

17. Fragmentation of the Body: Comestibles, Compost, or Customary Rite?

Christopher J. Knüsel and Alan K. Outram

Introduction

One of the most inimical ways to debase a people is to declare them cannibals – eaters of their own kind. The association between cannibalism and immorality, depravity, and base iniquity has contributed to the long-term interest in the behaviour. It has become a commonplace pejorative applied to exotic peoples, enemies, and strangers – sometimes and, more innocuously perhaps, to titillate fascination and, more sinisterly and more often, to dehumanise another group. Tuzin (1983, 62) characterises the Iahita Arapesh's (of northeastern New Guinea) attitude towards the cannibalism of the downstream Sepik, "... as an amused, faintly condescending interest that is morally neutral in tone..." and that those who engage in such consumption are described as an 'another kind of man'. The apparent relativism of this statement, although lacking in obvious contempt or fear, provides the basis upon which difference could be accentuated to justify actions at another time or under different circumstances. The use of the term 'cannibalism' among both Europeans and non-Europeans (see Strathern 1982, Rumsey 1999) to make a people less than human – with real social and political consequences for those so-labelled – prompted Arens (1979) to deny that the behaviour had ever been practised. Others have argued that it did occur upon occasion in a number of circumstances and for a variety of reasons. About the same time that Arens was writing, for example, Marvin Harris (1977, 126) remarked that:

As recently as fifty or a hundred years ago, small-scale sacrifice of prisoners of war and the redistribution of their flesh were common practices in hundreds of pre-state societies scattered across Africa south of the Sahara, South-East Asia, Malaysia, Indonesia, and Oceania. I have reason to believe, however, that eating human flesh was never an important aspect of the redistributive feasts in the culture which immediately preceded the rise of states in Mesopotamia, Egypt, India, China, or Europe.

In this passage, Harris not only supports the wides-

pread occurrence of cannibalism, he also provides a social context for the behaviour.

Since literary accounts of purported cannibalism appear to defy even the most probing textual and inter-textual analyses, an obvious complement to this literature is the study of the physical evidence for the behaviour as recovered from archaeological remains. Since archaeological studies also produce texts, they are not immune from the same literary polemic of other written accounts, however. Many of the early accounts based on archaeological remains interpreted bone breakage as resulting from cannibalism before the full range of archaeological signatures of the behaviour could be distinguished from others. Early on, an apparent absence or rarity of formal burials and scattered and broken human bones found on sites was enough to suggest that corpses had either been exposed or cannibalised (Clark 1962, Ucko 1969).

In an otherwise very descriptive and matter-of-fact account of the strata and features excavated at the Charlbury Camp hillfort in Dorset, England, when Whitley (1943, 103) addresses herself to the human remains encountered, she writes:

The floor [of what was interpreted to be the remnants of a wooden hut] was made up of a layer of fine trampled mud, but over everything a mass of human and animal bones, pottery, and charcoal lay scattered about in great confusion... They [the human remains] were not in articulation, so could not have been *in situ*, but may be the remains of early defenders of the rampart subsequently disturbed by the builders of the hut; human bones were actually found in the packing of one of the post-holes, so they must have been lying about when the hut was built. Cannibalism is another possible explanation; in any case, the phenomenon provides a striking instance of the casual treatment of human remains after death...

From the frequent occurrence of such assessments, it seems many of them were simply suppositions that were in vogue at a particular time to throw into stark contrast the lives of ancestors and peoples who were at a far

remove in both space and time and thus, by implication, culturally and socially very different from ourselves. Alternatively, they could be interpreted as untested hypotheses. In support of the former interpretation, it seems that exposure and excarnation have superseded cannibalism to explain the occurrence of scattered human bones on sites (see, for example, Cunliffe 1992, Hill 1995, Carr and Knüsel 1997). These shifting interpretations have less to do with the appearance and patterning of the remains, but seem to draw their inspiration more from general perceptions of past societies and a desire to make sense of apparently unburied and thus 'non-normative' depositions of human remains – in many instances from sites where the context is no longer clear.

Several of these early assessments of supposed cannibalism have been more recently denied. Early on, cannibalism was invoked to explain the occurrence of fragmented crania of the Zhoukoudian *Homo erectus* specimens. The occurrence of neurocrania with broken off viscerocranial elements, found in conjunction with burnt remains, longitudinally fractured hominid long bones, and consistently broken mandibulae were offered as defining characteristics to support such an interpretation. It is now clear that the evidence for fire at Zhoukoudian, one of the often-stated co-requisites for cannibalism, has recently been demonstrated to be the result of fluvial processes (Goldberg *et al.* 2001). The fragile nature of the viscerocranial skeleton and the absence of *bona fide* cutmarks on these remains seem to deny an association with cannibalism and, instead, suggest a taphonomic process and carnivore feeding as responsible for their fragmented state (Binford and Ho 1985, Binford and Stone 1986).

Similarly, in a more recent 7th century AD setting, Brothwell (1971) argued that an individual known as Q1, recovered from the Neolithic long mound at Maiden Castle in Dorset, England (Wheeler 1943, plate XLII), had sustained multiple injuries from an edged metal weapon and that circular traumatic cranial lesions had resulted from a mutilating attack. Brothwell (*ibid.*) surmised that they were unlikely to have been the result of an attempt to remove the brain, as had previously been suggested. This assessment relied as much on the presumed context and antiquity of such occurrences as they did on evidence that could be uniquely associated with the consumption of human flesh and the systematic refutation of alternatives (see Brothwell 1961 for similar sentiments).

Although refutation of such pronouncements has also occasioned the re-analysis of some early-excavated assemblages (see, for example, White and Toth 1991), some early investigators were aware of the importance of what, today, are considered archaeological indicators of cannibalism. In the 1870s, after examining human remains from shell middens in the southern U.S. state of Florida, Jefferies Wyman, Curator of the Peabody Museum, Harvard University, suggested cannibalism as being

responsible for disarticulated human remains found in unusual burial circumstances that had been broken in a manner similar to that identified in animal remains found in the same sites. Using ethnographic and ethnohistoric accounts, he also suggested that signs of dismemberment present in human remains, similar to those employed by more recent Amerindians in animal carcass butchery, were also an identifiable feature of cannibalism (cited in Buikstra, forthcoming, White 1992, 10). What is compelling about these earlier treatments is not only the easy alacrity with which cannibalism was interpreted in many of them, but the wide variation in the archaeological signatures used in supporting arguments. Although the former is less obviously the case in more recent years, the variation in the latter has been retained to the present day. This contribution addresses the nature of the physical evidence for cannibalism, examines the protocols to support its study, and considers a social context for the behaviour.

Archaeological arguments and equifinality

In the last few years, cannibalistic behaviour has once again been posited to have existed among the Neanderthals of the Middle (Fernández-Jalvo *et al.* 1999, Defleur *et al.* 1999) and Upper Palaeolithic (Andrews and Fernández-Jalvo 2003), in the Neolithic of France (Villa and Mathieu 1991), and among the Anasazi of the American Southwest (White 1992, Turner and Turner 1995, 1999), as well as to have been present among pre and protohistoric Fijians, where the behaviour is recorded by early European visitors to the area (DeGusta 1999). Given the wide geographic and temporal span covered, it would seem that a practice once considered nothing more than a means of dehumanising indigenous populations during colonial expansion (see Arens 1979) was widespread long before European colonisers took to the seas. Moreover, cannibalism appears to have an established legacy within Europe itself that stretches back to Middle Palaeolithic populations, some of which have been posited to represent pre-*sapiens* species on phylogenetic grounds.

There are other explanations for fragmented assemblages (see also Hurlbut 2000). These include the disturbance of primary burials (compost), customary mortuary rites involving defleshing of the dead and/or secondary burial, and peri-mortem torture and mutilation of individuals or of the corpse. Some instances of cannibalistic behaviour have been questioned and denied on the grounds of physical examination of the remains (DeGusta 2000) and on suspected misinterpretation of the ethnographic record (Murphy and Mallory 2000). Trinkaus (1985) examined the Archaic *Homo sapiens* (Neandertal) Krapina material and argued that the incised marks on these remains were the result of defleshing (*cf.* Russell 1987a and b) as part of a mortuary rite, an interpretation also levelled to explain similar occurrences on the Archaic *Homo sapiens* Bodo cranium (White 1986) and, most recently, on the Stw 53 cranium, a late

Australopithecine or early member of the genus *Homo* specimen from Sterkfontein, South Africa (Pickering *et al.* 2000).

A number of researchers have argued that cutmarks located in the vicinity of joints represent evidence of immediate post-mortem dismemberment. Ethnographic accounts of this behaviour abound (see Huntingdon and Metcalf 1991, 85, for a discussion of cleaning bones among the Berawan of northern Borneo). In Europe, medieval people retrieved the bones of saints for inclusion in reliquaries or for separate interment elsewhere (Mafart *et al.* 2004). The bodies of saints were not only defleshed and dismembered in these instances, but they were also often boiled to aid this process (Brown 1981). Dismemberment of the dead may also be practiced as a form of denigration of a defeated foe; Liston and Baker (1996), Olsen and Shipman (1994), and Scott *et al.* (2002) provide examples. Verano (1986, 2001) presents an excellent example of dismemberment related to trophy collection at the Moche Period site at Pacatnamu, Peru, c. 1100 AD, where the left radius was removed from three ritually murdered individuals buried in a haphazard fashion. A similar intent may be responsible for the 75 weapon-injured, decapitated males from the pre-Roman Iron Age site at Ribemont-sur-Ancre, département de la Somme, France (Brunaux 1998, Duday 1998). Injuries in these instances are indicative of peri-mortem trauma (breakages of bone that occur around the time of death) from stone (Walker and Long 1977, Shipman and Rose 1983, Wahl and König 1987, Frayer 1997) and metal (see Berryman and Symes 1998, Novak 2000, Boylston *et al.* 2000, Boylston 2000, Knüsel 2005) weapons (Fig. 17.1). If these individuals had survived – even for a week or two's duration – there would be signs of healing in the form of woven, porous bone around the site of injury, some of which may be visible only through microscopic analysis



Figure 17.1. Close-up of peri-mortem trauma in the right ulna of Towton 30 from the late medieval Battle of Towton (AD 1461). This fracture possesses spalling (chips removed from the cortical bone surface) associated with a parry fracture (Photograph: A. R. Ogden and the first author).

(Barber 1929, 1930). These are then instances of peri-mortem trauma that do not appear to involve consumption of human flesh. Fragmentation and dismemberment of human corpses due to weapon or tool trauma, however, might be expected to accompany cases of denigration of the deceased, of which cannibalism may also play a part.

Cannibalism as metaphor

Cannibalism may be invoked in a metaphorical sense and whether or not these references refer to the actual practice in the past remains a question in many parts of the world (see Pickering (1999) for a discussion of Australian Aboriginal metaphors involving 'cooked flesh' and Sahlins (1985) on 'cooked men' in Fijian society). In Papua New Guinea, there is a popular tradition of cannibals having lived in a distant time, and common speech draws on the presumed existence of such individuals (see Goldman 1999). Strathern (1982) discusses the use of terms such as 'to eat' to describe marriage, sexual intercourse, and exchange among the Melpa of the Western Highlands of New Guinea. In the context of a reprisal killing in the same area, the Big Man, Ongka (cited in Strathern 1979, 76), reports the following event:

They [the men involved] prepared various stuffs which were tough and prickly as adjuncts to their ritual... These things they scraped on to the pig's blood, cut the livers into small pieces over this, and made long sausages. The other meat they seasoned thoroughly too and prepared to dance out with fine decorations the next day. They added shreds of parsley and suet to the spices they had made. Finally, they took out the special red ochre powder and rubbed it all over the livers. A big-man got up, made small piles of all of this for each person and distributed them to each man of the group. Then each man said he was eating a particular part of the man they had killed- his head, tongue, liver, kidneys, leg, stomach, lower intestine, penis, testicles. They name each part of his body, including the bones, down to the last bit. Of course, they were actually only eating the pigs' livers.

Sahlins (1985, 112–113) remarks on the same theme in Polynesia. He writes, "...Polynesian social life is a universal project of *cannibalisme généralisé*, or even of endo-cannibalism, since the people are genealogically related to their own 'natural' means of subsistence." In these societies major staple foods, like taro or the sweet potato, are related to all else, including people, through common descent. Thus by cooking these tubers in an oven, people are in essence removing what is considered divine in them, and by consuming them, cannibalise a human relation. Similarly, the *kava* root that provides an infusion that is consumed in the installation ceremony of Fijian rulers is understood to be the 'child of the land' that is ritually killed by spear thrusts (*i.e.* harvested), prepared and served by young warriors to the ruler (Sahlins 1985, 95ff). As Sahlins (1983, 88) notes: "The problem, of course, is that cannibalism is always 'symbolic', even when it is 'real'."

