Abstracts for
African Taphonomy: A Tribute to the Career of C.K. "Bob" Brain

Co-Organizers: T.R. Pickering, K. Schick and N. Toth

Stone Age Institute, Bloomington, Indiana
April 29 – May 1, 2004

Fifty years of fun with fossils: some cave taphonomy-related ideas and concepts that emerged between 1953 and 2003

C. K. Brain (Transvaal Museum, Northern Flagship Institution, South Africa)

It is with particular gratitude that I participate at this meeting and thank Travis Pickering for his invitation and for all the effort he has put into its organization. I would like to wish him, Nick Toth, Kathy Schick and their colleagues at CRAFT every success with their work in the wonderful new facilities at Indiana University.

During the last 50 years, African cave taphonomy has been established as a discipline in its own right, capable of informing us about the lives and deaths of animals whose remains are preserved in the caves concerned. It all started with Raymond Dart who, shortly after his interpretation and description of Australopithecus africanus in 1925, began to speculate about what the faunal remains, associated with the child skull, could tell us about the circumstances in which our early ancestors lived and died. Twenty years later, when Dart became interested in fossils from the Makapansgat Limeworks cave in the northern Transvaal, he made a pioneering study of over 7000 fossil bone pieces that had been laboriously chipped from the rock-hard breccia matrix. He concluded that the vast fossil bone accumulation in this cave had been collected by Australopithecus for use as tools and weapons. In his view these hominids were undergoing a "predatory transition from ape to man" and were already mighty hunters, capable of killing the most powerful animals of their time and making use of an "osteodontokeratic culture". He put forward these ideas in a series of 39 publications, making use of dramatic and provocative prose that was intended to stimulate and provoke others to take the issues further. In my case, his provocation and encouragement was so great that I spent forty years examining southern African caves and their associated fossil assemblages, in particular the Swartkrans one, as well as documenting contemporary taphonomic processes. The following are some of the facts, concepts and ideas that emerged from this work:

1. That, while the study and interpretation of individual fossil specimens is important, it is essential in a cave taphonomic interpretation to examine a complete bone assemblage, or at least a representative sample of this.

2. That every fragment of bone from a cave excavation should be retained, with detailed information of its provenance, and fossils should be prepared in such a way as to cause minimal damage to bone surfaces.

3. That, in a complete fossil assemblage, skeletal disproportions are very likely to occur and need not be interpreted as the result of deliberate hominid selection, as Dart had suggested at Makapansgat.

4. That the survival potential of bovid limb-bone components in an assemblage, that had been worked over by carnivores, is linked directly to the specific gravity (or density) of the bone pieces involved, while fusion-times between shafts and epiphyses are also of particular importance.

5. That primate (including hominid) skeletons were more susceptible to carnivore damage than were bovid ones of equivalent live weight.

6. That, although Dart was inclined to dismiss hyenas as important collectors of bones in caves, we now know that several species of hyena do habitually collect bones in their feeding and breeding lairs.

7. That porcupines are compulsive collectors of bones in caves, concentrating particularly on defatted, weathered specimens.

8. That several species of owls are significant collectors of small animal bones in African caves, while various eagles that make their nests within the catchment areas of cave entrances also contribute remains to the assemblages.

9. That some caves are now known to have been used as habitual feeding and breeding lairs by leopards over many years.

10. That any interpretation of a fossil assemblage in an African dolomitic cave must take the structure of that cave into consideration, as this will have affected the nature of the infilling, as well as the composition of the bone assemblages that entered the cave.

11. That when one attempts to reconstruct past climate and environment from a study of surface-derived sediment fillings in southern African dolomite caves, it must be remembered that such sediments may be ancient relics of former times and may not reflect climatic conditions at the time of entry into the cave. This is something that I failed to recognize in the 1950s when I assumed that dolomite soils entering a sub-surface cavern would have been in equilibrium with the environmental circumstances of the time.

12. That predation on early hominids was a regular feature that contributed significantly to bone accumulations in southern African caves.

13. That hominids living prior to one million years ago were not the mighty hunters that Dart had visualized them to have been, but were subservient to the large carnivores.

