctions.

(21) SCHMIDT, Christopher. "Recent Excavations at a Multi-Component Prehistoric Site in Bartholomew County, Indiana." (abstract not available)

(22) SMITH, Emilie, Krista LATHAM, Stephen NAWROCKI, & Scott CHILDRESS. "An Analysis of an Embalmed 19th Century Juvenile Mummy."

In November of 2001, the Indiana Medical History Museum of Indianapolis donated a preserved child's body to the University of Indianapolis Archeology and Forensics Laboratory. In the 19th century, medical students were not furnished with human cadavers for dissection in their study of human anatomy, and so they had to obtain their own specimens any way they could. The juvenile in question was robbed from an undisclosed Indiana grave, circa 1874, and embalmed for purposes of dissection. It was then passed down through a family line of physicians as an educational specimen. Muscles, tendons, ligaments, skin, blood vessels, and nerves are all present in desiccated form. Upon receipt by the University of Indianapolis, the remains underwent heavy metals testing to determine potential health hazards due to the embalming chemicals. The presence of arsenic was detected. In addition, DNA analysis was performed to determine the sex of the individual, and radiography was used to refine the age estimate.

(23) SMITH, Maria. "The Social and Political Uses of Aggression."

Intergroup violence has generally been argued to be an essential ingredient in the cycling of Mississippian Period chiefdoms. However, the frequencies of cases of deliberate violent trauma accumulated from the approximately 35 sites surveyed from the Tennessee River Valley (approximately 2300 individuals) have not dovetailed with the presumed escalation of intergroup hostilities associated with the rise of chiefdom level societies. Although the raw frequencies of trauma

cases are not by any means accurate measures of the levels of intergroup violence, patterns have emerged which suggest socio-politically important temporal and regional variability. Additionally, there appear to be unexpected intragroup social uses of deliberate violent trauma that are independent of a warfare context. The results have suggested new directions for further deliberate trauma research. These include surveying interpolity buffer zones, establishing the contemporeneity (and therefore potential adversarial relationship) between large aggregate sites and more specific dates for the introduction and use of warfare-related technological markers such as the introduction of the bow and arrow and construction of palisades.

(24) SYMES, Steven. "The Interpretation of Perimortem Skeletal Trauma." (Keynote Address)

Recognition, examination, and interpretation of trauma in modern human remains is an area of expertise that potentially makes anthropologists invaluable to medical examiners, coroners and the judicial system. With advanced training in sharp, blunt, ballistic, burned and healing trauma, anthropologists can demonstrate that bone trauma is a "Moment Frozen in Time," consistently contributing not only to the investigation of human bone scatters, but also to the examination of the freshly dead. This new approach will witness anthropologists not only examining, but removing, analyzing, and retaining as evidence, trauma that aids in the interpretation of criminal behavior, and data admissible in a court of law.

Armed with a knowledge of human variation and an understanding of how that variation can be expressed in modern humans, forensic anthropologists are quickly adapting new tools for use in the examination of human remains. The new forensic anthropology innovations should allow the victim's story to be told like never before.

(25) TRAHE, Monika. "Age Related Changes Post Epiphyseal Closure in the Medial End of the Clavicle." (poster presentation)

This poster discusses whether observable stages of morphological change in the medial end of the clavicle correlated with increasing chronological age are distinguishable, which may be utilized in identifying skeletal age at death for unknown individuals. Using individuals of known documented age from Cobb, McCormick, and Terry collections, the medial articular surfaces of 205 pairs of clavicles were examined and scored for various morphological features including granularity, porosity, lipping, and an island characteristic. As it is always better to use multiple indicators to estimate age, establishing post epiphyseal ages at phases for the clavicle would aid in the identification of age at death for unidentified individuals. Preliminary statistical tests indicate, however, that no strong correlation exists between morphological change and increasing chronological age.

(26) TURK, Chris, Janene CURTIS, & Mary RITKE. "Restriction Enzyme Treatment Reduces Bacterial Inhibition of PCR Amplification of Human DNA."