Cannibalism is thus bound up with notions of ritual, magic, warfare and ceremony, as well as the practices subsumed within these (Tuzin and Brown 1983). These close links, though, do not necessarily mean that all instances relate to mythic practices, but they may provide a context and cosmology for the act for those who engage in it.

Archaeological indicators of cannibalism

Suitably rigorous methods for the study of complex and unusual peri-mortem treatment of human remains, at sites where cannibalism is a possible interpretation, have only surfaced – gradually and in an accretional manner – within the last ten to fifteen years. The field has developed to a large extent in response to the discovery of human remains in unusual (*i.e.* non-normative) circumstances among Anasazi sites in the American Southwest (*e.g.* White 1992; Turner 1993; Turner and Turner 1992, 1993, 1995, 1999). Individuals at these sites number between one and thirty plus, and they are found scattered within domestic settings, such as on the floors of rooms within pueblo complexes or semi-subterranean pithouses. These are considered unusual because they occur as multiple burials in the same stratum, lack grave good inclusions, and possess no standard body position or spatial location, a pattern that is different from the contemporary burial norm in the region – what the Turners refer to as ‘considerate burial’ (Turner and Turner 1999, 39ff.). In their 1999 volume, *Mancos: Cannibalism and Violence in the Prehistoric American Southwest*, the Turners provide a synthesis and gazetteer of the Anasazi sites that contain these non-normative burials. They support the interpretation of cannibalism in some, while denying it in others based on the presence or absence of a series of assemblage characteristics, including most fundamentally and most commonly, the presence of intentional, peri-mortem bone breakage, in addition to cutmarks, evidence

for burning, anvil or hammerstone abrasions (Fig. 17.2), and the absence or crushing of vertebrae to facilitate the recovery of fat from these highly cancellous-filled elements. They also address the context for the behaviour using analogies drawn from sites in contemporary prehistoric Mexico, where institutionalised cannibalism was practised, and from ethnographic accounts of animal butchery.

The Turners’ longer-term research efforts have been supplemented by White’s (1992) book, *Prehistoric Cannibalism at Mancos 5MTUR-2346*, which is based on a detailed analysis of a single site assemblage from Mancos Wash in southwestern Colorado, USA. Since the overarching theme of these studies is that people, like animals, are used for food, White (1992, 100) stressed the need to integrate the physical anthropologist’s detailed knowledge of human anatomy with the zooarchaeologist’s understanding of human-induced taphonomic factors. He (1992, 108) outlined the important data categories that support this type of study: preservation, fracture, toolmarks, percussion, gnawing, burning and fragment dimensions. Like the Turners, White has also developed criteria by which to identify cannibalism in the archaeological record. Because these authors worked in parallel, the names of these features are similar but not identical, although all are complementary and none are contradictory.

White (1992, 425) identifies two main groupings of features: those related to processing of human remains and another set that relates to the extent of animal access to the remains after processing. The first of these is heavily reliant on the mechanical properties of fresh bone to characterise the nature and timing (*i.e.* peri-mortem or post-mortem) of bone fragmentation. These include peri-mortem fractures (fractures produced around the time of death), including cranial remains exhibiting internal vault release (bevelling of the endocranial surface of the cranium) (see Fig. 17.3), inner conchoidal scars (in the

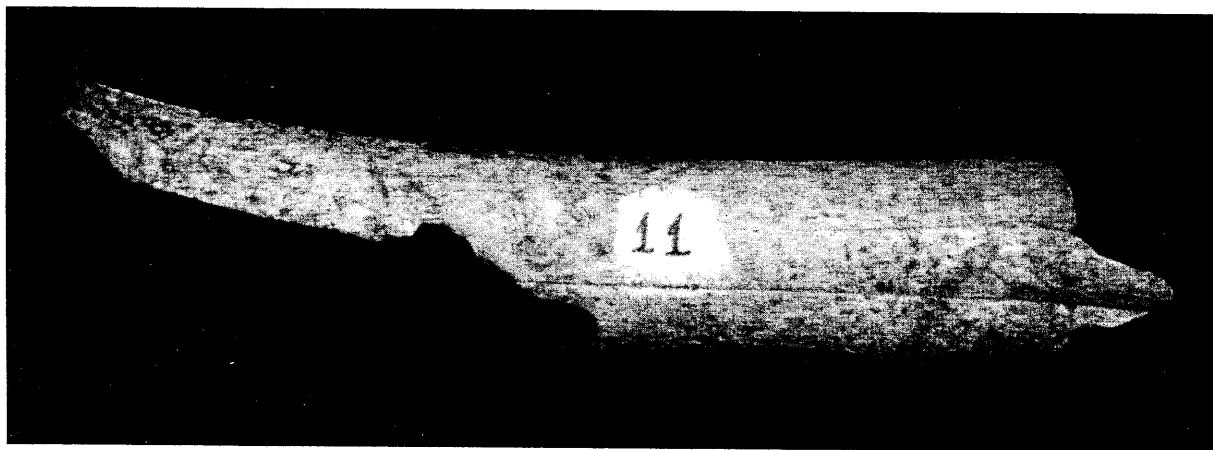


Figure 17.2. A sheep metapodial (an endo-cortical view of which appears in Fig. 17.4) bearing an impact scar (towards the left and bottom of the bone) and anvil abrasions (Photograph: the authors).

medullary canal of long bones from being broken with a hammerstone) (see Fig. 17.4), crushing, percussion pits (again from hammerstones) (Fig. 17.2), adhering flakes (from impacts with tools), peeling ('twig' peel or longitudinal spalls or bone splinters from impacts) (Fig. 17.1), cutmarks, chopmarks, polishing (or 'pot polish') of fractured ends of bones, intentional scraping (as in drawing a blade over bone), percussion striae (multiple curvilinear depressions from the use of a stone anvil) (Fig. 17.1), and burning. The most important feature added by White (1992) is the impact or conchoidal scars that are formed as part of the marrow extraction processing of bones and could thus be included with anvil abrasion marks, which are also called striae and consist of multiple

parallel scratches (see Turner and Turner 1995, Fig. 4). In a more recent study, Fernández-Jalvo *et al.* (1999) separate percussion marks from chopmarks – the former relate to marks left on a defleshed bone impacted to obtain access to the medullary canal, while the latter is a mark related to the process of dismemberment.

Pot polish, a novel feature identified by White (1992, 120–128) and synonymous with the Turners' end-polishing, has since been incorporated in the trait list by Turner and Turner (1999, 20–21 and Figs. 2.7 and 2.8). White (1992, 347, Fig.13.3) also noted human tooth puncture marks on human hand remains. These are considered as complementary but not defining features of cannibalised remains. Pot polish results from using a bone fragment to scrape fat deposits from the inside of ceramic vessels. This is a feature found in some, but not all, site assemblages in the American Southwest (see Turner and Turner 1999, Billman *et al.* 2000). White (1992, 124) performed an experimental study using cervid remains and ceramic vessels, but he noted that the extent of the polishing seen was not observed in the archaeological material. Moreover, Kantner (1999, 84) draws attention to the lack of experiments under which such polish might be produced under other circumstances, including post-depositional ones. Curiously, human tooth punctures have not played a substantial role, even given their apparently obvious importance (see below). White (1992) also highlighted the importance of distinguishing features related to animal activity from those associated with human processing, such as the multiple grooves produced by rodent incisors when they gnaw bones and the pits in the cortical surface and underlying cancellous bone produced by the teeth of carnivores ('carnivore damage').

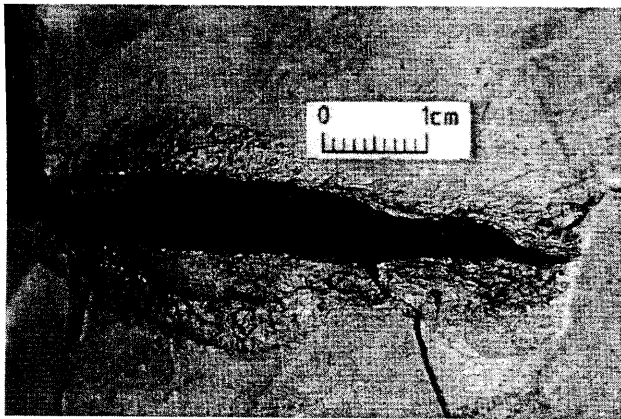


Figure 17.3. The bevel formed by internal vault release in a cranium from an unstratified individual 1 from the battle of Towton (Photograph: Eric Houlder)

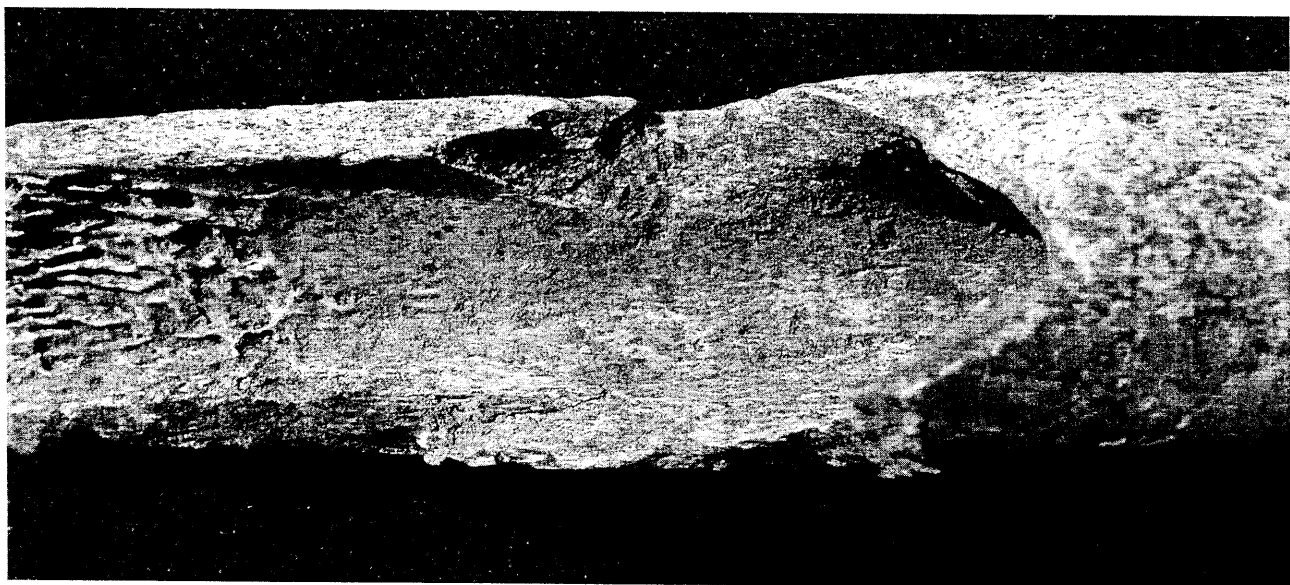


Figure 17.4. An inner conchoidal scar in the medullary canal of sheep metapodial (the same element as that in Fig. 7.2). This is similar to the bevel seen in cranial trauma (Photograph: C. Palmer and the authors).

Many of these features were anticipated and identified by Villa and colleagues (1986a and b, 1988) in their earlier analysis of Fontbrégoua Cave, a habitation site dating to the Early and Middle Neolithic and located in Provence, France, where three adults, one adolescent, two children and one child of indeterminate age were found (Villa and Mahieu 1991). As in the American Southwest, the remains from Fontbrégoua differed in their placement and treatment from contemporary normative burials. These researchers compared human and non-human animal remains found at the site and established the near contemporaneity of features through a combination of conjoining exercises and non-calibrated C14 dates. They used scanning electron microscopy to distinguish cutmarks on human and animal remains to distinguish them from abrasions made by trampling, which are shallow and more dispersed than are those made with stone implements. In addition, these authors characterised and compared element frequency, peri-mortem bone breakage, fracture, cutmark, impact scar, and discard pattern frequencies between animal and human remains from the site. They also recorded evidence for non-human gnawing of remains in order to gauge the potential effect of non-human animal activity in the creation of the assemblage.

Although they considered evidence for both boiling and roasting of remains, they were not able to identify either type of preparation through chromatographic analysis of collagen or through amino acid analysis directed at determining if the bone had been heated to temperatures greater than 150°C. In addition to these biochemical considerations, another unique feature of these authors' research is that they provided matched comparisons between cutmarks on human skeletal elements and those found on the remains of various animal species represented at the site based on their anatomical position. In this way, they noted differing treatment of the scapula and cranial remains based on anatomical differences between humans and animals, but similarities in the treatment of all other elements between different animal species. Human patterns were not identical to any particular species, but had similarities to animals of diverse size, ranging from martens, foxes, badgers, and dogs to wolves and domesticated sheep, pigs, and cattle. The authors noted the absence in some groups of remains of certain elements, such as crania, limb extremities or portions of the axial skeleton. Compared to the vertebrae from non-human species, human vertebrae were less well-represented at the site, which the authors attribute to the selection of parts for differing uses, such as immediate consumption at the site, as opposed to transport of some parts for consumption elsewhere.