14. That, although it is difficult to make a case for bone tools in the Makapansgat fossil assemblage as Dart had attempted, they do occur at the cave deposits at Swartkrans, Drimolen and Sterkfontein and appear to have been used for digging purposes.

15. That although stone artifacts had not been found at any of the South African early hominid sites prior to 1955, my investigations of the cave deposits showed them to be present at Makapansgat, Swartkrans, Sterkfontein and Kromdraai. A good deal of

subsequent work has been done on them, and on their stratigraphic relationships, by competent archaeologists.

16. That the stratigraphic complexity in the Swartkrans cave filling was the result of repeated climatically-induced cycles of deposition and erosion.

17. That progressive Cainozoic cooling had a major influence on the evolution of hominids and other animals in Africa.

18. That we now have evidence for the management of fire by hominids about one million years ago in Member 3 at Swartkrans.

19. That predation represented an important selective pressure promoting the expansion of the human brain, increase in intelligence, and the development of technology. It also drove the evolution of sense organs and nervous systems among the earliest animals, 600 million years ago, with which I am currently preoccupied.

20. That it is a source of great pleasure to me to see so many of the themes in cave taphonomy, mentioned above, being taken forward with ever increasing competence and sophistication by young researchers, such as Travis Pickering and his colleagues at CRAFT and elsewhere.

By way of acknowledgement, I wish to record that much of my early work in this field was supported by the Wenner Gren Foundation and, in particular, by the interest of its then Director, Lita Osmundsen. Fossil projects have provided me with a great deal of fun, due largely to the presence of Laura Brain who, with our four children and grandchildren, participated enthusiastically in them. Finally, the encouragement and generosity of spirit shown to me by Raymond Dart is something for which I will always be grateful.

Changes over three decades in skeletal part survival and bone modification in the Amboseli ecosystem, southern Kenya

Anna K. Beherensmeyer (Smithsonian Institution, USA)

Paleoanthropological inferences about taphonomic processes often rely on modern analogues to link features of bone assemblages with specific causes. Bob Brain was a pioneer in such research and has inspired many others to document a wide variety of carcass modification processes. This has resulted in alternative models about early hominin subsistence strategies and the taphonomic interpretation of bone modification features. It is important for such models to incorporate information on long-term (decadal-scale) ecological changes and how this might affect taphonomic evidence used to reconstruct hominin behavior. Study of the Amboseli taphosystem in southern Kenya (1975 – 2004) demonstrates how changes in predator diversity and population dynamics affect the availability of carcasses and taphonomic features of bone assemblages. Relatively high rates of carcass survival occurred during the 1970s and 1980s when lions, spotted hyenas and other carnivores competed for prey and the spotted hyena population was low. Herbivore die-offs during droughts also provided occasional surfeits of carcasses for scavengers. Under such conditions, hominins would have had access to carcasses either through accidental discovery or power-scavenging, as well as ample

opportunities to hunt and retain control of their prey. Lower rates of carcass survival have been the norm in Amboseli over the last decade, especially for prey in the size range from 25 – 250 kg, and this change correlates with a population increase of Crocuta accompanied by a decline in other predators. Intra-specific competition within the hyena population is intense and most carcasses disappear within minutes. Under such conditions, opportunities for power-scavenging would be minimal and competition for prey greatly increased. Skeletal part survival and bone modification patterns provide evidence for these different ecological conditions. In fossil assemblages associated with early hominins, such evidence could indicate the relative impact of bone-consuming predator/scavengers, predation pressure on prey populations, and competition levels within the hunting guild.

New contributions from vertebrate taphonomy to the understanding of Oldowan hominid landscapes and land use at Olduvai Gorge.