When DNA is recovered from bone samples, Polymerase Chain Reaction (PCR) amplification of specific informative DNA sequences is often inhibited. This may be due to the presence of bacteria, specifically bacterial DNA, from the soil and surrounding burial environment. This presentation suggests a protocol to successfully amplify a human DNA sequence (huTh01) from historic bone DNA samples that previously produced little or no PCR amplification. The results of our study demonstrate the potent inhibitory effects of bacterial DNA on PCR amplification of huTH 01 (a short tandem repeat or STR) from human DNA. Our preliminary results indicate the use of the restriction enzyme Pst 1

can reduce the effects of inhibitory properties of soil microbial DNA and improve the PCR amplification of historic bone DNA.

(27) TURNER, Kristi. "Non-Metric Skeletal Traits: Activity Related or Genetic?" (poster presentation)

Non-metric traits are routinely recorded in osteological studies for their potential utility in the reconstruction of activity patterns of individuals and the genetic structure of a group. This project involved the evaluation of ten traits found on the arm and shoulder in 50 individuals in the Terry Collection, of the Smithsonian Institute, and several prehistoric populations. The objective was to examine the etiology of these traits, to determine whether they reflect behavior, genetic structure, or elements of both. Patterns of frequency are compared by age, sex, side, and population. Implications of findings for bioarchaeology and forensic anthropology will be discussed.

(28) WEITZEL, Misty. "Human Taphonomy and the Mortuary use of Fire at Khuzhir-Nuge XIV, Siberia."

Although the use of fire in mortuary activity is a well-known occurrence in the archaeological record, it has not been adequately examined as a taphonomic factor. The Late Neolithic/Early Bronze Age cemetery site of Khuzhir-Nuge XIV on Lake Baikal in Eastern Siberia provides a unique opportunity to assess the taphonomic impact of the mortuary use of fire. Eighteen of the 78 burials at Khuzhir-Nuge XIV reveal evidence of in situ burning. Each burial and individual skeletal elements have been examined and visual characteristics (color, fracture, and deformation) analyzed by gross examination during the 2001 field season. Analysis of these charred remains reveals information about both the individual exposed to fire and the processes involved in exposure. This archaeological examination has generated additional questions that may be answered through controlled burning experiments using domestic pigs as human analogues. These experiments are midway through completion.

(29) WILLIAMS, John. "Taphonomy of Two Historic Cemeteries."

During a three year period from 1999-2001 two historic cemeteries in northwestern Minnesota were excavated to transfer unvaulted caskets to new locations. Eighty-five sets of remains were moved. These range in antiquity from 1885 to 1958. The condition of remains ranged from excellent to poor. Taphonomic variables included: casket design, burial depth, antiquity of remains, age of individual, soil moisture content, and tree roots. Only two variables showed a correlation with bone preservation; age of remains and tree root impregnation.

(30) ZAMBRANO, Carlos, Krista LATHAM, & Mary RITKE. "Does Boiling Affect Skeletal DNA Preservation?"

The maceration of skeletal remains is an important step taken by a forensic anthropologist before analysis. Removing the soft tissues from the remains allows the anthropologist a clear view of bone surfaces and removes any biohazardous threats. With the advent of DNA analysis it has become possible to genetically fingerprint and identify an individual from skeletal remains. Unfortunately, requests for a bone sample for genetic analysis may be received after maceration has been completed. Since the maceration process subjects the skeletal remains to heat, which is one of several factors known to damage DNA, it may be necessary to retain a bone sample (e.g., rib or clavicle) before

maceration. This study examines the preservation of skeletal DNA before and after boiling. Skeletal DNA was extracted from bone samples collected before and after the boiling of 28 pig femora. Using chemiluminecent techniques and slot blot analysis the extracted skeletal DNA was compared to known quantities of DNA to see if there were differences after boiling.

Suggested citation of individual abstracts (example): Grauer A (2002). Taking the 'Trauma' Out of Trauma, Or, How to Successfully Remodel Skeletal Data on Traumatic Lesions (abstract). Presented at the 9th Annual Meeting of the Midwest Bioarcheology & Forensic Anthropology Association, Indianapolis IN. University of Indianapolis Archeology & Forensics Laboratory (http://archlab.uindy.edu).

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