In summary, then, potential archaeological indicators of cannibalism are:

1. Human and animal remains found in the same context and in the same spatial relationships (through recording and conjoining) meaning that the discard history is similar.
2. Element representation is similar between humans and animals.
3. Patterns of bone modification are similar – cut and chop marks, percussion striae, anvil abrasions, internal vault release (bevelling), adhering flakes, inner conchoidal scars, crushing of cancellous bone, and peeling of cortical bone. The remains have these features in the same frequency and anatomical location.
4. Peri-mortem fractures are similar in both human and faunal remains. These are indicative of processing to retrieve marrow and brains for consumption.
5. Evidence for burning and/or cooking of both whole elements and of previously fractured elements. These features relate to similar preparation of human and non-human animal remains.
6. The presence of human tooth impressions.

Additional observations act as covering arguments to discount certain influences on the formation and appearance of the assemblage. These include:

7. Little evidence of carnivore or rodent gnawing. As a covering signature, the absence of such tends to exclude other animal activities in the processes observed.
8. No age or sex dependent aspect of the assemblage – both males and females, infants, children, adolescents, and adults may be included in the palaeodemographic profile (i.e. unlike battle-related sites, where males predominate). In other words, in most cases the age-at-death profile is most like a catastrophic palaeodemographic assemblage, one that includes individuals of both sexes and all ages.
9. No evidence for mortuary ritual, such as care in the placement and positioning of the deceased, grave cuts, or burial treatment, or artefact inclusions that respect the body.

Applications

Table 17.1 provides an over-view of assemblages of human remains that researchers have analysed for cannibalistic intent. They represent robust and holistic treatments of human remains in their archaeological context. The majority of these come from published journal articles, and some have been the subject of publication on more than a single occasion by different researchers (e.g. Cowboy Wash, Krapina).

As can be seen from the table there are not only a number of differences in the recording methods used, but also in the types of information recorded and how this information is presented in the text. Perhaps one of most obvious shortcomings of these studies is the lack of combined human and animal remains analysis that would permit direct comparisons between assemblages from the same site. This is despite the implicit understanding that

Study, Author And Date	Zone	Frag. Level	Fracture Types	Impact	Indet. Inc.	Preservation	Gnaw	Burn	Cook	Conjoin	Min No.	Trauma/ Butchery	Animal Integ.
Mancos 5MTUMR, Colorado, USA White 1992.	NO	YES IND	YES COD	YES COD	YES	YES SEM	YES SEM	YES LEV COD	YES POL	YES EXT	YES	YES COD SEM	YES D*
Fontbrégoua, Provence, France Villa <i>et al.</i> 1986/1991	NO	YES DAT IND	YES COD	YES COD	YES	YES	YES	YES	YES ALT	YES EXT	YES	YES COD SEM	YES LD
Gran Dolina, Atapuerca, Burgos, Spain Fernando-jalvo <i>et al.</i> 1999	NO	YES DAT	P**	YES COD	NO	YES	NO	NO	NO	YES EXT	YES	YES COD SEM	YES LD
Canyon Butte, Arizona, USA Turner <i>et al.</i> 1992	NO	YES IND	YES COD	YES COD	NO	NO	YES	YES I.FV COD	NO	NO	YES	YES COD	NO
Largo-Gallina, New Mexico, USA Turner <i>et al.</i> 1993	NO	YES IND	YES COD	YES COD	NO	NO	YES	YES COD	NO	NO	YES	YES COD	NO
Chaco-Canyon, New Mexico, USA Turner 1993	NO	YES IND	YES COD	YES COD	NO	YES	YES	YES LEV COD	YES POL	YES LIM	YES	YES COD	NO
Krapina, Croatia Trinkaus 1985, Russell 1987a and b	NO	NO	YES COD	YES COD	NO	YES	YES SEM	NO	NO	NO	NO	YES COD PIC SEM	YES LD
Moula-Guercy, Ardèche, France Defleur <i>et al.</i> 1999	NO	YES IND	YES PIC	YES	NO	YES	YES	NO	NO	YES EXT	YES	YES	YES FI
Franklin Expedition, King William Island, Canadian Arctic Keenleyside <i>et al.</i> 1997	NO	NO	YES***	NO	NO	YES	YES	YES	NO	NO	YES	YES COD	NO
Kodiak Island, Alaska, USA Simon 1992; Simon and Steffian 1994	NO	NO	NO PIC	NO	NO	NO	YES	YES	NO	NO	YES	YES COD PIC	NO

Table 17.1. Comparison of the Methods Employed in the Identification of Cannibalism. (For key, see page 261.)

Study, Author And Date	Zone	Frag. Level	Fracture Types	Impact	Indet. Inc.	Preservation	Gnaw	Burn	Cook	Conjoin	Min No.	Trauma/ Butchery	Animal Integ.
St. Lawrence Iroquoian Roebuck Site, Ontario, Canada Jamieson 1983	NO	NO	NO	NO	NO	NO	YES	YES LEV	YES	NO	YES	YES COD PIC	NO
Cowboy Wash, Colorado, USA Lambert <i>et al.</i> 2000a, and b, Billman <i>et al.</i> 2000	NO	YES IND	NO	YES	NO	NO	YES	YES LEV	YES	YES EXT	YES	YES COD	NO
Navatu, Fiji DeGusta 1999	NO	YES IND PIC	YES IND COD	YES COD	YES	YES	YES	YES P/A	YES	YES EXT	YES	YES COD	YES FI
Vunda, Fiji DeGusta 2000	NO	YES IND PIC	YES IND COD	YES COD	YES	YES	YES	YES P/A	YES	YES EXT	YES	YES COD	YES FI
Saunakruk, Northwest Territories, Canada Melbye and Fairgrievé 1994	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	YES COD PIC	NO
Grinnell Site Graver <i>et al.</i> 2002	NO	YES IND	YES IND PIC	YES COD	NO	NO	YES	YES	YES POL ALT	YES LIM	YES	YES COD PIC	NO
Backhoe Village, Utah Novak and Kollman 2000	NO	YES IND	YES	YES IND	YES	YES	NO	YES	YES POL ALT	YES LIM	YES	YES COD PIC	NO
Ram Mesa, New Mexico Ogilvie and Hilton 2000	NO	YES IND	YES	YES IND	NO	YES	YES	YES COD	YES	YES EXT	YES	YES COD PIC	NO
Alfred (<i>azé</i>) Packer Case Rautman and Fenton 2005	NO	YES	YES COD	YES	NO	YES	YES	YES	YES	NO	YES	YES COD PIC	NO
Gough's Cave, Somerset, England Andrews & Fernández-Jalvo 2003	NO	YES IND PIC	YES****	YES	NO	YES	YES	YES	YES	YES	YES	YES COD PIC	YES

Table 17.1. Continued. (For key, see opposite.)

<p>* Method would have been fully integrated if faunal material were available in the actual sample studied.</p> <p>** Only identification of peeling which can be related to green bone fracture, but no systemic description of fracture types.</p> <p>*** Indeterminate due to weathering.</p> <p>**** Hindered by gluing of fragments.</p> <p><i>Note:</i> Impact includes consideration of anvil marks.</p> <p><i>Abbreviations:</i></p> <p>D = Discussion of animal remains but no direct comparison of data given (not given or material not available or methods differ)</p> <p>C = Comparison with similar data derived from other analyses</p> <p>LD = Limited direct comparison – comparison of a selection of criteria using same methods</p> <p>FI = Full direct comparison – animal and human material recorded with fully integrated methodology</p> <p>SEM = Scanning Electron Microscopy employed to confirm difficult interpretation of surface features</p> <p>LIM = Limited Conjoining carried out</p> <p>EXT = Extensive conjoining carried out</p> <p>IND = Use of an index method to represent fragmentation level (e.g. a ratio or % complete figures)</p> <p>DAT = Full data on degree of fragmentation based on size classification of fragments</p> <p>P/A = Presence absence of particular butchery/trauma marks and burning</p> <p>COD = Coded approximate position of identified butchery/trauma marks, fracture scars and burning</p> <p>PIC = Pictorial record of exact position of identified butchery/trauma marks, fracture scars and burning</p> <p>LEV = Level of burning recorded</p> <p>POL = Microscopic analysis for “pot polish”</p> <p>ALT = Signs of physical and chemical alteration from cooking</p>
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Key to Table 17.1.

in cases of cannibalism, people are treated like animals. Sometimes, the lack of a combined analysis is due to the lack of animal remains, as is the case for White's (1992) study of Mancos 5MTUMR-2346 and the Krapina assemblage. This scarcity of animal assemblages also influences the work of the Turners. In these instances, researchers attempt to draw on contemporary remains from other sites, a practice that has been questioned by Villa and Mahieu (1991) on the grounds that the excavated material may have been collected using different protocols and is thus not comparable. For example, the faunal remains recovered from Combe Grenal, used for comparison with the remains from Krapina, were limited to articulations, and the excavators did not retain fragments from long bone diaphyses. Moreover, due to the selective nature of the Krapina remains, no attempt was made to characterise relative frequencies of fragmentation, a feature that is fundamental to analysis.

The frequency and intensity of fragmentation permits comparison of the peri-mortem and taphonomic history of human and animal bone assemblages. Interpretation of these frequencies has produced the greatest controversy and difference of opinion (see Villa *et al.* 1986a and b; Villa and Mahieu 1991; White 1992; Turner 1993; Turner and Turner 1995, 1999; Billman *et al.* 2000). Turner (1995, see also Turner and Turner 1999) has suggested threshold percentages to support an interpretation of cannibalism, but these have not been maintained in any categorical way in more recent treatments,

with studies tending to rely on direct comparisons of frequencies between human and animal remains from the same or other near-contemporary site.

Archaeozoologists often use the degree of fragmentation of animal remains to indicate intensity of processing that may reflect the economic and environmental context of their exploitation (see Outram 1999, 2003). DeGusta (1999) uses the same reasoning when he notes that the difference between the Navatu cannibalised remains and those from the American Southwest is largely due to the apparent less intensive marrow exploitation of the Fijian inhabitants, as represented in the frequency of percussion pits and crushing. Presumably, the same would apply to cannibalised humans where the intensity of processing could relate to the circumstances under which human flesh was consumed, but would also be affected by cultural practices that dictated the amount and portions of, and manner in which, humans could be consumed.

The studies in Table 17.1 rely on NISP (number of identifiable specimens) and MNI (minimum numbers of individuals) as a means to record human remains, while none rely on MNEs (minimum number of elements), which is a standard treatment employed more recently by faunal analysts due to the fragmentary and disarticulated nature of faunal assemblages. This method of analysis has recently been adopted by the authors in conjunction with a zonation method of recording (Dobney and Reilly 1988, Knüsel and Outram 2004). The zonation method produces an MNE that is a better reflection of

representativeness than the maximum number produced by NISP and the minimum number produced by MNI.

Very few studies quantify the number of indeterminate fragments. This results in an inability to determine the intensity of fragmentation, as well how this differs between axial, mainly cancellous and thus fat-bearing bones, and those from the appendicular skeleton with their considerable cortical bone coverage and endocortical fat stores. Without these, absent vertebrae could be interpreted as a taphonomic signature due to lack of preservation and/or animal activity or as the result of a processing behaviour (see Outram 2001, Outram *et al.* 2005). A tally of fragment size and whether fragments come from the axial or appendicular skeleton permit inferences to be made about the apparently unrepresented skeletal elements, as well as to quantify the intensity of fragmentation and better compare human and animal remains directly (Outram 2001, Outram *et al.* 2005).

It is also important to consider the presence of dry fractures, which are rarely explicitly considered in the studies found in Table 17.1. Dry fractures occur when the amount of collagen in the bone has been reduced and the mechanics of bone fracture altered as a consequence (Fig. 17.5). Micro-cracks caused by loss of both water and collagen result in features that distinguish dry from peri-mortem fractures. Peri-mortem fractures are identified on the basis of their smooth, sharp and helical

appearance in fresh bones (Knüsel 2005). Dry fracture morphology may resemble that found in fresh bones in part, but deviations from this appearance result in roughened, corrugated fracture surfaces and steps in the fracture outline. The dryer the bone, the rougher and straighter (diagonal, longitudinal, transverse, stepped or columnar, rather than spiral) the fracture outlines become. Straight diagonal breaks are most easily confused with true helical (*i.e.* peri-mortem) fractures. The presence of dry fractures would indicate the remains had been moved from a primary context in the past and have been employed as an indicator for secondary burial (see Valentin and Le Goff 1998, Outram 2002). Although Ogilvie and Hilton (2000) mention dry fractures in their treatment, there is no indication of their frequency or where they occurred in their sample. Their presence, though, in this assemblage would suggest disturbance or manipulation of the remains in the past.