Robert J. Blumenschine (Rutgers University, USA), Peter Andrews (Natural History Musuem, UK), Salvatore D. Capaldo (Rutgers University, USA), Jackson K. Njau (Rutgers University, USA), Charles R. Peters (University of Georgia, USA) and Briana L. Pobiner (Rutgers University, USA)

Fewer than 40 years after the publication of C.K. Brain’s pioneering work, vertebrate taphonomy has come to play a pivotal role in interpretations of hominid behavioral evolution. Here, we preview a range of taphonomic studies being conducted by the Olduvai Landscape Paleoanthropology Project (OLAPP) that are central components of the project's multidisciplinary investigation of Oldowan hominid land use at Olduvai Gorge. One of OLAPP’s fundamental aims is to define the landscape facets and sub-facets that existed during Bed I and Lower Bed II times within the Olduvai Basin's lake margin and eastern alluvial fan. We have accordingly conducted a systematic series of landscape taphonomic surveys of modern bones along Lake Masek and the Lower Grumeti River of the Serengeti. We are establishing the distinctiveness of crocodilian bone damage, which allows for the recognition of fine-scale landscape (sub-facet) settings in which crocodile remains and trace fossils are found. We have made experimental and naturalistic observations on bones submerged in fresh and saline water in order to understand the landscape sub-facets in which we find subaqueously weathered fossil bone. Finally, small mammal remains, both recent and fossil, have been investigated to detect fine-scale local changes in environment.
Another basic goal of OLAPP’s research is to determine the extent and causes of landscape variability in the distribution of hominid trace fossils. New analyses of fossil assemblages recovered by M.D. Leakey from Bed I reveal significant differences among assemblages in the frequency and anatomical location of bone surface marks inflicted by hominids and terrestrial carnivores. Other analyses suggesting theoretically expected correlations between the apparent degree of bone ravaging by hyaenids and the density and diversity of stone artifact assemblages are being tested by an ongoing study designed to identify the landscape distribution of bones modified by different types of mammalian carnivores.

Carcass transport and bone assemblage formation by Hadza foragers at Lake Eyasi, Tanzania

Henry T. Bunn (University of Wisconsin, USA)

Skeletal proportions in archaeological bone assemblages have long tantalized researchers with their interpretive potential for diagnosing everything taphonomic from bone tool and weapon use, carcass transport, and site function, to carnivore feeding behavior, density-mediated destruction during diagenesis, and many others. The fascinating challenge stems from the recognition that there is often no clear and easy separation between patterns caused by different taphonomic agents and there is a likelihood of different taphonomic agents operating sequentially on the same bone assemblage. That does not make the reconstruction of the taphonomic history of bone assemblages unachievable, but it does highlight the need for modern taphonomic studies where cause-and-effect relationships can be observed directly to aid in defining viable methods and achievable research goals for the study of ancient assemblages with unknown taphonomic histories. Toward that end, this paper examines all available data on carcass transport by Hadza foragers and evaluates alternative analytical methods for characterizing skeletal proportions that result. Two groups of researchers (Bunn and coauthors; O'Connell and coauthors) have observed Hadza carcass transport and presented primary data on this. Each group used different analytical methods and claimed to have identified different skeletal patterns indicative of transport, which is not reassuring for archaeological applications. Then a second level of researchers critiqued the published empirical data and characterized Hadza carcass transport in various ways. In 2003, a third level of critique was achieved by a researcher who attempted to characterize Hadza carcass transport, not by re-examining the primary data but by relying on the secondary sources. Having waited patiently through this, it is now my turn again! I combine the available data from the two research groups, analyze this larger data set using the alternative methods of the researchers, skeletal profile analysis (Bunn) and scalogram analysis (O'Connell), consider the efficacy and logic of these alternative methods, and illustrate with an archaeological example from Olduvai Gorge how the Hadza data can be used.

On the taphonomy of three Australopithecus skeletons from Sterkfontein

Ron J. Clarke (University of the Witwatersrand, South Africa) and Travis Rayne Pickering (Indiana University, USA)

Most of the thousands of fossils from Sterkfontein Caves, South Africa, consist of isolated bones, teeth and fragments, and it is rare to find articulated skeletal parts. Thus the recovery of two partial and one complete Australopithecus skeletons provides a welcome opportunity to attempt a reconstruction of the taphonomic history of those three individuals. The complete skeleton, StW 573 from Member 2, appears to have been that of an individual who fell into the cave and was not killed or eaten by carnivores but was mummified. The two partial skeletons, Sts 14 and StW 431, each consist of a torso with only one partial limb preserved in each case, suggesting one kind of carnivore may have been responsible for the occurrence of both partial skeletons

The destruction of human-discarded bone by carnivores: The growth of a general model for bone survival and destruction in zooarchaeological assemblages