The significance of dry bone fracture frequencies is revealed in Dongoske *et al.*'s (2000, 183) cautionary example relating to three disarticulated bone assemblages recovered during the construction of the La Plata Highway in New Mexico, citing an unpublished report presented at the 1993 annual meeting of the Society for American Archaeology. A detailed taphonomic analysis of these remains revealed that: "...one of the assemblages was due to carnivore damage and recent (trenching) damage, one

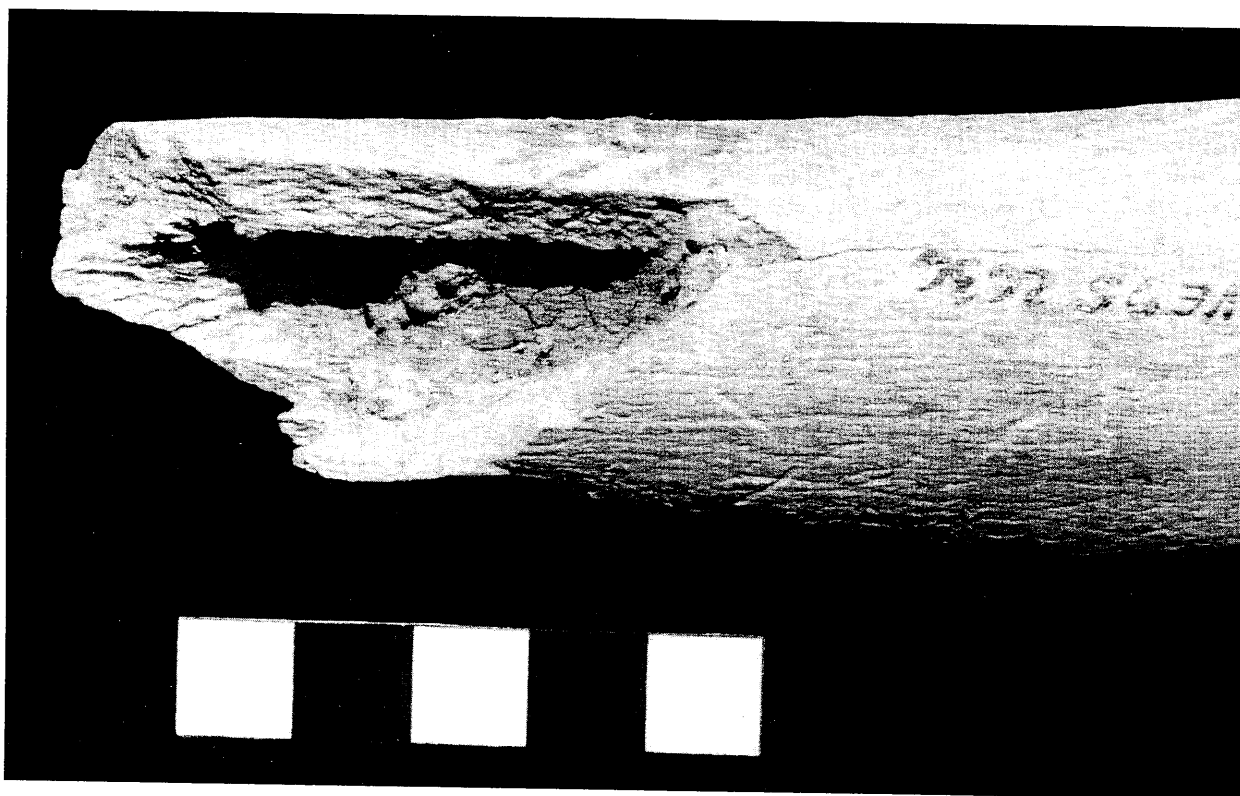


Figure 17.5. A dry fracture of a left femoral diaphysis from the Bronze Age site of Velim Skalka, Czech Republic (Photograph: C. Palmer and the authors).

was due to ancient movement of remains and secondary burial, and one was likely due to some human activity involving dismemberment and intentional arrangement.” This assessment is no different from that offered by the Turners, who analysed the same material, but they sustained the argument for cannibalism for the last assemblage, but not for the other two. They (1999, 316) write: “The considerable post-mortem damage we found in the human bone assemblage was due to excavation... We can easily distinguish between peri-mortem damage and that caused by recent excavation and archaeological techniques. However, the other criteria for proposing cannibalism are unquestionably present, although in low frequencies.” What is implicated here is not only a difference in interpretation based on the frequency of characteristics, but also one that invokes a problem with distinguishing features on the trait list to support cannibalism as opposed to other possibilities. Presumably, without explicitly saying so, the Turners used the presence of dry fractures to reject an interpretation of cannibalism for the second of these assemblages characterised by the ‘ancient movement of remains and secondary burial’.

Lastly, few treatments present drawings of the placement and position of cutmarks and other features on human and animal skeletons. There is often no similar record of the pattern of burning, although sometimes this information can be extracted from the text. This absence makes comparison between sites difficult, if not impossible. Information on the patterning of burning is essential if, for example, immolation is to be separated from the roasting or oven-cooking of remains and whether exposure to flame occurred before or after fragmentation. This may be due to the lack of obvious individuals among these remains, but a simple sample-wide line-drawing like those in Keenleyside’s (1997), Villa *et al.*’s (1986b), and Rautman and Fenton’s (2005) treatments is a good complement to tabular information, as are line-drawings of affected skeletal elements, as in the articles by Simon (1992) and Simon and Steffian (1994). Both the Turner’s volume and White’s are replete with high quality photographs that are essential to documenting the alterations to bone, but there are far fewer – or none at all – in many cases.

The earliest instances of cannibalism – in the absence of burning

The earliest evidence of cannibalism comes from Middle Palaeolithic sites that have produced remains ascribed to Archaic *Homo*, Neanderthals and their precursors in Europe (pre-Neanderthals or *Homo antecessor*) (Arsuaga *et al.* 1999). Defleur *et al.* (1999) report on remains from Baume Moula-Guercy, Ardèche, southern France, deriving from six Neandertals (two adults; two adolescents, aged 15 and 16 years of age at death; and two children, aged six and seven years of age at death), dating to isotope stage 5 (80,000–120,000 years ago). They were

found commingled with faunal remains, mainly of red deer, *Cervus elaphus*, along with stone tools (with little lithic débitage). The similar finds context, element representation (taking anatomical differences between species into consideration), fragmentation, and processing information (as represented by cutmarks, percussion pits, anvil striae, adhering flakes, inner conchoidal scars, crushing of cancellous bone, and cortical bone peeling) suggests that the discard pattern and treatment of these remains were similar. Conjoined human elements, found three metres apart, and evidence for splitting of long bone shafts suggest retrieval of marrow from the medullary canal after diaphyses had been broken open. There is no mention of evidence for burnt remains and, given the evidence for on-site processing, these remains may have been consumed in a raw state or prepared elsewhere.

Absence of evidence for burning appears to be a feature of European prehistoric sites. No evidence for cooking or heating was noted in either human or animal remains at Fontbrégoua Cave (discussed above). Villa *et al.* (1986b) note that animals and humans were treated in a similar manner, however. They identify cutmarks in similar locations made by the same type of implement – one was found in association with the human remains. Interestingly, the human and animal remains were segregated in different features, for which conjoining exercises demonstrated single short-term periods of accumulation. Both human and animal bones showed evidence not only for dismemberment in the form of jointed remains, but also that the muscle tissue had been filleted from the bones prior to consumption. Humans, like wild animals at the site, appear to have been butchered in groups, while domestic species were butchered singly. Villa and colleagues (1986b) note that the splintering of both human and animal bone is similar with similar frequencies of impact scars noted. Furthermore, this evidence for marrow extraction and the discard of these remains differs from the contemporary inhumation rite practised in the area during the Neolithic and that these patterns also contrast with those associated with secondary burial practices (see Villa and Mahieu 1991). Based on the absence of neuro-crania from the assemblage and cutmarks to the viscerocrania that are present these researchers argue for ritual retrieval of crania and exocannibalism (*cf.* Turner and Turner 1992). There does not appear, however, to be evidence for violent trauma that one might anticipate if cannibalism occurred as a result of hunting (and killing) humans. Therefore, this site presents substantial evidence for the consumption of human flesh but without evidence for exposure to fire.

Instances of survival cannibalism

There is no doubt that cannibalism has taken place under conditions of extreme distress and deprivation, both physical and mental (Tuzin 1983). One of the best-studied historical cases is that of the Donner Party, a wagon train

that was trapped by winter weather in 1846–1847. Numbering some 87 persons, this group experienced not only cannibalism but also violence among the males, over half of whom perished (Grayson 1990). In another example, Keenleyside *et al.* (1997) note that among the ice-locked crew of the Franklin Expedition, lost in the search for a Northwest Passage in 1848, the position of cutmarks near articular surfaces and possible peri-mortem breakage (although levelled tentatively by these authors due to weathering of the fractured surfaces) on approximately one-third of the fragmented and scattered human remains is consistent not only with cannibalism but also with defleshing or removal of soft tissue. The assessment of cannibalism is sustained, in this instance, by contextual and circumstantial evidence that supports historical accounts of the loss of the crew. This support includes the morphology of the cutmarks being consistent with the use of metal implements (not stone as used by the indigenous Inuit), other material culture (personal items and items of clothing), and oxygen isotope signatures that attest to a European, rather than an Arctic origin for these human remains. Above all, it is the eye-witness accounts collected from Inuit after the event that attest to cannibalism. Multiple cutmarks on the remains of the hands, for which the authors cannot attach significance, may perhaps attest to defence injuries. The drawing of the placement of them suggests that they were made to the palmar surface, a position that is consistent with individuals grabbing a cutting weapon while defending themselves from attack (see Novak 2000 for examples).

Although White (1992) refrained from interpreting the heavily fragmented assemblage from Mancos Wash, Colorado, using factor analysis of the indicators of cannibalism, Kantner (1999) has more recently demonstrated that this assemblage is unique among American Southwest sites previously analysed and identified as containing non-normative burials. This site, then, may be best associated with climatic deterioration and survival cannibalism.

In a case of historically documented murder/cannibalism, Rautman and Fenton (2005) record a combination of peri-mortem cranial trauma with a minority of post-cranial defence injuries affecting the upper limbs and evidence for defleshing in a group of late nineteenth-century males killed and subsequently cannibalised by Alferd (*sic*) Packer. In this example, the authors note the lack of cutmarks associated with disarticulation, e.g. without cutmarks found on the articular surfaces, with 95% of these marks occurring near the proximal or distal ends of the long bones and the remaining 5% (only nine cutmarks), found in the mid-diaphysal region. The authors suggest the patterning of these cutmarks relates to filleting of muscle tissue from the bone. They contrast this with defleshing marks that tend to be more randomly distributed on the bone. The lack of disarticulation and bone breakage associated with marrow extraction sets this instance off from those

associated with the Anasazi of the prehistoric American Southwest. The authors, like DeGusta (1999, see below) in his treatment of Fijian cannibalism, note that cultural and culinary differences play a substantial role in the form cannibalism may take.

The earliest, best-developed case for cannibalism comes from the karstic cave site of Gran Dolina, Atapuerca, Burgos, northwest Spain. Here, 80 fossil remains of a minimum of six individuals, dating to before 750,000 years ago, were found commingled with 200 lithic artefacts and faunal remains that included animals such as mammoths, cave bears, canids, foxes, lions, cats, weasels, horses, boars, as well as fallow, roe, and red deer, bison, and 'Irish Elk' (*Megaloceros* sp.). The part representation of this assemblage demonstrates that the most commonly occurring elements are metapodials, phalanges, ribs, isolated teeth, and vertebrae. Unlike the situation at American Southwest sites, vertebrae are found in a higher proportion than are metapodials and phalanges. The authors attribute this discrepancy to the absence of boiling of vertebrae. Conversely, the scapula, humerus, ulna, sacrum, pelvis, fibula, tibia, calcaneum and astragalus are entirely absent from the assemblage. Limb bone fragments overall were rare (one femoral and two radial fragments), so the assemblage was predominately made up of axial elements. The palaeodemographic profile of the hominids and fauna (MNI=22) are similarly dominated by infants and juveniles, with the hominids represented by two infants, 3–4 years old; two adolescents, one 14 years old, a second 11 years old; and two sub-adults, 16–18 years of age at death. Roughly 25% of the hominid specimens possess cutmarks and the hand elements also possess these, which the authors believe relates to cuts made when these elements were held in the mouth. In addition, there are conchoidal scars, percussion marks, peeling, and adhering flakes represented in the assemblage, damage induced by fracturing bones to reveal the medullary canal.