Naomi Cleghorn (State University of New York at Stony Brook, USA) and Curtis W. Marean (Arizona State University, USA)

In the 1960s Brain published on a series of taphonomic studies where he observed the destruction of goat bones by pastoralists and domestic dogs. Those studies were notable and novel for a variety of reasons: (1) the attempt to control for complex parameters through the use of what we now recognize as experimental and naturalistic actualism; (2) documentation of the destructive impact on skeletalelement abundance of secondary carnivore consumers; and (3) the attempt to understand this process in regards to mechanical properties and thus establish the foundation for justifiable uniformitarianism. This work set the stage for a proliferation of research, and today the differential destruction of bone by secondary carnivore consumers is considered one of, perhaps the most, significant molders of zooarchaeological patterning. It selectively removes less dense portions of bones, namely articular ends, and therefore demands a methodological shift away from the easily identified articular pieces to the more challenging shaft portions. It destroys greasy and less dense elements such as axial bones disproportionately, thus changing the skeletal element pattern away from that originally deposited by people. It is now clear that this process impacts the survival of different age groups of ungulates, with younger individuals being deleted from the age profile. This paper reviews this long accrual of knowledge initiated by Brain, evaluates what is known and unknown, develops a general model of archaeological bone survival, and concludes with a methodological roadmap for zooarchaeology's future studies of skeletal element abundance.

Models of passive scavenging by early hominids: Problems arising from the equifinality in carnivore tooth mark frequencies and the extended concept of archaeological palimpsests

Manuel Domínguez-Rodrigo (Universidad Complutense, Spain), Travis Rayne Pickering (Indiana University, USA) and Charles P. Egeland (Indiana University, USA)

Models of passive scavenging by early hominids from the abandoned kills of large cats are based largely on the analysis of tooth marks in faunal assemblages. Some of these models assert that primary access to carcasses by carnivores (and, by extension, late access by hominids) is reflected in high percentages of limb bone midshaft fragments that are tooth-marked. This assertion emanates from a referential framework constructed, in part, on the analysis of tooth mark frequencies in modern "carnivore-first" carcass feeding experiments. In these experiments, hyenas rather than felids are the predominant carnivore agent of bone modification. Here we emphasize the mismatch between the experimental premises of these studies and their subsequent application to Plio-Pleistocene archaeofaunas. Regardless of claims to the contrary, no experiment yet conducted models accurately tooth mark frequencies and distributions that should be expected if hominids were scavenging from abandoned felid kills. Based on observations of the feeding habits of large cats, it is agreed that in such a scenario hominids would be confronted with unbroken bones after abandonment by primary felid consumers. Thus, hominids are predicted to have concentrated on exploiting the remaining edible carcass

resource they had the capability to access using hammerstone percussion—marrow. Our preliminary analysis of bone refuse from carcasses consumed by cheetahs, leopards and lions demonstrates that tooth mark percentages on midshaft portions of limb bones potentially scavengeable by passively-acting hominids are much lower than previously supposed, and even overlap with tooth mark frequencies in bone assemblages modified secondarily by hyenas. We conclude with a consideration of how these observations impact the ways in which faunal palimpsests have been modelled. Emphasis is placed on the variable utility of different classes of bone surface modifications to construct inferences about the relative contribution of hominids and carnivores in creating faunal assemblages.

Rather odd detective stories

Gary Haynes (University of Nevada, USA)

This paper is a personal view of the last three decades of taphonomic research in American Paleoindian studies, viewed in the light of C.K. Brain's own contributions to taphonomy. Debates driven by clashing personalities reflected the tendency towards archaeological"brandscaping," which is the transformation of what should be merely interpretations into causes. Like Brain's research, the mostenduring and important taphonomic work included examples of actualism, neotaphonomy, and classical taphonomy. The best research was in the Brain style—making a case step-by-step, reviewing others' work, collecting data, and spelling out alternative interpretations with grace and tact.