In comparison to Anasazi assemblages, including that from Mancos Wash, there is greater evidence for conchoidal scars, peeling and adhering flakes, features of the Atapuerca assemblage that the authors relate to differences in treatment of the remains, perhaps due to the absence of fire and greater difficulty in the dismemberment process without it. The hominid remains share these features with the medium-sized mammals at the site, presumably due to the ease with which elements from these species can be broken by bending with the hands, as opposed to the greater force needed to break large mammal bones. Limb bones of all species were heavily fragmented to reveal the medullary canal. This difference may also explain the greater number of cranial cutmarks among the Atapuerca hominid remains as compared to those of animals. This lack of preparation may also be responsible for the relative abundance of vertebral and rib fragments in this assemblage since these are usually under-represented in other assemblages previously investigated for cannibalism due to rendering them for

grease. Due to what seems to be a temperate climate and abundant species diversity, the authors suggest that the Atapuerca remains relate to dietary or gastronomic cannibalism, rather than to survival cannibalism. They see no evidence for any ritual behaviour evident in this assemblage, as for example, may have characterised the Krapina assemblage and that from Neolithic Fontbrégoua. Based on the demographic profile of hominids found in the Simo de los Huesos, of which Gran Dolina is a part, these individuals represent a catastrophic assemblage, rather than an attritional one (i.e. one that characterises a slow accumulation of deaths), as indeed does the assemblage from Krapina (Bocquet-Appel and Arsuaga 1999). Although this assumes that these individuals died over a relatively short time, the profile reveals an age-at-death expected of a group of individuals living at the same time (i.e. a living population), an observation that is consistent with mortality independent of age or sex, as has been noted in other suspected cases of cannibalism from the American Southwest.

Compost

Disturbance of primary burials shortly after interment, but when the bone contains substantial amounts of collagen, may mimic the peri-mortem breakage patterns of remains said to be cannibalised. Based on observations of peri-mortem breakage, Simon (1992) and Simon and Steffian (1994) argue that scattered, disarticulated multiple human bones from the excavation of a Pacific Eskimo site (Kachemak Tradition, 733 to 2701 B.P.) on Crag Point, Kodiak Island, south-central Alaska, represent a complex mortuary rite rather than cannibalism, as had been argued previously. This complex mortuary rite involved processing of the bodies of the dead and of human bone, in addition to retention of skeletal elements removed from desiccated or skeletonised bodies for ceremonial purposes.

These researchers identify three types of interment: primary inhumation, multiple disarticulated inhumation that was at least partially fleshed when consigned to the ground, and scattered human remains. The last of these appear to result from the disturbance of primary inhumations, perhaps in the performance of retrieving human skeletal remains, and would thus be better described as a form of secondary mortuary rite. Only the scattered remains possess evidence of animal scavenging and were also, unlike the inhumations, the only remains to bear evidence of cultural modifications consisting of cutmarks, defleshing (*i.e.* incised marks), burning, drilled holes and two types of peri-mortem breakage, single fractures on single elements and multiple fractures of bones indicative of a reduction sequence. These features were found on sub-adult and adult female remains only, although the authors point out that this may simply reflect the fact that the elements involved were those for which sex and age-at-death could be determined.

At this site, cannibalism is denied on the grounds that

the interred elements lack features of those found scattered—cultural modification and animal gnawing—and that these interred remains are found in contexts that seem to have been disturbed as part of secondary funerary rites when elements had been removed for ceremonial purposes, or when burials, perhaps in a desiccated state, had been added to cairn-like structures and disturbed earlier burials. Simon (*ibid.*, 146) indicates that cannibalism might be implicated when cutmarks, peri-mortem breakage, and burning are found on skeletal material from the same feature and when “independent data”, such as historical accounts or oral tradition, suggest that human cannibalism occurred among a particular group of people at a particular place, and at a particular time. Simon and Steffian (1994, 86) conclude that the currently available data do not support, or discount, the possibility that traumatic death occurred or that human bones were processed for consumption at Crag Point.

It seems unwarranted to demand “historical accounts” to support interpretations of prehistoric events. Such a statement seems to fundamentally question the notion that archaeological remains can reflect cultural and social change. Melbye and Fairgrieve (1994, 57–58) elaborate upon this point in their analysis of the remains from the Inuit Saunaktuk site in Canada’s Northwest Territories. They write: “... we know of no corroborating independent data (such as historical accounts or oral tradition) at a particular time and place in south-central Alaska (or for the entire Arctic for that matter), which supports a mortuary custom of slashing or chopping the deceased, defleshing and dismembering the body, splitting the long bones, and scattering the remains in a random fashion about the site.” These authors rely on evidence for substantial peri-mortem trauma in scattered and disarticulated human bone found in association with two dwellings dated to AD 1370 ± 57 to support an interpretation of massacre. Although the authors entertain and, indeed, support the interpretation of the remains as cannibalised, they do not attempt to demonstrate this possibility by comparison with other assemblages. The human remains demonstrate cutmarks especially affecting the viscerocranial skeletal that the authors argue were intended to remove tissue and disfigure the deceased. They further identify evidence of torture in the form of medio-laterally gouged holes in the epicondylar region of three femora and one humerus in at least two different adults. Ethnographic sources attest to a practice whereby the knees were pierced with an object, by which the transfixed person was dragged. They also note substantial evidence for cranial trauma, as well as slash (*i.e.* chop) marks that suggest further cranial and infra-cranial injuries as well as numerous cutmarks that appear to relate to dismemberment. They argue that longitudinally split long bones represent cannibalism of mainly children and adolescents (24 of 35 individuals). These remains were then discarded and denied normative burial rites and left to decompose on the surface of the site.

Customary rites and endo-cannibalism

Cannibalistic behaviour may be part of a mortuary rite associated with consumption of the intimate dead (see Keesing 1975, 164–165). Diamond (2000) relates the story of how he became a second-hand ‘witness’ to cannibalism during fieldwork in Papua New Guinea, when he was informed that the departure of one of his team had been precipitated by the death of his son-in-law and that he had to return to his village to partake in eating his body. This form of cannibalism, known as endo-cannibalism, relates to a proscribed mortuary rite that is found in various parts of the world. Goldman (1999, 14) defines this practice as “the consumption of flesh from a member of one’s ‘insider’ group... and seems most usually associated with ideologies about the recycling and regeneration of life-force substances.” Exo-cannibalism he relates to the consumption of flesh from outsiders, such as defeated war enemies, that often includes some form of peri-mortem mutilation and head-hunting to retrieve trophies.

One of the enduring problems with records of cannibalism is that the mortuary type of cannibalism, endo-cannibalism, is confused with exo-cannibalism, single acts of denigration such as eating a vanquished foe(s) or, even, institutionalised cannibalism, represented by repeated highly ritualised acts of cannibalism of many individuals (also referred to as “gustatory cannibalism”). This confusion also extends to mortuary rites that involve defleshing the dead, sometimes involving boiling or burning. Pickering (1999, 66) recounts the following practice from the Mary River area of Queensland, Australia: “The body was reportedly skinned and decapitated, the legs were cut off at the knees and thighs and the arms removed. The anatomical portions were then defleshed through scraping and cutting. The bones were broken to get out the marrow, not for eating, but as part of the flesh disposal process. The flesh was then buried, while the scraped bones were distributed amongst relatives.” In this instance no flesh is consumed, as has been noted in other cases of ritual defleshing of human remains.

Using ethnographic examples, Kantner (1999) posits that in instances where mortuary rites produce peri-mortem fragmentation, the resulting burials would not be intermingled with animal remains, and there would be evidence of formalised and standardised burial treatment. These aspects, therefore, could be used to dissociate mortuary rites, even those involving endo-cannibalism, from exo-cannibalism, although Villa *et al.* (1986a and b) noted that at Fontbrégoua human remains were in separate contexts from those that contained animal remains, yet still sustained their argument that the remains had been exo-cannibalised based on the under-representation of human cranial remains that may have been collected for ritual reasons.

At the Iron Age (*c.* third-second century BC) Tuvan

burial ground at Aymyrlyg, Siberia, Murphy and Mallory (2000) note evidence for both dismemberment, with cutmarks found in the vicinity of articular joint surfaces and, more infrequently, for defleshing, which was especially evident on the scapulae, pelvic girdle, and femora. Even though the occasional burial was found in a disarticulated state lacking proper anatomical alignment, remains treated in this manner were interred separately from those of others and were not fragmented. None of the bones had been broken open to reveal the medullary canal, and none were burnt or demonstrated evidence of having been boiled (*i.e.* there was no pot polish, see below). On this evidence the authors argue for mortuary preparation and the secondary interment of those who died away from the winter settlement. Taylor (2002, 82) questions this assessment; he argues that the lack of bone breakage does not necessarily mean that the flesh removed was not eaten. He notes that in Herodotus’ account of the Issedones, predecessors of those people living in the region in the 3rd-2nd century BC, were said to cut off the flesh alone for consumption, after cooking it. This appears to be a form of endo-cannibalism. Herodotus (4.26) says that sons of a dead man chop up the corpse, mix it with the flesh of goats and sheep, and serve the mixture as part of a feast, while retaining the gilded head of the man as a sacred image. Because the individuals described by Murphy and Mallory (*ibid.*) are found singly and are not commingled, this example seems to bear out Kantner’s hypothesis, except that these remains are not heavily fragmented. It may be, then, that the Fontbrégoua remains are also better interpreted as deriving from endo-cannibalism – especially in the absence of trauma that would suggest a violent encounter (see above).

Trinkaus (1985) previously argued on the basis of circumstantial evidence that the fragmentation of the Krapina remains was due to rock falls and excavation trauma and that striations found on the bones were due to post-depositional processes. He supported this assessment by comparing the skeletal part representation of the Krapina remains with unburied and buried Neanderthal and anatomically modern human remains. This comparison showed that the Krapina remains more closely resembled the skeletal part representation of the buried samples than they did the unburied ones. The element representation included, for example, many of the more delicately constructed bones, such as scapulae and juvenile clavulae. Furthermore, it is unusual to find so many hand and foot phalanges as represented in Trinkaus’ (1985) diagrams. The absence of these remains is often one of the indicators of secondary interment (*cf.* Orschiedt 1997, Valentin and Le Goff 1998) and thus their presence at Krapina would suggest another accumulation mechanism.

In a subsequent analysis, Russell (1987a and b) studied the fragmented remains and the cutmark evidence from Krapina. She assessed all cutmarks and determined whether they were ancient or recent. In the absence of

impact scars, Russell interpreted the longitudinally split long bones as having derived from carnivore activity. She then compared the cutmark distribution of the Krapina hominid remains with butchered animals from the Middle Palaeolithic Dordogne site of Combe Grenal and a Late Woodland (AD 1320 \pm 75 years) Amerindian ossuary sample from Juntunen, Bois Blanc Island, Michigan, USA, where ethnographic records from the following historic period documented a secondary burial rite involving defleshing and reburial of human remains. The placement of cutmarks on the Krapina remains more closely resembles those of the Juntunen material than they do the butchery marks of the Combe Grenal material. Based on this analysis, she argued that the Krapina material derived from a mortuary rite involving defleshing of skeletal elements to obtain 'clean' bones. This cleaning of bones produced multiple and repeated, short incised marks in a 'ladder-series' arrangement that Russell (1987b) associated with scraping dried tissue from bones prior to interment (cf. Olsen and Shipman 1994).

One of the most intriguing studies of the physical evidence of cannibalism is DeGusta's study of Fijian remains from two sites, Navatu (1999) and Vunda (2000), both found on the island of Viti Levu, Fiji. Fiji has long been associated with cannibalism, the concept being used metaphorically (see above), in addition to instances of the behaviour being recorded ethnohistorically (Sahlins 1983). These treatments are unique in that, using the same methods, DeGusta (1999) sustains the argument for cannibalism at Navatu, while denying that the behaviour existed at Vunda.

Disarticulated shell midden material at Navatu, dating to between 100 BC to AD 1900, contains the commingled remains of humans with other non-human taxa, mainly fish, but also including pig, dog, bat (*Pteropus* sp.), rat (*Rattus exulans* and *norvegicus*) and, from more recent periods, goat and cattle, as well as turtles and a variety of bird species. DeGusta (1999) compares the fragmentary commingled human and non-human remains, found in middens, with Late Period burials dating from roughly AD 1800 to 1900. He notes greater similarity between the midden human material and the medium-sized mammal remains than he does with the remains from human burials. Breakage (fracture type) pattern and fragmentation are statistically significantly similar between the medium mammals and humans and different from contemporary human burials. Burning, cutmarks with peeling, percussion pits, and crushing are also characteristics of the medium mammal and human material in the midden, albeit these features are represented in relatively small numbers and are variable among taxa. All of these features are absent in the human burials. Perhaps indicative of differences in cooking methods, the evidence for the pattern of burning associates humans with fish and reptiles, while small and medium-sized mammals and birds form a separate group.