Taphonomy of immature hominid skulls and the Herto, Mojokerto, and Taung specimens

Gail Krovitz (Pennsylvania State University, USA) and Pat Shipman (Pennsylvania State University, USA)

Little attention has been paid to documenting the taphonomy of immature hominid skulls. Here, we report a first step toward constructing a method for deducing the taphonomic history of juvenile hominid crania. One of us (GK) conducted an inventory of the immature cranial remains of over 200 recent humans from archaeological samples and seven Neandertal and anatomically modern human individuals. Recent human samples where completeness of the crania was a primary criterion for collection were excluded. We argue that a cross-species approach (within hominids) is a valid way to document the taphonomy of immature hominid skulls because of their overall similarity in anatomy and structure. For each skull, we recorded the presence or absence of anatomical landmarks as an indicator of the loss or breakage of cranial elements. From these data, we constructed a generalized pattern of the taphonomic vulnerability of the various skeletal elements of immature hominid skulls. Using this pattern, we consider three key specimens that are exemplars of very different taphonomic histories. These are: the Herto juvenile skull, Homo sapiens idaltu, which was modified and curated by hominids after the death of the individual (Clark et al. 2003) and underwent primarily post-fossilization damage (White, pers. comm.); the Taung skull, Australopithecus africanus, which was dropped into a dolomitic cave, probably by a

leopard, while it was both fresh and fleshed (McKee, 2001, pers. comm.); and the Mojokerto skull, Homo erectus, which has a less clear taphonomic history but was deposited in fluvial sediments (Huffman and Zaim, in press). In addition to landmark data, we observed the weathering, cracking, post-mortem distortion, and breakage as exhibited on casts and high resolution photographs. From these data, we identify some important characteristics of immature hominid skulls with different taphonomic histories.

Site context in the South African Acheulean

Kathleen Kuman (University of the Witwatersrand, South Africa) and Joel C. Le Baron (University of the Witwatersrand, South Africa)

Although there are fewer than two dozen published Acheulean sites in good context, South Africa provides a long record which extends from the early Acheulean (c. 1.7 – 1.5 million years old) to the later Acheulean (<1 and >0.2 million years old). The earliest sites are, with one exception, all secondary deposits within underground dolomitic limestone caves, while cave occupations occur only in the later Acheulean less than 600,000 years ago. All other sites are found in open-air contexts, frequently close to standing water—in large river basins, in seasonal lake basins or pans, in river terrace and colluvial basin deposits, in one spring deposit, and in coastal aeolian deposits. Since 2001, we have been excavating Acheulean sites in the northern Limpopo Province in another open-air context. Sites in the Vhembe-Dongola National Park and vicinity are found in a mantle of sand capping Miocene river terrace deposits and early Jurassic sandstones. The non-alluvial fine sand is up to 2 – 3 m in depth and is derived from weathering of the local Aeolian sandstone. The sites lack stratigraphy and the artifacts cannot be dated, but a "cultural stratigraphy" may be present. While Acheulean assemblages occur at the base of the sand layer, a rich occurrence of Middle Stone Age has been discovered at one site at higher levels. Further excavation will determine if it is underlain by Acheulean at the base or if the two may be conflated together. The Acheulean sites show size profiles that are near complete to complete due to the lack of slope and resulting stability of the landsurface.

Loss of only the smallest fraction of material (<10 mm) is documented in our main site, which is located atop the Miocene terrace only 20 m from an escarpment formed by terrace incision and subsequent erosion. Other sites tested south of this escarpment are unaffected by erosion and have complete assemblage profiles, as well as conjoining artefacts. Despite these good assemblage profiles, however, the arid, interior environment of the Vhembe-Dongola sites has been seriously influenced by deflation, making the assemblage composition of the shallower sites unreliable. Future research is directed toward OSL dating of the deepest sites and confirming whether Acheulean material is mixed with, or physically segregated from, the Middle Stone Age.