The majority of the human remains that exhibit

burning are cranial and mandibular elements, 67 of 165 fragments. Post-cranial burnt bones included hand elements (N=9), a fragment of a foot phalanx, femoral fragments, one rib fragment, and a thoracic vertebral fragment. Essentially, then, burning affects the extremities more often than it does the thorax. This is in keeping with individuals who have been exposed to fire in a complete state (cf. Owsley *et al.* 1995, Ubelaker *et al.* 1995). From the appearance of the burnt elements in DeGusta's Figure 4, it is clear that burning occurred after fragmentation in that all surfaces are affected, including those from within articulations and those that exhibit peri-mortem fractures (cf. Novak and Kollman 2000).

DeGusta (1999) compares the assemblage from Navatu with that from Juntunen, previously analysed by Russell (1987a and b, see above), and notes that the Fijian assemblage is more fragmentary and has a lower percentage of cutmarks than does this defleshed and secondarily buried assemblage from Michigan. These observations are consistent with Russell's hypothesised differences between mortuary treatment and other behaviours. Moreover, samples derived from violent encounters and secondary burial from the Crow Creek, South Dakota, massacre site (AD 1325) are less fragmented, have a different pattern of element representation - far fewer hand and foot bones and far more *ossa coxae*, mandibulae, and sacra - and no cutmarks or evidence of burning. The midden remains are also distinctively different from Fijian normative burials, but also differ from suspected instances of cannibalism from the American Southwest Anasazi sites of Mancos and Chaco Canyon, where differences in breakage, burning, crushing, and percussion pit frequencies exist. These differences DeGusta attributes to cultural or sample composition differences. Like Villa and colleagues (1986a and b), DeGusta argues that the similarity between the human and non-human remains indicates that either both were processed for consumption or they were processed similarly but were not consumed.

At Vunda, DeGusta (2000) made a similar comparison between medium mammal remains and those of humans, and with human burials. Here, however, he found that breakage (fracture type) and fragmentation to be more common in the midden remains than they are in the human burials. Cutmarks and burning, although found to be less common than breakage and fragmentation in the midden, are virtually absent in the burials. Similarly, peeling, percussion pits, and crushing are rare in both the midden material and in the burials. There are no statistically significant differences between human remains found in the middens and the human burials. The medium mammals possess higher frequencies of cutmarks and burning, percussion pits, and peeling than do the human remains. Because the modifications between the midden human material is not different from that in burials and the medium mammals are somewhat distinct, DeGusta (2000) rejects the hypothesis that the

appearance and distribution of the Vunda human remains were the result of cannibalism. He also notes that the Vunda material is different from that from Navatu in post-cranial part representation and in its evidence for burning, cutmarks, and peeling. Based on these differences, he ascribes the distribution of midden human remains to having derived from disturbed burials. Again, the presence of dry fractures would have helped to support this argument.

Exo-cannibalism: cannibalism as denigration

In order to distinguish amongst the types of situations in which cannibalism occurs the context is all-important. The key between differentiating mortuary rites involving dismemberment and endo-cannibalism is the evidence for denigration of the deceased. Gardner (1999) records cannibalism in the context of raids carried out by men from the Mianmin of central New Guinea in 1960. These raids were undertaken to obtain wives from neighbouring peoples. The men encountered in these raids were killed, their bodies decapitated and entrails removed, and the dismembered remains carried away to be eaten. In addition, a captured, crippled woman who, due to her disability, had trouble keeping up with the raiding party was also killed and parts of her body were also consumed.

Kantner (1999) noted some features of assemblages from the American Southwest that would be expected to occur in instances of cannibalism, in addition to cutmarks, signs of dismemberment, and burning. These are the removal of body parts – hands, feet, or heads – as trophies, evidence of scalping, and most importantly evidence for violent trauma to long bones and crania but in a manner that would not be consistent with marrow or brain extraction. Evidence for denigration might include evidence for a non-normative burial, although this, alone, would not distinguish the patterning of human remains from those of other non-normative rites. The best evidence for denigration would be to find unusual burials with evidence of butchery, like that that characterises animal processing, along with evidence for substantial violence in the form of overkill injuries. Overkill injuries are multiple injuries that are in excess of those necessary to cause death. They would be similar to those meted to war captives who were beaten and wounded and, eventually, butchered and consumed.

One of the most revealing discussions of this type of evidence comes, again, from the American Southwest, where the question is not only about the status of the human remains, but is also coloured by perspectives of the modern descendants of indigenous peoples living in the area today. Dongoske *et al.* (2000, 188) make the following remark: “We also are concerned with how allegations of cannibalism in the popular press affect contemporary Native Americans, especially descendants of the Ancestral Puebloans.” There is no doubt that this type of study produces highly eye-catching leaders in the

popular press, but this polemical situation has also precipitated one of the fullest and most frank discussions of the evidence that has appeared in print to date.

The discussion centres on the fragmented remains of four adults, two adult males and one probable adult male, and an adult female, found inside the largest pithouse, Feature 3, and a child of roughly 11 years of age at death found in the ventilator shaft of the same pithouse at the Cowboy Wash site (5MT10010) in southwestern Colorado, USA. Another two individuals, a child aged about 7.5 years and an adolescent aged about 14 years at death, were found in pithouse Feature 13, the smallest pithouse, at the same site. These burials differed in their appearance and context from primary midden interments from the site. Unlike the latter remains, these were found scattered on the floors of the pithouses, with parts of the same individuals (identified by conjoined elements, skeletal part representation, and developmental age criteria) found in different locations within these structures. Fifty percent of the long bone diaphyses of these individuals had been shattered, producing 1150 pieces in total. These fragments possess numerous peri-mortem breaks in the form of spiral, hinge and conchoidal fractures, as well as evidence of crushing of elements and peeling of cortical bone surfaces, cutmarks, chopmarks, percussion pits and striae. A small minority of elements also demonstrate evidence of burning, both before and after breakage (Lambert *et al.* 2000b), which the authors interpret as evidence for roasting. There was no evidence for pot polish, although the authors concede that the pale colouration of the remains may indicate boiling. The vertebrae were under-represented, as were hand elements. All of the vertebrae recovered bore peri-mortem fractures, which supports the interpretation that they had been crushed. The context in which these remains were found suggest rapid abandonment of the pithouses, which were left to decay into dereliction as standing structures afterwards. The collapse of these structures did not, apparently, play a role in the peri-mortem breakage of the remains (Lambert *et al.* 2000b). The presence of utilitarian and items of personal adornment support the rapid abandonment of the site under what may have been circumstances of distress.

The analysis of this site is unique due to the biochemical analyses applied to potsherds and to a human coprolite found in another pithouse nearby, pithouse Feature 15. Analysis of a number, but not all, of the potsherds showed traces of human myoglobin (which are distinct from those of other animals), a protein found in human muscle tissue, but not in the skin, mucosal lining, or blood of humans. The only potsherds that did produce a positive result came from the remnants of a cooking pot found in association with the viscero-cranial remains of the adolescent found in pithouse Feature 3. The coprolite produced evidence for human myoglobin – and only humanly-derived myoglobin – to the exclusion of that of other animals. It was found in the hearth of pithouse

Feature 15 in an unburnt state, suggesting that it had been deposited after the hearth's last use (Marlar *et al.* 2000). Lastly, using blood residue analysis, two but not all stone tools, and these from pithouse Feature 13 (that associated with the child and adolescent remains), showed signs of human blood (Marlar *et al.* 2000).

This evidence benefited from further clarification offered by the authors after Dongoske *et al.* (2000) questioned the context and interpretation of the human remains, as well as the reliability of the analytical methods used to obtain the results. Dongoske *et al.* (2000, 186) also provide a competing scenario that sees the patterning of these remains resulting from an attack in which individuals were hacked to death (as in modern-day Kosovo and Rwanda), some of whom fell into or over fires and were burned, after which the survivors returned to perform perfunctory burials and, shortly thereafter, abandoned the site. These authors' critique clarified a number of issues. Lambert *et al.* (2000b) did not find evidence of carnivore and other animal activity, such as gnawing and tooth punctures, which indicates that animal activity did not appear to contribute to the patterning of the assemblage. In addition, it is possible that missing elements may have been removed and deposited elsewhere on the surface and lost from the archaeological record as a result (Lambert *et al.* 2000b). Dongoske *et al.* (2000) also question the residue analyses on the stone tools, drawing on the rather unsubstantiated history of such analyses in archaeology. Lambert *et al.* (2000b) reply that previous analyses relied on under-developed laboratory protocols and that such residues relate to the last use of the tool only. The blood could not have come from an abrasion of the skin of those using the tool because blood from such an event would have been removed with subsequent use. With regard to the coprolite, it did not contain any floral material and can be differentiated from other animal dung, including that of dogs, who ingest bone when eating (none was found and neither was dog fur incorporated as a result of self-grooming). The deposit of this coprolite, although in another pithouse, was coeval with the deposition of the human remains and abandonment of other structures at the site.

Other critiques of the cannibalism hypothesis have concentrated on mutilation of the dead to explain the patterning observed. Although the evidence from the American Southwest seems clear evidence for the butchery and subsequent burning of human remains after dismemberment, based on ethnographic evidence of more recent southwestern groups, Darling (1998) and Ogilvie and Hilton (2000) posit that similar fracturing, dismemberment, and defleshing could be the result of the treatment meted to suspected witches, who were not, apparently, the subject of cannibalism. The bodies of such individuals were dismembered or struck with stones in order to disable the corpse so that it would no longer trouble the living. Although neither Darling nor Ogilvie

and Hilton present osteological comparative evidence for the peri-mortem treatment of witches, to demand this of researchers would involve the same constraints as does demonstrating cannibalism itself, the use of human corpses in experimental studies. However, that these assemblages may relate to the presence of notions of witchcraft is not incompatible with other interpretations, including cannibalism, especially if the treatment of witches changed form more recently. In the distant past perhaps suspected witches were consumed. Darling (1998) notes, for example, that witchcraft and cannibalism are linked concepts among the peoples of the American Southwest in the recent past, and this may suggest that the two had some physical relationship in the past. It may not be coincidence that Hough's earliest record of what he interpreted as cannibalised human remains discovered in 1901 recorded the burial of a 'medicine man', an individual interred with ritual paraphernalia similar to that of more recent Zuni priests, near to these assemblages (Turner and Turner 1992). Whatever the case, it may be that both witch execution and cannibalism were relatively rare events that were quite variable in their expression when they did occur. This seems to pose, at present, an insurmountable problem for distinguishing the two behaviours from one another (although see below).

From the same region, Graver *et al.* (2002) argue for extreme violence after their analysis of human remains found at the Grinnell site, Colorado, in what they interpret as a small ceremonial centre dating the late Pueblo II/early Pueblo III periods. The human remains, dated by dendrochronology to 1244 AD were found in a cist adjoining a kiva in a 'mass burial', a position that is reminiscent of the deposition at Cowboy Wash, Colorado, although the latter is found in a pithouse, rather than in a kiva. The remains of eight individuals: three pre-teen children; two subadults 16 to 21 years of age at death; and three adults, two young adult females and a young adult male, were found scattered and disarticulated (i.e. not in proper anatomical alignment) on the floor of a cist and on the floor of the kiva outside the cist, while some were found within a corrugated pot that sat on top of the cist and was surrounded by human bones. The bones were heavily fragmented (only 24, mainly crania, were whole) with spiral fractures occurring on most of the long bone fragments and cutmarks concentrating mainly in the cranial remains (N=126) with another 45 found on post-cranial elements, and with seven chopmarks on a single tibia fragment with these marks predominately found on the proximal and distal ends. Most of the cutmarks on the crania occurred in the nasal, orbital, frontal, maxilla and mandible. Some 5.6% had either been burnt (N=10) or charred (N=11). On the basis of this evidence, the authors interpret that these remains had sustained both sharp and blunt force traumatic injuries, the crania having been flayed (i.e. skinned or defleshed), and the body disarticulated, as if butchered. On the basis of what they describe as a low prevalence of burning, however, and in the absence of

anvil abrasions and pot polish, these authors reject an interpretation of cannibalism. Due to the presence of blunt force cranial trauma that occurs on 20% of the cranial remains and crushing of the viscerocranial skeleton they argue that, instead, these individuals had been beaten to death, after which their bodies were defleshed and the bones further fragmented. In this instance the authors emphasise the traumatic injuries over the evidence for fragmentation to argue in support of an assessment of endemic violence in the American Southwest.