Carcass foraging by early hominids at Swartkrans Cave (South Africa): A new investigation of the zooarchaeology and taphonomy of Member 3

Travis Rayne Pickering (Indiana University, USA), Manuel Domínguez-Rodrigo (Universidad Complutense, Spain), Charles P. Egeland (Indiana University, USA) and C.K. Brain (Transvaal Museum, Northern Flagship Institution, South Africa)

While the Plio-Pleistocene paleontology of South African cave faunas is abundant and well-known, the zooarchaeology of these same assemblages is sparser and less appreciated. Most reconstructions of carcass foraging by Early Stone Age hominids are based largely on East African datasets. Here we take steps to remedy that situation by providing zooarchaeological and taphonomic data on the important c. 1.0 million-year-old archaeofauna from Swartkrans Member 3. Because most actualistic models of hominid-carnivore-“prey” carcass interaction are focused on limb bones, we concentrated our study on the limb bone midshaft sub-assemblage from Member 3. Results indicate that carnivores contributed more predominantly to the formation of the Member 3 fauna, but that a substantial portion of the limb bone midshaft sub-assemblage is also reliably attributable to the acquisition and modification behaviors of hominids. Based on the anatomical distribution of stone tool cutmarks, Swartkrans hominids appear to have been capable carcass foragers during Member 3 times, gaining access to carcass parts usually defleshed early and entirely by feeding carnivores before that happened. A similar pattern of cutmark distribution also characterizes broadly contemporary assemblages from East Africa, suggesting that hominids throughout Africa were capable acquirers of preferred parts from large animal carcasses.

Spatial scales of analysis of African mid-Pleistocene hominin activity and faunal change

Rick Potts (Smithsonian Institution, USA)

Analyses of early human behavior have tended to focus on artifacts and faunal remains recovered from spatially small areas – i.e., excavation sites on the order of 10 – 100 m2. Over the past two decades, field projects in eastern Africa have sought to expand the spatial scale of excavation and taphonomic analysis in order to place concentrations of past hominin activity and faunal change into a broader taphonomic and paleoenvironmental context. This type of research at the southern Kenya rift valley locality of Olorgesailie, which was inspired by awareness of taphonomic processes brought to light by Bob Brain and others, has recovered fauna and artifacts over spatial scales ranging from 100 to 106 m2, and offers evidence concerning the spatial distribution of hominin behavior and mammalian community formation during the mid-Pleistocene, particularly 1.2 to 0.5 million years ago. Attention to a variety of spatial scales of taphonomic and species sampling now enables us (1) to determine the gradient from site concentrations to background scatters of artifacts and bones, (2) to identify significant taxonomic and skeletal variations within narrow stratigraphic and temporal intervals, and (3) to assess how hominins and other species varied in their response to environmental change on a regional to continental scale.

Excavation and taphonomic analysis of a recent striped hyena den in northeastern Jordan

Kathy Schick (Indiana University, USA), Nicholas Toth (Indiana University, USA), Travis Rayne Pickering (Indiana University, USA), Thomas Gehling and Jason Heaton (Indiana University, USA)

A striped hyena den in the eastern desert of Jordan (approximately 60 km southeast of the town of Azraq, near the village of Umari and the border with Saudi Arabia) was excavated using archaeological techniques. The den is situated on a shelf at the base of a limestone cliff that overlooks a small wadi. The recovered fauna was analyzed taphonomically in order to discern patterns of assemblage formation and modification by this lesser studied species of bone accumulating hyena. Species represented, beginning with the most abundant, include Dromedary camel, dog, Dorcas gazelle, goat/sheep, ass, human, hedgehog, hare, fox, horse, stork, honey badger, hyena, oryx, and snake. Analysis included consideration of species representation, element representation and completeness, and surficial condition and modifications. A detailed analysis of limb bone fragmentation was also conducted. This allowed us to test current ideas about the relative importance of limb bone ends versus shaft fragments for accurate reconstruction of faunal assemblage formation.

Neotaphonomy of Parc National des Virunga (The Congo) as a model for background frequencies of carnivore damage to bone

Martha Tappen (University of Minnesota, USA)