For the ninth-century Backhoe Village site in south-central Utah, USA, Novak and Kollman (2000) make a similar assessment of the remains of nine individuals (five adult males; two adult females, broadly aged from young to older adults; and two juveniles, one roughly nine years and the other about six years of age at death). In this group, evidence for blunt force trauma to the viscerocranial areas and scalping is accompanied by cutmarks, the location of which, near joint surfaces, suggests disarticulation, with anvil abrasions, percussion scars, crushing and peeling evident on long bones, and a relative absence of vertebrae indicating peri-mortem fragmentation. Some of the peri-mortem fragments had also been exposed to fire after they had been fragmented, as indicated by their fracture surfaces being blackened. Based on the sequence of these events, these authors support an interpretation of cannibalism. This level of burning is higher (57%) than that noted by Graver *et al.* (2002) but, like these authors, Novak and Kollman (2000) did not find evidence for pot polish. Uniquely, Novak and Kollman suggest that the thoracic cavity had been flayed and spread based on the pattern of peeling noted in the vicinity of the angle of the ribs. The level of burning, then, separates these two interpretations.

In another interpretation of remains as evidence for violence, Ogilvie and Hilton (2000) present arguments surrounding the remains of 13 individuals, including males, females, children, and infants, ranging in age from one year to over 40 years of age at death, recovered from a Basketmaker III pithouse and kiva, located about 800 m apart. The remnants of the kiva, or ceremonial structure, contained the remains of 12 of these individuals, while the pithouse contained only those of a 30–40 year old female. The kiva remains were found scattered and commingled in the bench and floor areas, with a smaller concentration on an ash lens in the hearth area. These remains were found in association with an artefactual assemblage that included hammerstones, stone flakes, and bone awls; residue analysis of the hammerstones produced signatures of primate blood (presumably, likely to be human since North America has not had natural populations of that Order, other than humans, since the Eocene). These remains were so fragmented that only 23% (651 from 2823 specimens) could be identified to element and thus the authors concentrated primarily on the cranial material in their analyses. In addition to fragmentation, these authors also found evidence of peri-mortem

fractures on 19.6%, burning on 10.9%, cutmarks (1.2%), and impact marks (9.6%), as well as evidence for rodent gnawing and scratching. The cutmarks predominate on the cranial remains (including avulsion of the crowns of anterior teeth) of both adults and children. The authors contend that the fragmentation is in excess of that required for processing of remains for consumption and that the extent of blunt force trauma is responsible for an under-representation of mainly cranio-facial and vertebral elements in both mature and immature individuals, although to a lesser extent in mature individuals. They support an interpretation that these remains represent ritualised violence directed at witches in that entire families were executed in the recent ethnohistoric period by stoning, cutting up, and burning. This assemblage stretches the occurrence of such assemblages further back into prehistory, before 750 AD, and predates the apparent efflorescence of these assemblages in the later Puebloan period in the American Southwest.

In a later American Northeast example, dating to 1390 ± 100 AD, Jamieson (1983) argued for prisoner sacrifice and, possibly, cannibalism based on cutmarked, burnt, and scattered human bones from the Roebuck Site, in eastern Ontario. There is good evidence from this site for defleshing in the form of horizontal cutmarks along the diaphyses of long bones and the manufacture of beads from human bone, gorgets from portions of human crania drilled with holes, and possibly awls or daggers made from human ulnae. Jamieson (*ibid.*) notes, however, that the butchery marks might relate to mortuary rites and, without information on fracture type—whether dry or peri-mortem—it remains a possibility that, as the author avers, ploughing had disturbed the site, and this more recent phenomenon is responsible for the appearance of the remains. Based on the demographic profile of the humanly modified cranial bones, including a minority of children and females, Jamieson suggests that prisoner-sacrifice was practiced. This association, though, is made with scant reference to the presence of peri-mortem injuries that might indicate such an activity; the only mention of this type of evidence comes with Jamieson's observation of cuts along the suprasmatal crest of two temporal bones that he surmises may relate to removal of the ear. Cutmarks are distributed in a pattern suggestive of dismemberment, after which some bones and their flesh were exposed to fire, evidence that could relate to cannibalism. Curiously, Jamieson argues for the certainty of prisoner-sacrifice, but remains much less supportive of cannibalism to explain the patterning and appearance of the remains from the site. Ultimately, the interpretation of the assemblage hinges on practices recorded in the ethnohistoric record of the region.

Here, we see the predominating influence of the context in which researchers pose their questions, analyse, and interpret their data. This observation is at odds with the published sentiments of Turner and Turner (1999, 24), who contend that: "... it is our theoretical position

that bone alone can generate a reliable reconstruction of the death history of a burial or charnel deposit." White (1992, 364), too, although not explicitly supporting this position, argues for further analysis of museum collections, rather than focusing on on-going excavation material. These sentiments are difficult to sustain after reviewing the published literature. It seems that the context is the starting point for such studies because the non-normative nature of them is the first aspect to draw attention in excavation. It is also fundamental to the interpretation of the remains. One of the more recent examples of disarticulated and burnt remains of 41 adults and subadults, mixed with the remains of rats, birds, and fish, comes from the island of Mangaia, southern Cook Islands, in a rock shelter used by humans between 1390 and 1470 AD (Steadman *et al.* 2000). The authors describe this rock shelter as a ritualistic site where "...human body parts, as well as some fish, rats and a few birds were cooked in earth ovens...". These remains are more like the fragmented human remains, possibly from sacrifices, found at temples (*Marae*) on the island than they are like cave burials. This disparity leads the authors to suggest that the rock shelter remains do not appear to be in a mortuary context (Antón and Steadman 2003).

White (1992, 422ff.) lays out the sequence of procedures that are required in the analysis of heavily fragmented and scattered human remains. These are: discovery, exposure, recording, labelling, lifting, transport, washing, sorting by element, attribute recording, refitting, anatomical analysis, photography, and curation. The first six parts of this sequence occur *before* the assemblage reaches the laboratory, while the remaining seven occur once the material reaches the laboratory. Much of this sequence occurs prior to material leaving the field. This emphasises the importance of the context and relationships among parts of the assemblage that can only be recovered in the field. It is the absence of these early parts of the procedure that make interpretations of mortuary treatment difficult to distinguish from one another. The possibility exists, as well, that remains may have gone through more than a single process and the unique signatures are inter-mixed.

Kantner (1999) relies heavily on the archaeological context to aid the interpretation of his factor analyses of sites in the American Southwest exhibiting non-normative burials. One of the three groupings comes from sites with taphonomic indicators associated with heavily fragmented human remains of, in the main, males. These appear to have been rarely intentionally inhumed but were found scattered indiscriminately on the floors of pueblo complex rooms. These individuals possess evidence of interpersonal violence in the form of embedded projectile points and peri-mortem breakage that did not involve heavy fragmentation of the remains, although there are peri-mortem fractures due to what has been interpreted as resulting from rocks being thrown down from above on the individuals. They lack pot polish, anvil abrasions,

cutmarks, and evidence of burning. There is no apparent absence of vertebrae and a reduced frequency of fragmented remains. Nearly all of these sites date to Pueblo III times (AD 1100–1300).

In Kantner's second grouping, which dates to the preceding Pueblo II period (*c.* AD 900 to 1100), are sites that have produced fragmented remains, but include some intentional burials and also those that display pot polish and evidence for scalping. These remains, though, are not found in association with non-human animal remains and consist of groups of all ages and both sexes buried together or in close proximity. A benign climate at this time seems to mitigate against an explanation of survival cannibalism, but evidence for extreme violence—scalping and multiple peri-mortem cranio-facial fractures—and the presence of pot polish in the context leads Kantner (1999, 93) to characterise these as indicative of possible cannibalism. Given the evidence for extreme violence, the cannibalism appears to have been performed to denigrate the deceased and, perhaps, as a means of intimidation and humiliation.

In summary, then, Kantner (1999) argues that these sites represent two different behaviours. Those from Pueblo II times are brutalised casualties of warfare with perhaps some cannibalism, while those from the succeeding Pueblo III period are more likely to represent war casualties who had sustained peri-mortem injuries as a result of violent conflict. The palaeodemographic profiles seem also to support this difference with the latter being mainly males, while the former includes groups of both sexes and more variable ages at death. These profiles, then, are much like the mass graves found at Early Neolithic sites, as at Schletz in Austria (Teschler-Nicola *et al.* 1999) and Talheim in Germany (Wahl and König 1987), as opposed to that from Towton, England (Fiorato *et al.* 2000), which contained the remains of males, solely, and are thus more like the Pueblo III sites described by Kantner (1999).

The context of cannibalism and commensal politics in world later prehistory

The question of cannibalism has been posed within the framework of more recent fascination with the behaviour and its dehumanising features. This framework has contributed to a polemical atmosphere that has as much to do with recent history and ethnic tensions as it does with past history and events. As a result considerations of the social context of cannibalism have been overshadowed by modern reactions to the behaviour. For example, instances have been ascribed to social pathology (Turner 1993, Turner and Turner 1999), a very modern concept. Today, cannibalism is treated as a criminal activity (the raiders discussed by Gardner (1999), above, were tried in court and incarcerated for their actions). Under what social circumstances might such a practice have been given significance in the past, though? In instances of survival

cannibalism, one could posit that the behaviour occurred under stressful environmental circumstances, whether among stranded seafarers (see above) or among protein-starved Aztecs (Harner 1977), although the latter has manifest socio-political overtones, while the former may be attributed to the vicissitudes of climate (*cf.* Fagan 2000).

Many recent studies of food have considered it as more than a means of sustenance and have attempted to delve into the symbolic and social aspects of food and its consumption (Dietler 1990, 2001; Hamilakis 1998; Hamilakis and Konsolaki 2004). These studies indicate that certain foods – meats and various beverages especially – are consumed rather infrequently and only for certain special occasions, such as during festivals or rites of passage. In the absence of evidence for widespread and sustained cannibalism, it would seem that if human flesh was consumed, then this consumption may have been sporadic and, like survival cannibalism, occurred only under very particular circumstances.

Food, its acquisition, preparation, and consumption are intimately linked to obtaining pre-eminent social status, as well as maintenance of the social structure and social organisation of society. A number of researchers have linked the mass consumption of food to feasting (Hayden 1996, Parker Pearson 1999), a social behaviour that takes on a greater role under conditions of emergent or developed social inequality. The social significance of feasting intensifies with the adoption of and dependence on agricultural products that can be stored to support mass consumption (Hayden 1990). Dietler (1996) identifies three patterns of feasting within the political economy: the entrepreneurial, the patron-client, and the diacritic. Although he did not discuss these in the context of cannibalism, all of these could be seen to operate in instances of cannibalism.

The first of these, entrepreneurial feasting, is associated with the work-party feast, in which an individual provides food and refreshment in order to bring together a sufficient work-force to complete an undertaking that brings increased social prestige to the host. Williams (cited in Carneiro 1990, 206) noted that: "Human bodies are sometimes eaten in connection with the building of a temple or canoe; or on launching a large canoe; or on taking down the mast of one which has brought some chief on a visit; or for feasting of such as take tribute to a principal place." The second of these, the patron-client feast, is a formalised use of the feast to symbolically legitimise unequal social power and is associated with the lavish feasts of chiefs in pre-state societies. As Carneiro (1990, 205) remarks, "Although commoners were allowed to partake of human flesh, it was chiefs who were by far the most accomplished cannibals. Many of the Fijian chiefs were famous for the quantity of human flesh they had consumed." The third of these types of feast, the diacritic, involves the use of special foods and special means of preparation and/or service that symbolically reifies rank differences in social groups. This type involves

elaborate service vessels from which exotic or difficult to produce foods or drinks are served. These may be similar to those found in ancient Mesoamerica, where powerful individuals engaged in sacrifice and consumption on special feast days associated with a deity when the "...sacrificed person is quartered and the meat is prepared as a meal with squash flowers for the gentlemen and principals, who eat it in a ritual manner" (Fernández, quoted in Turner and Turner 1999, 417).

Hayden (1996, 137ff) argues that these socially competitive feasts can be identified in the archaeological record by the following:

1. Abundant resource bases capable of providing surpluses
2. Special foods used for feasting
3. Special vessels used for serving feasting food
4. The use of prestige items that food surpluses could be converted into
5. The occurrence of special grounds or structures where feasting events could be held
6. The occurrence of 'Triple A' (ambitious, aggressive, accumulative) individuals having more wealth and influence than others in the community. They are also called aggrandizers, accumulators, and acquirators.

The question is, then, does cannibalistic behaviour fit within this scheme. Given that there seems to be no evidence that any human society subsists for any extended period of time solely on eating members of their own kind (save, perhaps among the Aztecs), the act of cannibalism should be seen, perhaps, as an extension of feasting. From the published literature, the vessels that would have served this purpose would help us to understand how such actions were perceived. Were such vessels, like the corrugated pots found with human remains in them in the American Southwest or the 'great red and yellow bowl', similarly associated with the remains of humans found at Azcapotzalco, Mexico, dating from the Teotihuacán period (Harner 1977), considered part of feasting paraphernalia? If so, one would expect to find evidence of cannibalistic behaviour associated with certain kinds of vessels and special implements, such as the 'cannibal forks' of Fiji (Carneiro 1990, 204) reserved for consumption of feasting foods, including human flesh. Turner and Turner (1999) note the ceremonial and ritual context of sacrificial and cannibalistic rites in Mesoamerican feasts centred on the consumption of special foods, including those derived from humans. This may involve bouts of consumption where a number of individuals are consumed, or indeed, only one, perhaps to symbolise the triumph of the consumer and his or her group over the consumed. This is often done to capture the essence or the personal strength of the individual consumed, but can also be viewed, simultaneously, as an act of supreme denigration and disempowerment by those contributing individuals who are eaten (see Carneiro 1990).

Kantner (1999) places what appear to be the relatively rare instances of cannibalism in the American Southwest in this context, where Pueblo II times are characterised by social inequality on a much grander scale than in preceding Basketmaker and Pueblo I (prior to AD 900) times (see also Haas 1990). Turner and Turner's (1999) survey supports the view that the period between 900 and 1300 AD in the area occupied by the Anasazi experienced violence on a previously unprecedented scale. In their review of 76 sites with evidence of fragmented remains found in non-normative burial contexts, Turner and Turner (1999) accept 38 of 76 sites to be valid; 286 individuals of all ages and both sexes come from these sites and fit the criteria for cannibalism.

Importantly, another 445 individuals from their survey had sustained injuries due to violent trauma, again with all ages and both sexes being affected. These include five sites associated with towers interpreted as defensive structures that occur in the Largo Gallina area of New Mexico (Turner and Turner 1993). They do not meet the criteria for cannibalised remains but appear to have resulted from violent raids initiated in the area in the same period, 1100–1300 AD, in which suspected cannibalism also occurred. Although they possess some of the same features of cannibalised remains, such as a lack of formal burial of multiple individuals, evidence for peri-mortem burning in one case (from what has been interpreted as a result of a burning roof collapse), and fragmentation of remains, they lack the level of fragmentation, anvil abrasions, and cutmarks associated with cannibalised remains. In addition, these bodies are mostly complete, with vertebrae well-represented. When they do possess anvil abrasions, these are associated with signs of peri-mortem trauma in the form of embedded projectile points, mutilation, scalping, and body part removal (hands and feet) as trophies. Viscero-cranial trauma in these remains occurs without the anvil abrasions that would indicate butchery directed at removal of the brain. Importantly, the sex profile of these remains is skewed with the remains of males outnumbering those of females in a 5:1 (26 to 5) ratio and with the majority (51 out of 55) over the age of 12 years at death. Thus the association of these remains with defensive structures, the evidence for peri-mortem trauma, and the nearly entirely adult male make-up of these sites serves to differentiate them from those with evidence for cannibalised remains. Turner and Turner (1993) note that two of these sites could have resulted from cannibalism had they demonstrated evidence for burning or heating of remains. It is thus highly possible that the two forms of behaviour, violence and cannibalism, could co-occur at the same site, just as they seem to co-occur in time.

On the basis of previously identified material culture connections with Mesoamerican state-level societies (including the burial of an individual exhibiting dental modification like that practiced in Mesoamerica, see Geller, this volume), where there is ample evidence of

institutionalised sacrifice and cannibalism recorded ethnographically, ethnohistorically, and through the study of human remains – Turner and Turner (1999, 484) argue that "...the majority of Chaco Anasazi cannibal episodes resulted from acts of violent terrorism, possibly combined with ritual, incited by a few zealous cultists from Mexico and their descendant followers who possessed the deadly knowledge of certain Mexican socio-religious and warfare practices." Cannibalism in this context may have been used as a means of social control and intimidation. It would have served to cement the loyalty of the group by distinguishing the prestige and power of leaders who could dehumanise others by transmuting them into comestibles, while acting as a warning to dissenters, as well as outsiders. In this context, it is perhaps illustrative to note that at Cowboy Wash 5MT10010 the only meat consumed by those leaving behind their droppings was apparently human (Billman *et al.* 2000, Lambert *et al.* 2000b, 404). This uniquely human signature suggests that the consumption of human flesh may have occurred over a very short time, more like that associated with consumption of a special food in a feast.

Conclusion and further research

From the appearance of Table 17.1, the procedures for studying assemblages of peri-mortally fragmented remains are not uniform, nor is their reporting. It is also clear that the level and standard of recording requires more sustained attention. There are many examples reviewed here (those for which there is only a "YES" indicated) where a particular feature is only mentioned but without identifying the level or intensity of the feature noted. The depiction of features, too, needs to be improved with further use of photographs, line drawings of the location of traits for comparison across sites, and greater use and publication of SEM images in order to bolster interpretations. It comes as no surprise, then, that in summarising the osteological features associated with an interpretation of cannibalism, Kantner (1999, 84) writes: "The conclusion, therefore, is that none of the taphonomic criteria constitutes definitively convincing evidence for the occurrence of cannibalism." He (*ibid.*) envisions the application of biochemical evidence as a means of refining the arguments to support the interpretation of cannibalism. The Cowboy Wash site in southwestern Colorado has since seen the application of such evidence, where biochemical analysis of faeces in association with human skeletal remains with cutmarks consistent with those resulting from butchery appears to have confirmed that the bodies of individuals were consumed in the prehistoric American Southwest during Pueblo times (*c.* 1150 AD) (Marlar *et al.* 2000). Due to the unusual contextual features of this site, the protocol is unique, combining osteological, archaeological, and biochemical evidence of excreted faeces, and not applicable in the others reviewed here.

In the absence of such evidence, it is particularly clear that there is no single trait or traits of an assemblage that can be easily and uniquely associated with cannibalism. In their consideration of the influence of cultural values on the form that cannibalism takes, Rautman and Fenton (2005, 338) note that "...cannibalism per se has no necessary correlation with any particular postmortem treatment of the human body." The easy alacrity with which scattered human remains were linked with cannibalism in the past can certainly no longer be sustained. What, though, of cannibalism itself from the study of bone assemblages? It seems that, although there are well-founded means to demonstrate that human remains have been processed, there is no clear way to distinguish a mortuary treatment involving defleshing and dismemberment from cannibalism. The longitudinal splitting and fragmentation of some assemblages do not fit easily with this mortuary rite, however, but this combination of features is recorded ethnographically, such as with the treatment of suspected witches in the American Southwest. The separation of bone fragments over an area, though, seems inconsistent with this peri-mortem treatment, where – in the absence of subsequent disturbance – helically broken bone fragments would be expected to be found in close approximation to one another – like the victims of suspected rock falls.

Distinguishing endo-cannibalism from exo-cannibalism may depend on finding evidence for cannibalistic behaviour in conjunction with evidence for peri-mortem injuries, although as in Graver *et al.*'s (2002) and Novak and Kollman's (2000) examples, this is often seen as evidence for death in violent circumstances without invoking cannibalism. At the present time, it is clear that there is no agreed upon means by which to distinguish endo-cannibalism from exo-cannibalism, although as noted above some of the associated part representations and spatial patterns may be suggestive of each of these (see Villa *et al.* 1986b, Kantner 1999). Due to similarities between carnivore damage to human remains and those modified by humans, a fundamental covering argument must be to exclude carnivore involvement in the creation of such assemblages. Part of torture or ceremony, though, might also include feeding animals on human flesh, the fate of the torsos of sacrificed individuals that were fed to animals in the ruler's zoo in the Aztec Empire (Harner 1977).

Whether researchers interpret heavily fragmented human remains as evidence for prisoner-sacrifice (Jamieson 1983), witch torture and killing (Darling 1998), genocidal attack (Dongoske *et al.* 2000), being beaten to death (Graver *et al.* 2002), survival cannibalism (Keenleyside *et al.* 1997), gastronomic cannibalism (Fernández-Jalvo *et al.* 1999), civil war (Novak and Kollman 2000), massacre (Melbye and Fairgrieve 1994), ritualised violence (Ogilvie and Hilton 2000), institutionalised cannibalism (Turner and Turner 1999), raiding and cannibalism (Lambert *et al.* 2000a and b), or social pathology (Turner 1993), all seem to agree

that these human remains indicate periods of local environmental and/or social instability that produced interpersonal violence and, in some cases, what may have been endemic warfare (see also LeBlanc 1999). Novak and Kollman (2000) document similar bone pattern assemblages at the ninth-century Backhoe Village site in south-central Utah, USA, among Fremont horticulturalists that predate the Anasazi sites further to the south, so the same types of human remains deposits may also be found in the Great Basin, outside the Anasazi Culture area. In essence, then, this may be part and parcel of the development of more highly socially integrated (*i.e.* complex) societies in this area. As Earle (1987, 293) notes: "Intense warfare characterizing stateless societies may favor [the development of] regional chiefdoms." In others, similar patterning may be minimally interpreted as an elaboration of funerary rites, whether cannibalism can be sustained or not.

Essentially, no-one disagrees with the evidence for peri-mortem fracturing and most of the physical features (save, perhaps, pot polish – see Kantner 1999) and unusual burial contexts of these assemblages. What is more revealing about these various arguments is that researchers are more accepting of the occurrence of what must have been endemic violence for decades, if not centuries, perpetrated on men, women, children, and infants – even seeing such an interpretation as 'more conservative' (Graver *et al.* 2002) than one of cannibalism. This perhaps has more to say about how violence is viewed (and accepted) today. Apparently, modern dispositions are better able to cope with interpretations of what must have been considerable brutality and cruelty to the living or, potentially, desecration of the deceased if fragmentation occurred immediately after death, as long as it was perpetrated without then eating the flesh of the deceased.

In the absence of faecal material (*i.e.* coprolites) upon which to perform biochemical assays, it seems that one of the most direct forms of evidence for cannibalised human remains may be tooth punctures like those noted by White (1992) on the Mancos remains, and which DeGusta (1999, 225) notes as an untested possibility in the Navatu remains from Fiji. If this type of evidence could be clearly distinguished from similar punctures produced by animals, then this would seem to be an immensely important indicator of cannibalism. At least, it would suggest mastication of human bones by humans. Tooth puncture marks from some carnivore species have been differentiated from measurements made on moulds of the pits produced by animal teeth (Pickering *et al.* 2004 and references therein). These could be supplemented by SEM analysis to aid further differentiation of human and non-human tooth marks (see also Blumenshine *et al.* 1996). Perhaps due to the lack of comparative studies, this feature of the Mancos remains has not received much attention in literature published since. Kantner (1999) in his synthesis of the taphonomic features of apparently cannibalised remains does not mention it.

As in other instances when arguments are based on the physical evidence of human remains, the recovery and recording of the burial context and knowledge of the general pattern of the mortuary variability of a given region over contiguous periods of time is essential. If cannibalism is an adjunct to, or an extension of, feasting and power politics, then the potential of environmental upheaval to produce or exacerbate these processes needs to be addressed as well, if for no other reason than to rule out cases of cannibalism related to short-term environmental disturbances. As White (1992) has previously noted, there is a need for further experimental work on taphonomic aspects of animal and human remains assemblages. These are required to be specific to different environmental circumstances (*cf.* Andrews and Cook 1985).

In the absence of analogous controlled instances of human cannibalism (cases of modern human cannibalism being rare and the physical features of such remains being unpublished as far as the authors are aware), interpretive models based on analogies drawn from the behaviours of non-human primate hunting and consumption of kills might provide some additional insights. As White, the Turners, and other researchers have noted, the assemblages associated with suspected cannibalism possess a relative absence of vertebrae, a feature usually attributed to the preparation and consumption of these cancellous-filled bones, but which could also be associated with variable preservation and heavily disturbed deposits (see Outram 2004), some of which may represent post-mortem manipulation of the dead, as in secondary burial. In a study of chimpanzee carnivory at Gombe National Park, Tanzania, Plummer and Standford (2000) noted the relative paucity of these elements in hunted red colobus monkey (*Colobus badius*) remains, which make up only a little over 2.0 % of the surviving remains. Cranial elements (60.0%) and hemi-mandibulae (40.0%) contributed the greatest number of surviving elements, with those of the appendicular skeleton and pectoral and pelvic girdles falling in between, forming between 11.1 and 22.2 % of remains. These authors also note the occurrence of chimpanzee canine puncture marks in the crania of these monkeys. As in the earliest instances of cannibalism (see above), these remains were not cooked or roasted before consumption. This type of non-human primate data, although drawn from a study of a small number of individuals (N=5) appears to provide some support for the association of some of the indicators of cannibalism with archaeologically retrieved assemblages thought to have been cannibalised by humans. This type of research is a good complement to investigations of human remains with a recent history or reports of cannibalism (*cf.* Rautman and Fenton 2005). Without these further controls and concerted efforts, it may not be possible to dissociate closely related mortuary behaviours and our interpretations will continue to be held hostage to equifinality.

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