As palimpsests, most archaeological sites have a mixture of evidence for bone modification by both hominids and carnivores, and the task of the taphonomist is to discern the relative extent of and the nature of involvement by each agent. The degree to which areas of repeated predation ("serial predation sites" or "predator arenas"), as opposed to den sites per se, contribute to the archaeological and paleontological record has not been settled, nor have their characteristics been well delimited. In the spirit of actualistic work advanced by C.K. Brain, I studied the landscape attritional death surface assemblage from Parc National des Virunga (PNV) of the Western Rift Valley. Bone modification data from PNV can serve as a model of frequencies of carnivore (mainly lion and spotted hyena) damage to bone (tooth scores, pits, and punctures) and as a model for expected frequencies of damage in the background "noise" of attritional deaths as well as for postulated serial predation sites. The frequencies of types of conspicuous marks by skeletal element, degree of bone breakage in different microhabitats and for different body sizes of prey, are compared with those from published data on carnivore dens as well as some archaeological sites, especially Dmanisi in Georgia. For the early "Out of Africa" site, it is important to delineate which taphonomic processes differ from those that occur in Africa, so that comparisons to neotaphonomic studies, which have most extensively been conducted in Africa, and to contemporary sites in Africa, can be made wisely.

Hominids and carnivores at Kromdraai A and B

Francis Thackeray (Transvaal Museum, Northern Flagship Institution, South Africa)

Kromdraai A (KA) and Kromdraai B (KB) are localities approximately two kilometers east of Sterkfontein in the Cradle of Humankind World Heritage Site. Since the discovery of the type specimen of Paranthropus robustus at KB in 1938, work has been undertaken intermittently at Kromdraai under the direction of Robert Broom, Bob Brain, Elisabeth Vrba and Francis Thackeray. Palaeomagnetic data, combined with faunal associations, indicate that the Olduvai Event is represented at KB. Most of the hominids from KB represent P. robustus, but early Homo has recently been recognized. KA is probably younger than the KB deposits. No hominids have been recovered as yet from KA, but the description of KA as a "non-hominid site" is a misnomer since stone artifacts indicate a hominid presence, associated with Developed Oldowan/Early Acheulean technology. Studies of bone damage suggest that large carnivores (including Dinofelis) were the principal agents of accumulation of faunal remains at KA, where alcelaphines are well represented. It is probable that large carnivores were preying primarily on vulnerable juveniles of wildebeest-sized alcelaphines. The possibility that hominids were occasionally present at KA to scavenge from carcasses of animals killed by carnivores is considered. As yet no cut marks have been found on antelope bones to support this. Potentially, core tools may have been used to break open long bones for the extraction of marrow. This possibility is being considered in the context of analysis of organic residues on stone tools.

The taphonomy of the Rusinga Island Lagerstätte

Alan Walker (Pennsylvania State University, USA)

The early Miocene volcanoclastic sediments of Rusinga Island, Kenya, produce exceptionally well preserved fossils. As well as teeth and bones, soft parts of plants and animals are preserved as natural calcite casts. Rare vertebrate body casts contain the bones. The reason for the fine preservation is chemical. The ancient volcano of Kisingiri is one of a series of Miocene carbonatite volcanoes that run north to south in Eastern Africa. The resulting ashes set like plaster of Paris around soft tissues and the natural cavities formed when the tissue rotted were later turned into calcite geodes. Another particularly interesting case is that of fossil hollow tree trunks that are still standing surrounded by sediment. One tree has been partly excavated and many skeletons have been recovered from it. These include animals that lived in the tree, such as bats, pythons and monitor lizards, and others, such as a juvenile Proconsul, that were carried there by carnivores.

Modified vertebrate fossils from Herto, Ethiopia

Tim D. White (University of California, Berkeley, USA)

Excavations by J. Desmond Clark and colleagues in the Bouri Formation's Lower Herto Member, Middle Awash study area, Ethiopia, revealed the butchery of hippopotamus carcasses by Late Acheulean hominids. The overlying Upper Herto Member, is Late Middle Pleistocene in age, dated by argon-argon analyes and tephrachronological correlation to between 154 and 160 kyr. This deposit has yielded abundant artifacts including large bifaces in an assemblage transitional between the Acheulean and the Middle Stone Age.

Associated vertebrate remains include large bovids and hippopotamids whose postcranial remains display cutmarks and fracture patterns consistent with their having been exploited for nutrition by the associated hominid, Homo sapiens idaltu. Three fossilized hominid crania (two adults and a child) have been recovered in contemporary stratigraphic contexts in close proximity to these occurrences of butchered large mammals. The hominid fossils display bone modifications, including cutmarks related to tissue removal, repetitive scratching, and polishing attributed to long-term handling.